

# PROJECT MANUAL: VOLUME 1 of 2

Divisions 1 thru 12: Civil, Structural & Architectural

---

New Corporate Offices for:  
**SOUTH KENTUCKY RURAL ELECTRIC COOPERATIVE**

Somerset, Kentucky

2008-00371

---

**Owner**

SKRECC

925-929 North Main Street  
Somerset, Kentucky 42501

T: (606)-678-4121 F: (606) 679-8279

RECEIVED

JAN 22 2010

PUBLIC SERVICE  
COMMISSION

**Architect**

**Tate • Hill • Jacobs: Architects, Inc.**

346 East Main Street  
Lexington, Kentucky 40507

T: (859) 252-5994 F: (859) 253-1607

**Landscape Architect**

**John L Carman & Associates**

310 Old Vine Street  
Lexington, Kentucky 40507

T: (859) 254-9803 F: (859) 255-8625

**Structural Engineer**

**Brown + Kubican**

121 Prosperous Place  
Lexington, Kentucky 40509

T: (859) 543-0933 F: (859) 543-0733

**Mechanical Engineers**

**GRW**

801 Corporate Drive  
Lexington, Kentucky 40503

T: (859) 223-3999 F: (859) 223-8917

**Electrical Engineers**

**CDP**

3250 Blazer Parkway  
Lexington, Kentucky 40509

T: (859) 264-7500 F: (859) 264-7501

---

Date: April 7, 2008

Set Number: \_\_\_\_\_



DOCUMENT 00010

TABLE OF CONTENTS

DIVISION 2 - SITE CONSTRUCTION

- 02000 Site Work
- 02230 Clearing
- 02300 Earthwork
- 02301 Storm Water Pollution Prevention Plan
- 02361 Termite Control
- 02552 Ground Loop – Heat Pump Piping
- 02630 Storm Utility Drainage Piping
- 02722 Site Signage
- 02741 Hot-Mix Asphalt Paving
- 02751 Cement Concrete Pavement
- 02764 Pavement Joint Sealants
- 02821 Chain-Link Fences and Gates
- 02826 Ornamental Metal Fences and Gates
- 02920 Lawns and Grasses
- 02930 Exterior Plants

DIVISION 3 - CONCRETE

- 03130 Permanent Forms: Insulating Concrete Forms
- 03131 Insulated Concrete Forms Accessories – Integrated Assemblies
- 03300 Cast-In-Place Concrete

DIVISION 4 - MASONRY

- 04065 Masonry Mortar and Grout
- 04810 Unit Masonry Assemblies

DIVISION 5 - METALS

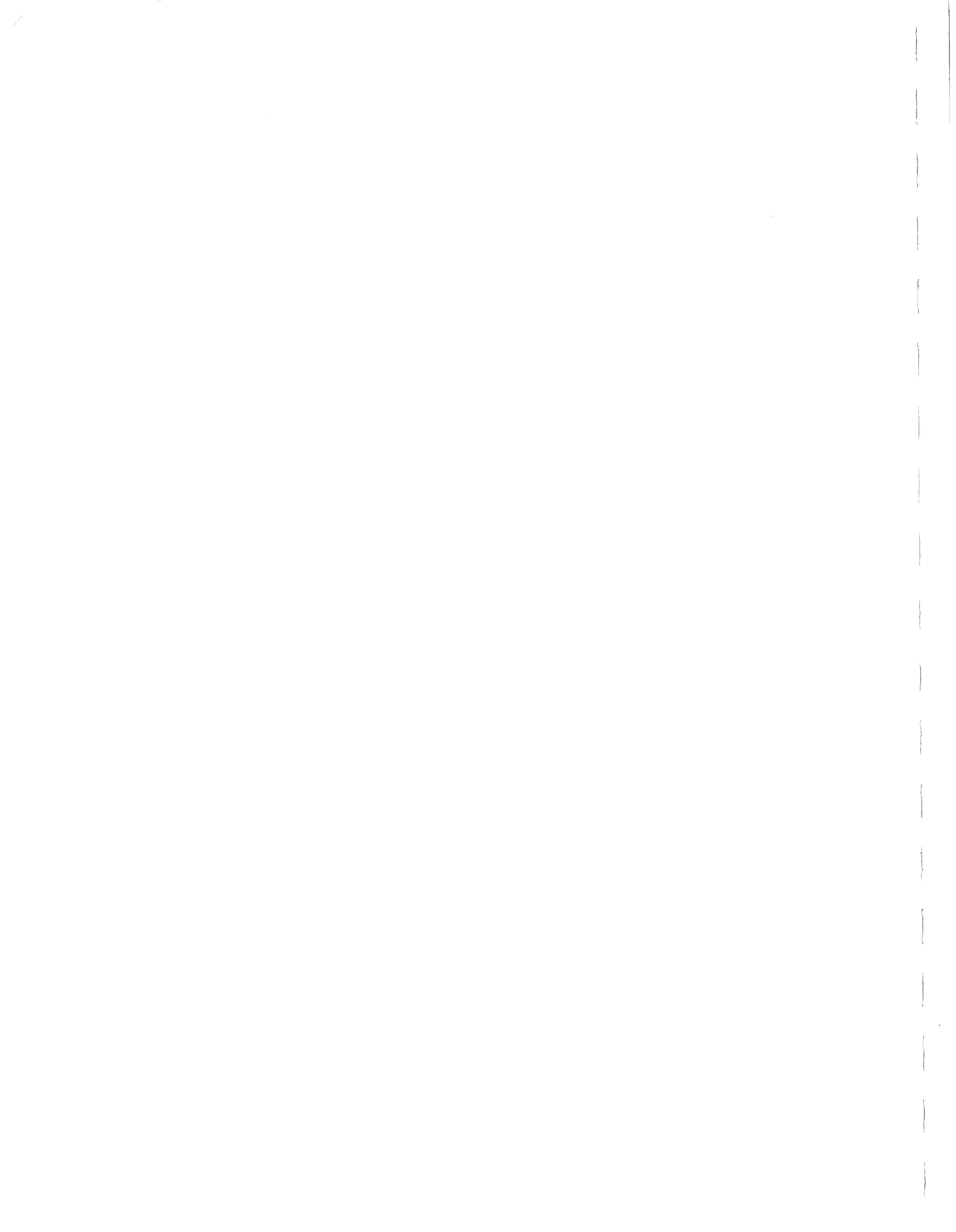
- 05100 Structural Anchors
- 05120 Structural Steel Framing
- 05310 Steel Decking
- 05400 Cold Formed Metal Framing - Structural
- 05475 Shop Fabricated Cold Form Metal Trusses
- 05500 Metal Fabrications
- 05510 Metal Stairs and Ladders
- 05520 Handrails and Railings
- 05580 Architectural Metal Column Covers

DIVISION 6 - WOOD AND PLASTICS

- 06001 Carpentry
- 06170 Heavy Timber Roof Decking
- 06410 Custom Cabinets

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

- 07212 Board Insulation
- 07214 Foamed-In-Place Insulation
- 07270 Air Barriers





- 07613 Manufactured Sheet Metal Roofing
- 07620 Sheet Metal Flashing and Trim
- 07714 Gutters and Downspouts
- 07840 Firestopping
- 07900 Joint Sealers

DIVISION 8 - DOORS AND WINDOWS

- 08114 Standard Steel Doors
- 08115 Standard Steel Frames
- 08212 Flush Wood Doors
- 08310 Access Doors and Panels
- 08333 Overhead Coiling Doors
- 08410 Metal-Framed Storefronts
- 08450 All-Glass Entrances
- 08520 Aluminum Windows
- 08710 Door Hardware
- 08800 Glazing
- 08830 Mirrors

DIVISION 9 - FINISHES

- 09260 Gypsum Board Assemblies
- 09300 Tile
- 09440 Plastic Matrix Terrazzo
- 09510 Acoustical Ceilings
- 09650 Resilient Flooring
- 09686 Sheet Carpet
- 09900 Paints and Coatings

DIVISION 10 - SPECIALTIES

- 10100 Visual Display Boards
- 10140 Signage
- 10165 Plastic Laminate Toilet Compartments
- 10500 Lockers
- 10523 Fire Extinguishers and Cabinets
- 10800 Toilet Accessories

DIVISION 11 - EQUIPMENT

- 11132 Projection Screens
- 11150 Banking Equipment
- 11161 Dock Levelers
- 11165 Dock Bumpers

DIVISION 12 - FURNISHINGS

- 12486 Floor Mats
- 12494 Roller Shades

DIVISION 13 - SPECIAL CONSTRUCTION

- 13121 Pre-Engineered Buildings

DIVISION 14 - CONVEYING SYSTEMS

- 14245 Hydraulic Passenger Elevators



SECTION 02000

SITE WORK

PART 1 GENERAL

1.01 DESCRIPTION

- A. These general site work requirements apply to all site work operations. Refer to Division 2 specification sections for specific general, product, and execution requirements.

1.02 QUALITY ASSURANCE

- A. Comply with all applicable local, state, and federal requirements regarding materials, methods of work, and disposal of excess and waste materials.
- B. Obtain and pay for all required inspections, permits, and fees. Provide notices required by governmental authorities.

1.03 PROJECT CONDITIONS

- A. Contractor shall locate and identify existing underground and overhead services and utilities within contract limit work areas prior to commencement of work to verify utility location or omissions on plans. Provide adequate means of protection of utilities and services designated to remain. It shall be the Contractor's responsibility to contact all utility companies to verify location of existing utilities. Repair utilities damaged during site work operations at Contractor's expense.
- B. Arrange for disconnection, disconnect and seal or cap all utilities and services designated to be removed before start of site work operations. Perform all work in accordance with the requirements of the applicable utility company or agency involved.
- C. When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the applicable utility company and Landscape Architect immediately to obtain procedure directions. Cooperate with the applicable utility company in maintaining active services in operation.
- D. Locate, protect, and maintain benchmarks, monuments, control points and project engineering reference points. Re-establish disturbed or destroyed items at Contractor's expense.
- E. Perform site work operations and the removal of debris and waste materials to assure minimum interference with streets, walks, and other adjacent facilities.
- F. Obtain governing authorities written permission when required to close or obstruct street, walks and adjacent facilities. Provide alternate routes around closed or obstructed street, walks and adjacent facilities. Provide alternate

routes around closed or obstructed traffic ways when required by governing authorities.

- G. Control dust caused by the work. Dampen surfaces as required. Comply with pollution control regulations of governing authorities.
- H. Protect existing buildings, paving, and other services or facilities on site and adjacent to the site from damage caused by site work operations. Cost of repair and restoration of damaged items at Contractor's expense.
- I. Protect and maintain street lights, utility poles and services, traffic signal control boxes, curb boxes, valves and other services, except items designated for removal. Remove or coordinate the removal of traffic signs with the applicable governmental agency. Provide for temporary relocation when required to maintain facilities and services in operation during construction work.

## PART 2 PRODUCTS

### 2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment: As selected by Contractor, except as indicated.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Examine the areas and conditions under which site work is performed. Do not proceed with the work until unsatisfactory conditions are corrected.
- B. Consult the records and drawings of adjacent work and of existing services and utilities, which may affect site work operations.

END OF SECTION

SECTION 02230

SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Protecting existing trees, shrubs, groundcovers and grass to remain.
2. Removing existing trees, shrubs, groundcovers and grass.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and abandoning site utilities in place.
7. Temporary erosion and sedimentation control measures.

- B. Related Sections include the following:

1. Division 1 Section "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities[, and temporary erosion and sedimentation control procedures].
2. Division 1 Section "Execution Requirements" for verifying utility locations and for recording field measurements.
3. Division 2 Section "Tree Protection and Trimming" for protecting trees remaining on-site that are affected by site operations.
4. Division 2 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.
5. Division 2 Section "Lawns and Grasses" for finish grading including preparing and placing planting soil mixes and testing of topsoil material.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

- B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

#### 1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

#### 1.5 SUBMITTALS

- A. Record drawings, according to Division 1 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

#### 1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

### PART 2 - EXECUTION

#### 2.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

## 2.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control Drawings.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

## 2.3 TREE PROTECTION

- A. Erect and maintain temporary construction fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
  - 1. Do not store construction materials, debris, or excavated material within fenced area.
  - 2. Do not permit vehicles, equipment, or foot traffic within fenced area.
  - 3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
  - 1. Cover exposed roots with burlap and water regularly.
  - 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
  - 3. Coat cut faces of roots more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
  - 4. Backfill with soil as soon as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.
  - 1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
  - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Architect.

## 2.4 UTILITIES

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
  1. Arrange with utility companies to shut off indicated utilities.
  2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  1. Notify Architect not less than two days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Architect's written permission.
- D. Excavate for and remove underground utilities indicated to be removed.

## 2.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
  1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
  3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches (450 mm) below exposed subgrade.
  4. Use only hand methods for grubbing within tree protection zone.
  5. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
  1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

## 2.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
  1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.



- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Do not stockpile topsoil within tree protection zones.
  - 2. Stockpile surplus topsoil to allow for respreading deeper topsoil.

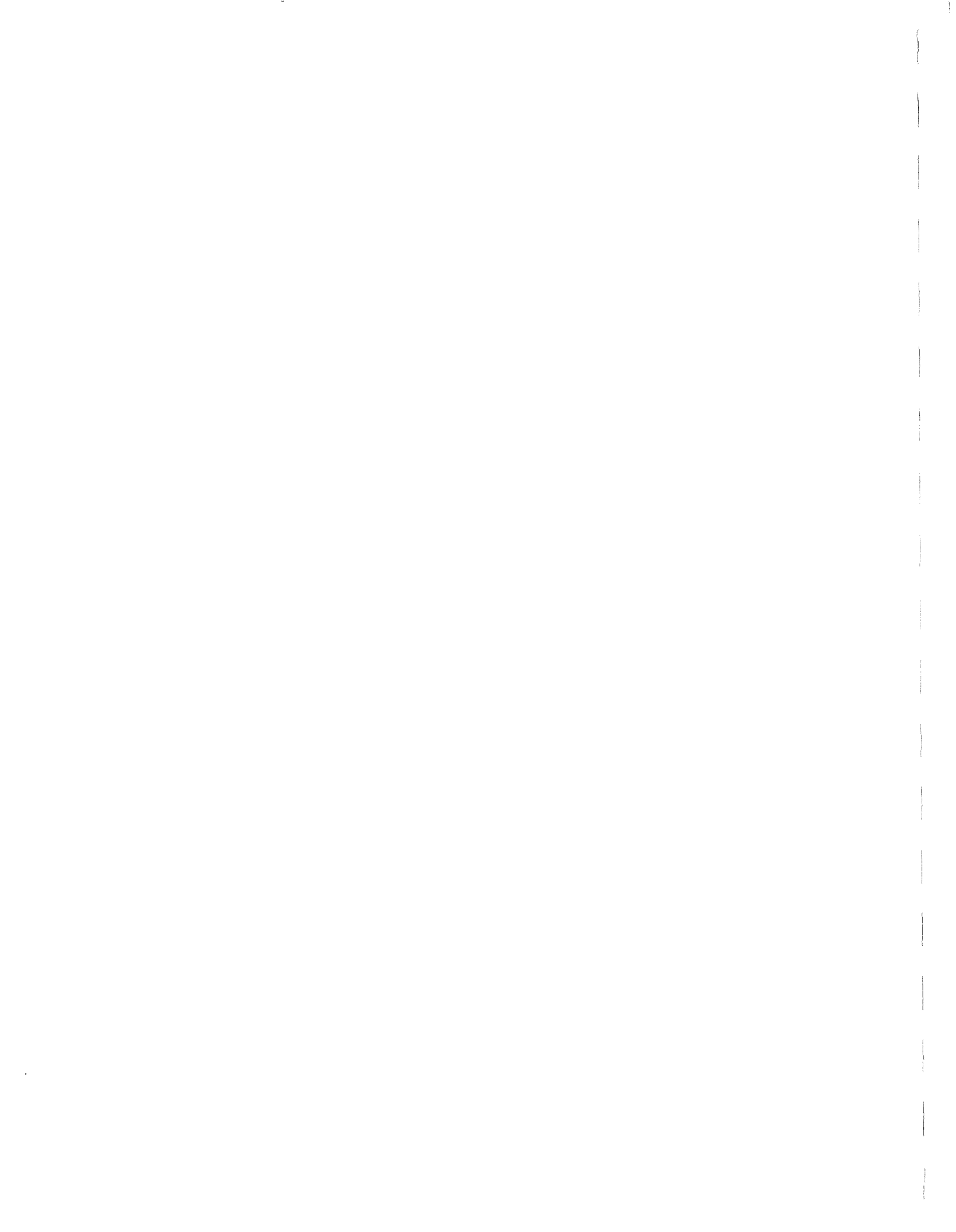
## 2.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
  - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
  - 2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

## 2.8 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
  - 1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION



SECTION 02300

EARTHWORK

PART 1 GENERAL

1.01 DESCRIPTION

- A. Perform earthwork as shown and specified. The work includes:
  - 1. Site grading and filling to indicated elevations and contours.
  - 2. Excavating and backfilling structure footings and foundations.
  - 3. Subgrade preparation for structure slabs, curbs, walks and paving.
  - 4. Topsoil distribution and finish grading.
  - 5. Granular base under structure slabs-on-grade.
  - 6. Erosion control
  
- B. Related Work:
  - 1. Section 02230: Site Clearing.
  - 2. Section 02630: Storm Drainage.
  - 3. Section 02920: Lawns and Grasses.
  - 4. Section 02741: Hot-Mix Asphalt Paving.
  - 5. Section 02751: Cement Concrete Paving.
  - 6. Section 16000: Electrical.

1.02 QUALITY ASSURANCE

- A. Comply with Section 02000 requirements.
  
- B. Testing and inspection: Performed by a qualified independent testing laboratory, under the supervision of a registered professional engineer, specializing in geotechnical or soils engineering.
  
- C. Provide and pay for testing and inspection during earthwork operations. Laboratory, inspection service, and Geotechnical Engineer shall be acceptable to the Landscape Architect.
  
- D. Materials and methods of construction shall comply with the following standards:

1. Kentucky Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.
2. American Society for Testing and Materials, (ASTM).
3. American Association of State Highway and Transportation Officials, (AASHTO).
4. National Fire Protection Association, (NFPA).

#### 1.03 SUBMITTALS

- A. Provide samples of materials proposed for use. Forward samples to testing laboratory for testing as directed by the Geotechnical Engineer.
- B. Submit reports and certifications for testing and inspection of the following:
  1. Fill and backfill materials.
  2. Compaction operations.
  3. Foundation excavations and footing subgrade.
  4. CBR values for subgrade surfaces of driveways & parking lots.

#### 1.04 PROJECT CONDITIONS

- A. Known underground and surface utility lines are indicated on the drawing. Contractor is responsible for verifying location of existing utilities.
- B. Protect existing trees, plants, lawns, and other features designated to remain as part of the landscaping work.
- C. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods, as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.
- D. Underpin adjacent structure (s), including utility service lines, which may be damaged by excavation operations.
- E. Promptly repair damage to adjacent facilities caused by earthwork operations. Cost of repair at Contractor's expense.
- F. Promptly notify the Landscape Architect of unexpected sub-surface conditions.
- G. Protect bottoms of excavations and soil beneath and around foundation from frost and freezing.
- H. Grade at excavations to prevent surface water draining into excavated areas.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. All fill material is subject to testing and inspection.
- B. Fill materials: Inert subsoil material free of organic matter, rubbish, debris, and rocks greater than 6" diameter and meeting the following requirements:
  - 1. Plastic index of not more than 30 - ASTM D424.
  - 2. Minimum laboratory dry weight at optimum moisture content of 100 pounds per cu. ft.
  - 3. Utilize off-site borrow fill material when borrow fill is required to complete the work. Verify suitability of off-site borrow fill material and locations with the Geotechnical Engineer.
  - 4. Proposed fill material shall be inspected prior to use in the work.
  - 5. Suitable excavated materials removed to accommodate new construction may be used as fill material subject to Geotechnical Engineer's inspection and approval.
- C. Granular base: AASHTO M43, #2 or #57 clean uniformly graded stone or gravel as noted on plans.
- D. Granular fill: AASHTO M43, #2, #57 or #9 clean uniformly graded stone or gravel as noted on plans.
- E. Topsoil: Natural, friable, fertile soil characteristic of productive soil in the vicinity, reasonably free of stones, clay lumps, roots, and other foreign matter.
  - 1. Utilize on-site stockpiled topsoil as required to complete the work.
  - 2. Proposed topsoil material shall be acceptable to the Landscape Architect.
- F. Rip rap: Round carbonate stones or fragmented carbonate rock, dense, sound, and free of cracks or seams, shale, clay, friable materials and debris, placed at thickness indicated on plans. Provide all rip rap materials as required to complete the work.
- G. Other materials required for proper completion of work: As selected by Contractor and acceptable to Landscape Architect.
- H. Filter fabric: Geotextile fabric used within rock check dams shall be KYDOH Section 843 - Type IV.
- I. Silt fence - One of the following products or approved equal:
  - 1. Prefabricated product Amoco 2130.

2. Contech C35NW stapled to wooden stakes and supported by wire mesh per detail.
3. Contech C50NW stapled to wooden stakes without wire mesh per detail.

### PART 3 EXECUTION

#### 3.01 PREPARATION

- A. Establish extent of grading and excavation by area and elevation. Designate and identify datum elevation and project engineering reference points. Set required lines, levels, and elevations.
- B. Do not cover or enclose work of this Section before obtaining required inspections, tests, approvals, and location recording.

#### 3.02 EXISTING UTILITIES

- A. Before starting grading and excavation, establish the location and extent of underground utilities in the work area by contacting utility companies. Exercise care to protect existing utilities during earthwork operations. Perform excavation work near utilities by hand and provide necessary shoring, sheeting, and supports as the work progresses.
- B. Maintain, protect, relocate, or extend as required existing utility lines to remain which pass through the work area. Pay costs for this work, except as covered by the applicable utility companies.
- C. Protect active utility services uncovered by excavation.
- D. Remove abandoned utility service lines from areas of excavation. Cap, plug, or seal abandoned lines and identify termination points at grade level with markers.
- E. Accurately locate and record abandoned and active utility lines rerouted or extended on project record documents.

#### 3.03 SITE GRADING

- A. Perform grading within contract limits, including adjacent transition areas, to new elevations, levels, profiles, and contours indicated. Provide subgrade surfaces parallel to finished surface grades. Provide uniform levels and slopes between new elevations and existing grades.
- B. Grade surfaces to assure areas drain away from structures and to prevent ponding and pockets of surface drainage. Provide subgrade surfaces free from irregular surface changes and as follows:

1. Rough grading: Plus or minus 0.10 ft. subgrade tolerance. Finish required will be that ordinarily obtained from either blade-grader or scraper operations.
  2. Provide subgrade surface free of exposed gravel or stone exceeding 4" in greatest dimension in paved areas or 1" in lawn and planting areas. Areas with concentrated amounts of stone of any size including smaller than 1", such as stockpile/staging areas, edges of pavement or utility trenches, shall be raked clean of stone prior to placement of topsoil.
  3. Lawn and planting areas: Allow for minimum 4" average depth of topsoil at lawn areas, and 12" depth at planting areas, except as otherwise indicated on the drawings.
  4. Paved areas: Shape surface of subgrade areas to line, grade, and cross-section indicated. Provide compacted subgrade suitable to receive paving base materials. Subgrade tolerance plus 0, minus 1/2".
  5. Granular base: Grade subgrade surface smooth and even, free of voids to the required subgrade elevation. Provide compacted subgrade suitable to receive granular base materials. Tolerance 1/2" in 10'-0".
- C. Grading at existing trees to remain:
1. Perform grading, within branch spread of existing trees to remain, by hand methods to elevations indicated.
  2. Cut roots cleanly to depth 3" below proposed finish grade. Coat cut roots with tree paint.

### 3.04 EXCAVATING

- A. Excavate for structures to elevations and dimensions shown. Extend excavation a sufficient distance from foundations to permit placing and removal of formwork, installation of materials, services, and inspection. Hand trim foundation excavations to final grade just before concrete is placed. Remove loose, soft materials, and all organic matter. Footings shall bear on approved undisturbed bearing soil.
- B. Obtain inspection and testing of foundation excavations by Geotechnical Engineer before concrete is placed.
- C. Excavate for curbs, walks, and paving to elevations and grades indicated. Allow for base material. Obtain inspection and testing of subgrades for paving.
- D. Earth excavation shall include the satisfactory removal and disposal of all materials encountered, regardless of the nature of the materials, the condition of the materials at the time they are excavated, or the manner in which they were excavated. All excavation shall be **unclassified**.

- E. Extra excavation: Excavate unsatisfactory soil materials extending below required elevations to depth as directed. Such extra excavation will be paid for as a change in work. Obtain Landscape Architect's written authorization before performing extra excavation work.
- F. Unauthorized excavation: Backfill and fill all over excavation to proper grades. Fill over excavation at footings with 1,500 psi concrete. Additional labor and material for unauthorized excavation and remedial work at Contractor's expense.
- G. Shore, sheet, or brace excavations as required to maintain them as secure from caving. Remove shoring and bracing as backfilling progresses, when banks are safe against caving.
- H. Do not excavate footings or slabs to the full depth when freezing temperature may be expected, unless footings or slabs are placed immediately after the excavation has been completed. Protect excavation bottoms from freezing when the placing of concrete is delayed.
- I. The use of explosives is not permitted.
- J. When necessary, cut away rock in bottom of excavations to form level beds that follow natural strata. Form with sharp steps when steps are indicated. In utility trenches, excavate 6" below invert elevation of pipe and 24" wider than pipe diameter, minimum 36" trench width. Remove loose materials to sound base.
- K. Existing sewerage: Where existing sewers pass beneath new paving, remove existing earth fill to the top of the sewer pipe or to a depth as directed by the Geotechnical Engineer. Install an approved backfill material compacted in maximum 8" layers. Extend compacted fill from top of sewer pipe to proposed paving subgrade elevation.

### 3.05 DRAINAGE

- A. Provide necessary pumps and drainage lines and maintain excavations, including footings and pits, free from water, ice and snow during excavating and subsequent work operations.
- B. Provide drainage of the working area at all times.

### 3.06 FILLING, BACKFILLING, AND COMPACTING

- A. Obtain inspection and approval of subgrade surfaces by Geotechnical Engineer prior to filling operations. Scarify, dry, and compact soft and wet areas; remove and replace unsuitable subgrade materials with an approved compacted fill material. Take corrective measures before placing fill materials.
  - 1. Topsoil not permitted as fill or backfill material within structure limits or under paved areas.
- B. Soil stabilization: When exposed subgrade surfaces become spongy during construction operations and soil stabilization is required, stabilize subgrade



materials as directed by the Geotechnical Engineer. Soil stabilization will be paid for as a change in work. Obtain Landscape Architect's written authorization before performing soil stabilization work.

- C. Spread approved fill material uniformly in layers not greater than 8" of loose thickness over entire fill area.
  - 1. Lift thickness requirements may be modified by Geotechnical Engineer to suit equipment and materials or other conditions when required to assure satisfactory compaction.
  - 2. Moisture-condition fill material by aerating or watering and thoroughly mix material to obtain moisture content permitting proper compaction.
  - 3. Place and compact each layer of fill to indicated density before placing additional fill material. Repeat filling until proposed grade, profile, or contour is attained.
  - 4. Suspend fill operations when satisfactory results cannot be obtained because of environmental or other unsatisfactory site conditions. Do not use muddy or frozen subgrade surface. Do not place fill material on muddy or frozen subgrade surface.
  - 5. Maintain surface conditions, which permit adequate drainage of rainwater and prevent ponding of surface water in pockets. When fill placement is interrupted by rain, remove wet surface materials or permit to dry before placing additional fill material.
  
- D. Filling at existing trees to remain:
  - 1. Minor fills or 6" or less: Fill with topsoil; hand grade to required finish grade elevation.
  - 2. Moderate fills of 12" or less: Place layer of 3/4" to 1-1/2" stone or gravel on grade. Provide aggregate depth 1/2 of fill height, minimum of 3". Cover drainage fill with polypropylene filter fabric or 1" thickness straw choke. Fill remaining depth with loose topsoil; hand grade to required finish grade elevations.
  
- E. Place backfill materials in uniform layers not greater than 8" loose thickness over entire backfill area.
  - 1. Use hand tampers or vibrating compactors at foundation walls, retaining walls, and similar locations. Do not use large rolling equipment adjacent to foundation walls and retaining walls.
  - 2. Do not backfill against foundation walls or retaining walls until walls for bearing surfaces have reached design strength or are properly braced, and backfilling operations approved. Provide clean backfill materials, except where granular materials are indicated. Compact in maximum 8" layers.

- F. Fill all areas of settlement to proper grade before subsequent construction operations are performed.
- G. Backfill building foundations and subgrade of structural slabs with crushed stone per structural drawings.
- H. Compaction:
  - 1. Provide compaction control for all fill and backfill.
  - 2. Compact top 12" of subgrade and each layer of fill or backfill material at foundations and floor slabs to 100% of maximum dry density at optimum moisture content in accordance with ASTM D698 Standard Proctor Method. Extend compaction at least 5'-0" at both sides of foundations.
  - 2. Compact top 12" of subgrade and each layer of fill or backfill material at paved areas to 95% of maximum dry density at optimum moisture content in accordance with ASTM D698 Standard Proctor Method. Extend compaction at least 5'-0" at both sides of foundations and retaining walls and at least 1'-0" beyond slabs-on-grade and paving.
  - 3. Compact top 6" of subgrade and each layer of fill material at lawns and unpaved areas to 85% of maximum dry density at optimum moisture content in accordance with ASTM D698 Standard Proctor Method.
  - 4. Water settling, puddling, and jetting of fill and backfill materials as a compaction method are not acceptable.
  - 5. Maintain moisture content of materials, during compaction operations within required moisture range to obtain indicated compaction density.
  - 6. Provide adequate equipment to achieve consistent and backfill materials.
- I. Provide minimum 4" depth of granular base under structure concrete slabs-on-grade. Refer to Section 02513 for asphaltic concrete paving base and Section 02515 for concrete walks and paving base.

### 3.07 EROSION CONTROL

- A. Provide erosion control measures as indicated on plans including installation of silt fencing, installation of silt check inlet controls and soil reinforcement blanket lined channels and basins with specified materials.
  - 1. Install silt fence in areas indicated on plans to conform with specified details. Silt fencing shall be installed prior to all grading activity.
- B. Contractor shall provide continual maintenance of erosion control structures, including but not limited to:

1. Removal of silt, trash, mud, debris from ditches, channel and from silt fences and check dams.
  2. Replacement of silt fence that has been damaged or destroyed.
  3. Removal of erosion control structures at the end of construction or as specified.
- C. Contractor shall provide seeding and mulching as required in Section 02920 as soon as disturbed area has been graded to final elevations specified.
- D. Contractor shall keep all public roads free of silt, dirt, mud and debris throughout the entire project. Contractor shall remove and clean any silt, dirt, mud and debris from roadways at their expense.
- E. The Contractor shall be named a co-permittee of the KPDES permit and shall agree to the following certification:

"I certify under penalty of law that I understand the terms and conditions of the general Kentucky Pollutant Discharge Elimination System (NPDES) permit that authorized the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

The Contractor shall be responsible for preparing and submitting the Notice of Intent to governing agency.

### 3.08 FINISH GRADING

- A. Prior to finish grading, make certain that areas with concentrated amounts of stone of any size including smaller than 1", such as stockpile/staging areas, edges of pavement or utility trenches, have been raked clean of stone prior to placement of topsoil. Uniformly distribute and spread stockpiled topsoil. Provide minimum 4" average depth at lawn areas, 12" at planting areas. If necessary, provide additional imported topsoil as required to complete the work. Use loose, dry topsoil. Do not use frozen or muddy topsoil. Place during dry weather. Do not grade topsoil with equipment that will over compact topsoil preventing the adequate root growth of proposed turf. Bulldozers and backhoes are not suitable for finish grading. Tractors with box graders shall be used.
- B. Fine grade topsoil eliminating rough and low areas to ensure positive drainage. Maintain levels, profiles, and contours of subgrades.
- C. Remove stones, roots, weeds, and debris while spreading topsoil materials. Rake surface clean of stones 1" or larger in any dimension and all debris. Provide surfaces suitable for soil preparation provided under lawn and planting work.
- D. Landscape Architect shall be notified a minimum of 2 days prior to placement of topsoil so the subgrade may be inspected and the placement of topsoil by the Contractor may be observed.

- E. Maintenance:
  - 1. Protect finish graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and damaged areas.
  - 2. Where completed areas are disturbed by construction operations or adverse weather, scarify, re-shape, and compact to required density.

### 3.09 FIELD QUALITY CONTROL

- A. Provide field quality control soils testing and inspection during earthwork operations.
- B. Contractor shall provide adequate notice, cooperate with, provide access to the work, obtain samples, and assist testing agency and their representatives in execution of their function.
- C. Fill materials: Test proposed materials to verify suitability for use, gradation of material, moisture-density relation by ASTM D698 Standard Proctor Method, design bearing value, and percent of organic materials.
- D. Subgrade surfaces: Based on visual examination at the site, provide bearing tests as required to verify questionable subgrade surfaces are adequate and meet or exceed design bearing values.
  - 1. Structure slabs and paved areas: Make at least 1 test for each 2,000 sq. ft. of slab or paved area.
- E. Compaction operations: Provide full-time inspection and testing during structure slabs and paved areas filling and compaction operations. Test each lift to fill to verify compaction meets specified requirements. Provide periodic inspection and testing during site area filling and compaction operations.
  - 1. Structure slabs and paved areas: Make at least 1 test for each 2,000 sq. ft. of slab or paved area.
  - 2. Foundation wall and retaining wall backfill: Make at least 2 tests at locations and elevations directed by the Geotechnical Engineer.
- F. Foundation excavations: Based on visual examination at the site, provide bearing tests as required to verify bearing surfaces are adequate and meet or exceed design bearing values.
  - 1. Make at least 2 tests at locations directed by the Geotechnical Engineer.
- G. When, during progress of work, field tests or observations indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is achieved, or remove and replace defective materials with new materials as directed by the Landscape Architect. Cost of

additional labor, materials, and testing to attain specified density at Contractor's expense.

3.10 DISPOSAL OF WASTE MATERIALS

- A. Stockpile, haul from site, and legally dispose of waste materials, including excess excavated materials, rock, trash, and debris.
- B. Maintain disposal route clear, clean, and free of debris. Disposal in any floodplain is not allowed.

3.11 CLEANING

- A. Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment. Provide site clear, clean, free of debris, and suitable for site work operation.

END OF SECTION



## SECTION 02301

### STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

A. The following documents comprise the SWPPP:

1. Specification Section 02301
2. Best Management Practices (BMP) Plan
3. Notice of Intent (NOI)
4. Notice of Termination (NOT)
5. Contractors BMP implementation schedule
6. Operation and Maintenance Plan Checklist

##### 1.2 SUBMITTALS

- A. Notice of Intent: A minimum of 48 hours prior to beginning work, the Contractor shall submit a Notice of Intent (NOI) for a General Permit to the Kentucky Division of Water . A copy shall be sent to the office of Carman, Inc. and shall be kept on file with the BMP Plan and the SWPPP. A copy of the NOI is included at the end of this section.
- B. Contractors BMP implementation schedule: Prior to mobilizing on the site, the Contractor shall submit a detailed schedule to the design professional outlining the sequence of major activities that includes the installation of all controls, earth disturbing activities and stabilization activities. This implementation schedule will become part of the SWPPP.
- C. Notice of Termination: Upon final stabilization of the construction site and removal of all temporary erosion and sediment control measures, the Contractor shall submit a Notice of Termination (NOT) to the Kentucky Division of Water. A copy shall be sent to the office of Carman, Inc. and shall be retained with the BMP Plan and the SWPPP for a period of one year after filing the NOT. A copy of the NOT is included at the end of this section.

##### 1.3 QUALITY ASSURANCE

- A. Inspections: The Contractor shall employ qualified personnel to inspect all storm water control measures as outlined in the KPDES Storm Water General Permit (KYR10). Inspections shall be made at least once every 7 days and within 24 hours of the end of a storm event that is 0.5 inches or greater. Areas that have been temporarily or finally stabilized shall be inspected at least once every month. Revisions to the BMP plan based on the results of the inspection shall be implemented within seven (7) days of the inspection.

- B. Reports: The qualified personnel conducting the inspections shall prepare a report summarizing the scope of the inspection, names and qualifications of personnel making the inspection, the date of the inspection, major observations relating to the implementation of the BMP plan, and any corrective actions taken shall be made and kept as part of the BMP plan for at least three (3) years after the date of the inspection, or until one (1) year after coverage under the General Permit (KYR10) ends. The report is to be signed by the qualified personnel.
- C. The SWPPP implementation and methods of construction shall comply with the following standards
  - 1. KPDES General Permit No.: KYR10, General KPDES Permit for Storm Water Point Source Discharges Construction Activities.
  - 2. EPA 832-R-92-005: Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

#### 1.4 PROJECT DESCRIPTION

- A. General: The proposed development and land disturbance activity is located in Pulaski County between Norwood Road and Old Salt Road north of Somerset and near Science Hill, Kentucky. The property is being developed by SKRECC for a new corporate headquarters with associated drives and parking. Prior to the current development, the site has been agricultural. The property is surrounded by other agricultural and residential uses on all sides. The total property area is 81.25 acres. Approximately 61.5 acres of the site is anticipated to be disturbed during construction. The average pre-construction runoff coefficient is 0.35 and the average post construction runoff coefficient is 0.65. The latitude and longitude are 37.13829 and -84.64703 respectively.

- B. Soils:

The predominant soils (54%) at this site consist of the Frederick series. They include Frederick silt loams and Frederick silty clay loams and range from 6-12% slopes to 12-20% slopes. These soils are found on sides of ridgetops, along draws and encircling depressions in karst areas. They are deep, well-drained soils formed in residuum or old alluvium derived mainly from limestone, but partly from sandstone. They have high available moisture capacity and moderate permeability. This soil series has a very severe potential for erosion.

A portion of the site (35%) consists of Mountview series. The Mountview silt loam ranges in slopes from 2-6% and 6-12% and are found in plane areas on the sides of ridges. They are deep, well-drained soils that formed in loamy residuum. Mountview soils have high available moisture capacity and moderate permeability in the upper part of the subsoil and moderately slow permeability in the lower part of the subsoil. The hazard of erosion is moderate to severe.

A minor portion of the site (8%) consists of Frankstown series. The Frankstown cherty silt loam has 12-20% slopes and is located on plane slopes on the sides of ridges. They are moderately deep to deep, well-drained soils that formed in residuum derived mainly from cherty limestone, but in some places from siltstone. They have moderate



available moisture capacity and moderate permeability. The hazard of erosion is very severe.

A very minor portion of the site (3%) consists of Bedford series. The Bedford silt loam ranges in slope from 2-6% and is found on ridgetops and stream terraces. It is a deep, moderately well drained soil that has a fragipan. It formed from residuum derived from Mississippian limestone, sandstone or alluvial sediment. Bedford soils have moderate available moisture capacity and slow permeability due to the fragipan. The hazard of erosion is moderate.

- C. Site Conditions: The topography of the site is rolling with two "blue-line" streams intersecting the site. On the eastern portion of the site, Hall Branch of the Big Clifty Creek runs parallel with Norwood Road and drains the eastern half of the site. On the western boundary of the site, Morgan Hollow Branch of the Big Clifty Creek drains most of the remainder of the property. Other less significant portions of the site drain through a culvert under Old Salt Road and toward residential land to the southwest, but both areas ultimately reach the two aforementioned branches of Big Clifty Creek. Karst features are evident from the contours of the site with at least two potential sinkholes identified. Old Salt Road and residences to the south are the most significant adjacent land uses that could potentially be affected by the land disturbance activities. All drainage from the site will be directed toward the aforementioned branches of Big Clifty Creek or existing sinkholes.

Development will result in added impervious area and potential stormwater runoff. Buffers of existing vegetation will not be disturbed adjacent to critical areas. Water quality controls during construction will consist of construction entrances, erosion control blankets, turf reinforcement mats, silt fence, rock check dams and excavated sediment basins intended to capture sediment on the site before it has an opportunity to erode down the slopes to the tributaries of Big Clifty Creek or other adjacent property.

According to FEMA FIRM Panel 2101970100B, there are no areas on the property in the 100 year floodplain.

- D. Critical Areas:
1. Norwood and Old Salt Roads: It is crucial for the motoring public to prevent mud and debris from entering the roadway.
  2. Hall Branch and Morgan Hollow Branch of the Big Clifty Creek: Sediment controls must be in place prior to land disturbance activities to prevent sediment laden runoff from reaching the receiving water and adjacent residences downstream.

## 1.5 MATERIAL INVENTORY

- A. The material or substances listed below are expected to be present onsite during construction. The Contractor shall amend this list as appropriate as part of the overall SWPPP.
1. Concrete
  2. Detergents

3. Paints (enamel and latex)
4. Metal studs
5. Tar
6. Metal roofing
7. Fertilizers
8. Masonry Block
9. Wood
10. Petroleum products

## PART 2 - CONTROLS

### 2.1 EROSION AND SEDIMENT CONTROL MEASURES

- A. The erosion and sediment control measures will be typical of a small scale earth moving site including:
1. Construction Entrance
  2. Dust and Pollutant Control
  3. Fertilizer Application Control
  4. Permanent Turf Reinforcement Mats and Temporary Erosion Control Blankets
  5. Rock Check Dams
  6. Silt Fence Silt Control
  7. Land Grading and Sediment Basins
  8. Permanent Seeding and Sodding
  9. Inlet Protection
  10. Riprap aprons at headwall outfalls.

### 2.2 BMP PLAN

- A. The permittee shall modify the BMP plan when there is a change in design, construction, operation, or maintenance of the site which has significant effect on the potential for the discharge of pollutants to the waters of the Commonwealth and shall implement the changes within seven (7) days.
- B. The permittee shall amend the BMP plan if it proves to be ineffective in controlling the discharge of pollutants to the waters of the Commonwealth and shall implement the changes within seven (7) days.

### 2.3 STABILIZATION PRACTICES

- A. Temporary Stabilization: Temporary stabilization of top soil stockpiles and disturbed portions of the site shall begin within 14 days on areas where construction activities have temporarily (for 21 days or more) ceased. Temporary stabilization can be accomplished through seeding Rye (grain) applied at 120 pounds per acre and/or straw mulching at a rate of 4,000 pounds of straw per acre.

- B. Permanent Stabilization: Disturbed portions of the site where construction activities permanently ceases shall be stabilized with permanent seed or sodded no later than 14 days after the last construction activity. The permanent seed mix shall consist of 90% tall fescue (*Festuca arundinacea*) blend of minimum three (3) cultivars and 10% annual rye sown at a rate of 175-lbs/acre. Prior to seeding, ground agricultural limestone at rate specified by soil test and 220 lbs/acre of 20-26-6 fertilizer shall be applied to each acre stabilized. Seeding shall be done with a hydroseeding process as specified. Steep slopes and drainage channels shall have erosion control blankets or turf reinforcement mats installed following seeding. Other areas shall be sodded as specified. Follow specs for post fertilization and maintenance for watering, etc.
- C. Storm water management: The development of the site will result in increased runoff during construction while the areas are graded and denuded. The contractor shall conduct all operations responsibly to prevent off-site sedimentation. Curb and gutter, catch basins, yard drains, and trench drain and piping will provide storm water capture and controls. Roof drains will be piped underground to the storm drain system to prevent surface splash and erosion. The structural control measures detailed on the Erosion Control Plan are proposed to minimize the impact of erosion.
- D. The contractor shall also manage the site as needed according to the following checklist:
  - 1. Manage the site to infiltrate stormwater into the ground and keep sediment out of storm drains.
  - 2. Minimize the amount of exposed soil on site at any one time to the extent possible.
  - 3. Plan the project in stages to minimize the amount of area that is bare and subject to erosion.
  - 4. Vegetate disturbed areas with permanent or temporary seeding immediately upon reaching final grade.
  - 5. Vegetate or cover stockpiles that will not be used immediately.
  - 6. Reduce the velocity of stormwater both onto and away from the project area.
  - 7. Use interceptors, diversions, vegetated buffers, and check dams to slow down stormwater as it travels across and away from the project site.
  - 8. Construct temporary diversion measures to direct flow away from exposed areas toward stable portions of the site.
  - 9. Protect defined channels immediately with measures adequate to handle the storm flows expected.
  - 10. Use sod, geotextile, natural fiber, riprap, or other stabilization measures to allow channels to carry water without causing erosion.
  - 11. Maintain all BMPs to ensure their effectiveness during the life of the project.
  - 12. Maintain fences that protect sensitive areas, silt fences, diversion structures, and other BMPs.

## 2.4 OTHER CONTROLS

- A. Waste Materials: All waste materials will be collected and stored in a securely lidded metal dumpster rented from licensed waste management company. Dumpster shall meet all local and site solid waste regulations. All trash and construction debris will be deposited in the dumpster. The dumpster will be emptied when 90% full and trash

hauled to the respective approved landfill. No construction waste will be buried on site. All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted at the office trailer and the site superintendent will be responsible for seeing that these procedures are followed.

- B. **Hazardous Waste:** The use of any hazardous material is not anticipated at this site. But in such an event all hazardous waste materials will be disposed of in a manner specified by local or state regulation or by manufacturer. Site personnel will be instructed in these practices, and the site superintendent will be responsible for seeing that these practices are followed.
- C. **Sanitary Waste:** All sanitary waste will be collected from portable units at a minimum of one time per week by a licensed sanitary waste contractor as required by local regulation.
- D. **Offsite vehicle tracking:** Stabilized construction entrances shall be provided to help reduce vehicle tracking of sediments at the primary points of entry to the site. The adjacent paved street will be swept to remove any excess mud, dirt or rock tracked from site. Dump trucks hauling material from the site will be covered with a tarpaulin.
- E. **Non-Storm Water Discharges:** It is expected that the following non-storm water discharges could occur from the site during the construction period
  - 1. Water from water line sterilization/flushing. All water to be treated, neutralized, and handled per Kentucky Division of Water regulations.
  - 2. Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
  - 3. Uncontaminated ground water (from dewatering excavation as applicable).

## 2.5 SEQUENCE OF MAJOR ACTIVITIES

- A. The Contractor shall prepare his BMP implementation schedule based on the following outline of major activities.

Construction Activity	Schedule Consideration
Construction Access-entrance to site, construction routes, equipment parking areas	This is the first land disturbing activity. As soon as construction begins, stabilize any bare areas with gravel and temporary vegetation.
Sediment traps and sediment fences	After construction site is accessed, principal sediment fence barriers, as applicable, should be installed, with addition of temporary traps and barriers as needed during grading operation.
Runoff control-diversions, perimeter dikes, water bars, outlet protection	Key practices should be installed after the installation of principal sediment traps and before land grading. Additional runoff control measures may be installed during grading as required.

<p>Land clearing and grading-site preparation(topsoil strip, excavation, fill placement, grading, sediment traps, barriers, diversions, drains, surface roughening)</p>	<p>Implement major clearing and grading after installation of principal sediment and run off control measures, and install additional control measures as grading continues. Clear borrow and disposal areas as required, and mark tree and buffers for preservation. Clearing will be kept to a minimum.</p>
<p>Surface stabilization-temporary and permanent seeding, mulching, sodding, riprap</p>	<p>Temporary or permanent stabilizing measure should be applied immediately to any disturbed areas where work has been either completed or delayed 21 days. Land disturbance will be scheduled to limit exposure of bare soils to erosive elements to the extent possible.</p>
<p>Building construction-buildings, utilities, storm piping, curb and gutter, paving</p>	<p>During construction, install any erosion and sediment control measures that are needed per the attached specific sediment control plan and according to local regulatory agency, i.e., additional inlet control, etc. Install gravel areas for building material lay down and for vehicular traffic.</p>
<p>Landscaping and final stabilization-backfilling, topsoil replacement, trees, shrubs, permanent seeding, sodding, riprap</p>	<p>Last construction phase. Vegetation and mulch will be applied to applicable areas immediately after final grading is completed. Stabilize all open areas, including, borrow and fill areas, remove and stabilize temporary control measures as prescribed on the accompanying erosion control plan sheets.</p>

- B. Timing of controls/measures: As indicated on the Sequence of Major Activities, silt fences and construction entrances will be constructed prior to clearing or grading on other portions of the site. Areas where construction activity ceases for more than 21 days will be stabilized with temporary seed and mulch within 14 days of the last disturbance. Once construction activity ceases permanently in an area, that area will be stabilized with permanent seed and mulch or sod as specified. After the entire site is stabilized, the accumulated sediment will be removed from the trap or basin and the berms removed as applicable.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. Store combustible materials apart from building.

## 2.6 SPILL PREVENTION

- A. Good Housekeeping: The following are material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff.
1. An effort will be made to store only enough product to do the job.
  2. All materials stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
  3. Products will be kept in their original containers with original manufacturers label.
  4. Substances will not be mixed with one another unless recommended by manufacturer.
  5. Whenever possible, all of a product will be used up before disposing of the container.
  6. Manufacturers' recommendations for proper use and disposal will be followed.
  7. The site superintendent will inspect daily to ensure proper use and disposal of materials onsite.
- B. Hazardous Products: Hazardous materials are not expected to be brought to the site, if they are required then the guidelines below should be followed.
1. Product will be kept in original containers unless they are not resealable.
  2. Original labels and material safety data sheets will be retained for product information.
  3. If surplus product must be disposed of, manufacturer's, local government, and state recommended methods for proper disposal shall be followed.
- C. Petroleum Products: All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chances of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Portable equipment fuel tanks will be located as far away from surface water bodies as possible. Fuel tanks will be situated in a containment vessel to prevent spillage in case of a leak. All oils drained from equipment will be captured in pans or other suitable equipment and placed in drums for removal from site for disposal at an approved off-site location.
- D. Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
- E. Paints: All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system, but will be properly disposed of according to manufacturers' instructions or State and local regulations.
- F. Concrete trucks will be required to wash out or discharge surplus concrete or drum wash water into a wash out pit that would be selected by the site superintendent. The wash out pit shall be designated in an area that does not receive significant runoff and does not drain into a storm network. Upon the completion of the project, this area would be cleared of the concrete and the site restored.

- G. Any asphalt substances used onsite will be applied according to the manufacturers' recommendations.
  
- H. Spill Control Practices: In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup.
  - 1. Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the locations of the information and cleanup supplies.
  - 2. Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not limited to brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically designed for this purpose.
  - 3. All spills will be cleaned up immediately after discovery.
  - 4. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
  - 5. Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of size.
  - 6. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
  - 7. The site superintendent responsible for the day-to-day site operations will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area in the office trailer onsite.
  
- I. Spill Notification: In the event of a spill, make the appropriate notification(s) consistent with the following procedures.
  - 1. Any spill of gasoline greater than 25 gallons in a 24-hour period or spill of diesel fuel greater than 75 gallons in a 24-hour period must be reported to the Kentucky Environmental Response Team at (800) 928-2380.
  - 2. Any spill of oil that 1) violates water quality standards, 2) produces a "sheen" on a surface water, or 3) causes a sludge or emulsion must be reported to the Kentucky Environmental Response Team at (800) 928-2380.
  - 3. Any spill of oil or hazardous substance to waters of the state must be reported immediately by the telephone to the List State agency and phone number.
  - 4. Any release of a hazardous substance that may be a threat to human health or the environment must be reported to the List State agency and phone number immediately upon discovery.

PART 3 - CERTIFICATION

3.1 CONTRACTORS AND SUBCONTRACTORS

- A. As part of the BMP implementation schedule, the Contractor shall clearly state the Contractor or Subcontractor that will implement each control measure identified on the BMP plan.
- B. All Contractors and Subcontractors identified in the BMP plan must sign a copy of the certification statement below before conducting any professional service at the site.

1. General Contractor

- a. "I certify under penalty of law that I understand the terms and conditions of the general National Pollution Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

_____	_____
Company Name, Address and Phone	Name
_____	_____
_____	Title
_____	_____
_____	Site Address

2. Earthwork Subcontractor

- a. "I certify under penalty of law that I understand the terms and conditions of the general National Pollution Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

_____	_____
Company Name, Address and Phone	Name
_____	_____
_____	Title
_____	_____
_____	Site Address



3. Storm Sewer Subcontractor

- a. "I certify under penalty of law that I understand the terms and conditions of the general National Pollution Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

_____ Company Name, Address and Phone	_____ Name
_____ _____	_____ Title
_____	_____ Site Address

4. Site Utility Subcontractor

- a. "I certify under penalty of law that I understand the terms and conditions of the general National Pollution Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

_____ Company Name, Address and Phone	_____ Name
_____ _____	_____ Title
_____	_____ Site Address

END OF SECTION 312500



TERMITE CONTROL

SECTION 02361

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Soil treatment with termiticide.

1.3 PERFORMANCE REQUIREMENTS

- A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than five years against infestation of subterranean termites.

1.4 SUBMITTALS

- A. Product Data: For termiticide.
  - 1. Include the EPA-Registered Label for termiticide products.
- B. Product Certificates: For termite control products, signed by product manufacturer.
- C. Qualification Data: For Installer of termite control products.
- D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:
  - 1. Date and time of application.
  - 2. Moisture content of soil before application.
  - 3. Brand name and manufacturer of termiticide.
  - 4. Quantity of undiluted termiticide used.
  - 5. Dilutions, methods, volumes, and rates of application used.
  - 6. Areas of application.
  - 7. Water source for application.
- E. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.
- B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.
- C. Source Limitations: Obtain termite control products through one source.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

1.7 COORDINATION

- A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

- 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- 1. Termiticides:
  - a. Aventis Environmental Science USA LP; Termidor.
  - b. Bayer Corporation; Premise 75.
  - c. Dow AgroSciences LLC; Dursban TC Equity.

- d. FMC Corporation, Agricultural Products Group; Talstar Prevail FT Torpedo.
- e. Syngenta; Demon TC.

## 2.2 SOIL TREATMENT

- A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.
  - 1. Proceed with application only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
  - 1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

### 3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

### 3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
  2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
  3. Crawlspace: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
  4. Masonry: Treat voids.
  5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION

SECTION 02510 - WATER DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes piping and specialties for combined potable-water and fire-protection water service outside the building.
- B. Related Sections include the following:
  - 1. Division 15 Sections for fire-protection piping inside the building.
  - 2. Division 15 Section "Water Distribution Piping" for potable-water piping inside the building.
  - 3. Division 16 Section "Fire Alarm Systems."
- C. Utility-furnished products include domestic water meter. All meter, pit, tap, and/or installation fees shall be borne by the Contractor. Coordinate requirements with the local utility:

Western Pulaski Water District  
1059 West Highway 80  
Somerset, KY 42503  
Voice: (606) 679-1569 – Kevin Marcum

1.3 DEFINITIONS

- A. The following are industry abbreviations for plastic and rubber materials:
  - 1. NP: Nylon.
  - 2. PE: Polyethylene.
  - 3. PP: Polypropylene.
  - 4. PTFE: Polytetrafluoroethylene.
  - 5. PVC: Polyvinyl chloride.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated:
  - 1. Combined Potable-Water and Fire-Protection Water Service: 160 psig (1100 kPa).
  - 2. Fire-Protection Water Service, Downstream from Fire Department Connections: 250 psig (1725 kPa).

1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Backflow preventers.
  - 2. Pipe and fittings.
  - 3. Flexible pipe fittings.
  - 4. Valves.
  - 5. Fire hydrants.
  - 6. Fire department connections.

- B. Shop Drawings: For precast or cast-in-place concrete structures. Include frames and covers and drains.
- C. Record Drawings: At Project closeout of installed water-service piping according to Division 1 Section "Contract Closeout."
- D. Test Reports: As specified in "Field Quality Control" Article in Part 3.
- E. Purging and Disinfecting Reports: As specified in "Cleaning" Article in Part 3.
- F. Maintenance Data: For specialties to include in the maintenance manuals specified in Division 1. Include data for the following:
  - 1. Backflow preventers.
  - 2. Valves.
  - 3. Fire hydrants.

#### 1.6 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of water-service piping specialties and are based on specific types and models indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."
- B. Comply with requirements of utility supplying water. Include tapping of water mains and backflow prevention.
- C. Comply with standards of authorities having jurisdiction for potable water-service piping. Include materials, installation, testing, and disinfection.
- D. Comply with NSF 61, "Drinking Water System Components--Health Effects," for materials for potable water.
- E. Comply with standards of authorities having jurisdiction for fire-protection water-service piping. Include materials, hose threads, installation, and testing.
- F. Comply with NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances," for materials, installations, tests, flushing, and valve and hydrant supervision.
- G. Comply with ASTM F 645, "Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems."
- H. Comply with NFPA 70, "National Electrical Code," for electrical connections between wiring and electrically operated devices.
- I. Provide listing/approval stamp, label, or other marking on piping and specialties made to specified standards.
- J. Listing and Labeling: Provide electrically operated specialties and devices specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
  - 1. Ensure that valves are dry and internally protected against rust and corrosion.
  - 2. Protect valves against damage to threaded ends and flange faces.
  - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
  - 1. Do not remove end protectors, unless necessary for inspection; then reinstall for storage.



2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

#### 1.8 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Verify that water-service piping may be installed to comply with original design and referenced standards.
- C. Site Information: Reports on subsurface condition investigations made during design of Project are available for informational purposes only; data in reports are not intended as representations or warranties of accuracy or continuity of conditions between soil borings. Owner assumes no responsibility for interpretations or conclusions drawn from this information.

#### 1.9 SEQUENCING AND SCHEDULING

- A. Coordinate connection to water main with utility company.
- B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building water distribution piping.
- C. Coordinate piping materials, sizes, entry locations, and pressure requirements with building fire-protection water piping.
- D. Coordinate with other utility work.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Drilling-Machine, Sleeves, and Corporation Stops:
    - a. Ford Meter Box Co., Inc.
    - b. Grinnell Corp.; Mueller Co.; Water Products Div.
    - c. Lee Brass Co.
  2. Bronze Corporation Stops and Valves:
    - a. Ford Meter Box Co., Inc.
    - b. Grinnell Corp.; Mueller Co.; Water Products Div.
    - c. Lee Brass Co.
    - d. Master Meter, Inc.
    - e. McDonald: A.Y. McDonald Mfg. Co.

- f. Red Hed Manufacturing Co.
- g. Watts Industries, Inc.; James Jones Co.
- 3. Gate Valves:
  - a. American AVK Co.
  - b. American Cast Iron Pipe Co.; American Flow Control Div.
  - c. Grinnell Corp.; Grinnell Supply Sales Co.
  - d. Hammond Valve Corp.
  - e. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa)
  - f. Milwaukee Valve Co., Inc.
  - g. Nibco, Inc.
  - h. Pratt: Henry Pratt Co.
- 4. Relief Valves:
  - a. Bermad, Inc.
  - b. GA Industries, Inc.
  - c. MULTIPLEX Manufacturing Co.
  - d. Oceco, Inc.
  - e. Val-Matic Valve and Manufacturing Corp.
- 5. Water-Regulating Valves:
  - a. Ames Co., Inc.
  - b. Bermad, Inc.
  - c. Cla-Val Co.
  - d. OCV Control Valves.
  - e. Watts Industries, Inc.; Water Products Div.
- 6. Indicator Posts and Indicator Gate Valves:
  - a. American Cast Iron Pipe Co.; American Flow Control Div.
  - b. Grinnell Corp.; Grinnell Supply Sales Co.
  - c. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa)
  - d. Nibco, Inc.
  - e. Stockham Valves & Fittings, Inc.
  - f. United States Pipe & Foundry Co.
- 7. Dry-Barrel, Post Fire Hydrants:
  - a. American AVK Co.
  - b. American Cast Iron Pipe Co.; American Flow Control Div.
  - c. American Foundry & Mfg. Co.
  - d. East Jordan Iron Works, Inc.
  - e. Grinnell Corp.; Mueller Co.; Water Products Div.
  - f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa)

- g. Penn-Troy Machine Co.
- h. United States Pipe & Foundry Co.
- 8. Detector-Type Water Meters:
  - a. Badger Meter, Inc.
  - b. Grinnell Corp.; Grinnell Supply Sales Co.
  - c. Schlumberger Industries, Inc.; Water Div.
  - d. Sensus Technologies, Inc.
- 9. Detector Check Valves:
  - a. Ames Co., Inc.
  - b. Grinnell Corp.; Mueller Co.; Hersey Products Div.
  - c. McWane, Inc.; Kennedy Valve Div.
  - d. Viking Corp.
  - e. Watts Industries, Inc.; Water Products Div.
- 10. Backflow Preventers:
  - a. Conbraco Industries, Inc.
  - b. Grinnell Corp.; Mueller Co.; Hersey Products Div.
  - c. Watts Industries, Inc.; Water Products Div.
  - d. Zurn Industries, Inc.; Wilkins Div.
- 11. Keyed Couplings:
  - a. McWane, Inc.; Tyler Pipe; Gustin-Bacon Div.
  - b. Victaulic Co. of America.
- 12. Drains:
  - a. Enpoco, Inc.
  - b. Josam Co.
  - c. McWane, Inc.; Tyler Pipe; Wade Div.
  - d. Smith Industries, Inc.; Jay R. Smith Mfg. Co.
  - e. Watts Industries, Inc.; Ancon Drain Div.
  - f. Zurn Industries, Inc.; Hydromechanics Div.
- 13. Fire Department Connections:
  - a. Firematic Sprinkler Devices, Inc.
  - b. Grinnell Corp.; Grinnell Supply Sales Co.
  - c. Guardian Fire Equipment, Inc.
  - d. Reliable Automatic Sprinkler Co., Inc.
- 14. Alarm Devices:
  - a. Gamewell Co.
  - b. Grinnell Corp.; Grinnell Supply Sales Co.
  - c. Pittway Corp.; System Sensor Div.

- d. Potter Electric Signal Co.
- e. Reliable Automatic Sprinkler Co., Inc.
- f. Victaulic Co. of America.
- g. Watts Industries, Inc.; Water Products Div.

## 2.2 PIPES AND TUBES

- A. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.
- B. Copper Tube: ASTM B 88 (ASTM B 88M), seamless water tube, annealed temper.
- C. Ductile-Iron, Push-on-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include rubber compression gasket according to AWWA C111.
- D. Ductile-Iron, Mechanical-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include gland, rubber gasket, and bolts and nuts according to AWWA C111.

## 2.3 PIPE AND TUBE FITTINGS

- A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.
- B. Copper Fittings: ASME B16.22; wrought-copper, solder-joint pressure type.
- C. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150 or 300, as required for system operating pressure.
- D. Ductile-Iron, Push-on-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and rubber compression gaskets according to AWWA C111.
- E. Ductile-Iron, Mechanical-Joint Fittings: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
- F. Ductile-Iron, Grooved-End Fittings: ASTM A 47 (ASTM A 47M), malleable-iron; or ASTM A 536, ductile-iron casting complying with AWWA-pipe size, with grooved ends. Include cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include keyed couplings according to AWWA C606.
- G. Ductile-Iron, Flanged Fittings: AWWA C110, with cement-mortar lining and seal coat according to AWWA C104 or epoxy, interior coating according to AWWA C550. Include gaskets and bolts and nuts.
- H. Ductile-Iron, Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Units have 2 gasketed ball-joint sections and 1 or more gasketed sleeve sections. Include 250-psig (1725-kPa) minimum working-pressure rating; epoxy, interior coating according to AWWA C550; length for offset and expansion indicated; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
- I. Ductile-Iron, Deflection Fittings: Compound coupling fitting with sleeve and flexing sections, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include 250-psig (1725-kPa) minimum working-pressure rating; cement-mortar lining or epoxy, interior coating according to AWWA C550; deflection of at least 20 degrees (0.34 radians); and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
- J. Ductile-Iron Expansion Joints: 3-piece assembly consisting of telescoping sleeve with gaskets and restrained-type, ductile-iron bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Include 250-psig (1725-kPa) minimum working-pressure rating; cement-mortar

lining or epoxy, interior coating according to AWWA C550; length for expansion indicated; and glands, rubber gaskets, and bolts and nuts according to AWWA C111.

- K. Cast-Iron Flanged Fittings: ASME B16.1, Class 125, unless otherwise indicated.

#### 2.4 JOINING MATERIALS

- A. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.

- B. Refer to Division 2 Section "Utility Materials" for commonly used joining materials.

- C. Ductile-Iron Piping: The following materials apply:

1. Push-on Joints: AWWA C111 rubber gaskets and lubricant.
2. Mechanical Joints: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.
3. Flanged Joints: AWWA C115 ductile-iron or gray-iron pipe flanges, rubber gaskets, and high-strength steel bolts and nuts.
  - a. Gaskets: Rubber, flat face, 1/8 inch (3 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
  - b. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
4. Keyed Couplings: AWWA C606, consisting of ASTM A 536 ductile-iron housing with enamel finish, with synthetic-rubber gasket with central-cavity, pressure-responsive design, with carbon-steel bolts and nuts to secure grooved pipe and fittings and gasket suitable for hot water, unless otherwise indicated.

- D. Brazing Filler Metals: AWS A5.8, BCuP Series.

- E. Solder Filler Metal: ASTM B 32, Alloy Sn95, Alloy Sn94, or Alloy E, with 0.10 percent maximum lead content.

- F. Pipe Couplings: Iron-body sleeve assembly, fabricated to match OD of pipes to be joined.

1. Sleeve: ASTM A 126, Class B, gray iron.
2. Followers: ASTM A 47 (ASTM A 47M), malleable iron; or ASTM A 536, ductile iron.
3. Gaskets: Rubber.
4. Bolts and Nuts: AWWA C111.
5. Finish: Enamel paint.

#### 2.5 PIPING SPECIALTIES

- A. Flexible Connectors for Nonferrous, Metal Piping: Bronze hose covered with bronze wire braid; with copper-tube, pressure-type, solder-joint ends or bronze flanged ends; brazed to hose.

- B. Flexible Connectors for Ferrous Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1 threaded steel pipe nipples or ASME B16.5 steel pipe flanges; welded to hose.

- C. Dielectric Fittings: Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and corrosion.

1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.
2. Dielectric Unions: Factory-fabricated union assembly, designed for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C). Include insulating material isolating dissimilar metals and ends with inside threads according to ASME B1.20.1.

3. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum pressure to suit system pressures.
4. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
  - a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure to suit system pressures.
5. Dielectric Couplings: Galvanized-steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
6. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig (2070-kPa) working pressure at 225 deg F (107 deg C).

## 2.6 PE ENCASEMENT

- A. PE Encasement for Ductile-Iron Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch (0.20-mm) minimum thickness, tube or sheet.

## 2.7 VALVES

- A. Nonrising-Stem, Metal-Seated Gate Valves, 3-Inch NPS (DN80) and Larger: AWWA C500, gray- or ductile-iron body and bonnet; with cast-iron or bronze, double-disc gate, bronze gate rings, bronze stem, and stem nut. Include 200-psig (1380-kPa) minimum working-pressure design; interior coating according to AWWA C550; and mechanical-joint ends, unless otherwise indicated.
- B. Nonrising-Stem Gate Valves, 4-Inch NPS (DN100) and Larger: UL 262, FM approved, iron body and bonnet with flange for indicator post, bronze seating material, inside screw, 175-psig (1200-kPa) working pressure, and mechanical-joint ends. Provide with flanged ends for pit installation.
- C. Rising-Stem Gate Valves, 3-Inch NPS (DN80) and Larger: AWWA C500, cast-iron double disc, bronze disc and seat rings, cast-iron or ductile-iron body and bonnet, OS&Y, bronze stem, 200-psig (1380-kPa) working pressure, and flanged ends.
- D. Rising-Stem Gate Valves, 2-1/2-Inch NPS (DN65) and Larger: UL 262, FM approved, iron body and bonnet, bronze seating material, OS&Y, 175-psig (1200-kPa) working pressure, and flanged ends.
- E. Rising-Stem Gate Valves, 2-Inch NPS (DN50) and Smaller: UL 262, FM approved, bronze body and bonnet, OS&Y, bronze stem, 175-psig (1200-kPa) working pressure, with threaded ends.
- F. Nonrising-Stem Gate Valves, 2-Inch NPS (DN50) and Smaller: MSS SP-80; body and screw bonnet of ASTM B 62 cast bronze; with Class 125 threaded ends, solid wedge, nonrising copper-silicon-alloy stem, brass packing gland, PTFE-impregnated packing, and malleable-iron handwheel.
- G. Valve Boxes: Cast-iron box with top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches (125 mm) in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.
  1. Provide steel tee-handle operating wrench with each valve box. Include tee handle with one pointed end, stem of length to operate valve, and socket-fitting valve-operating nut.
- H. Indicator Posts: UL 789, FM-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve.

- I. Curb Stops: Bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet to match service piping material.
  - J. Service Boxes for Curb Stops: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include cover with lettering "WATER," and bottom section with base of size to fit over curb-stop and barrel approximately 3 inches (75 mm) in diameter.
    - 1. Provide steel tee-handle shutoff rod with each service box. Include tee handle with one pointed end, stem of length to operate curb stop, and slotted end fitting curb-stop head.
  - K. Ball Valves: AWWA C507, Class 250. Include interior coating according to AWWA C550.
  - L. Butterfly Valves: AWWA C504, with 150-psig (1035-kPa) working-pressure rating. Include interior coating according to AWWA C550.
  - M. Butterfly Valves: UL 1091, with 175-psig (1200-kPa) working-pressure rating.
  - N. Check Valves: AWWA C508, with 175-psig (1200-kPa) working-pressure rating. Include interior coating according to AWWA C550.
- 2.8 SPECIALTY VALVES
- A. Pressure-Regulating Valves: Automatic, pilot-operated, cast-iron body with interior coating according to AWWA C550. Include 250-psig (1725-kPa) working-pressure design, bronze pressure-reducing pilot valve and tubing, and means for discharge pressure adjustment.
  - B. Air-Release Valve: AWWA C512, hydromechanical device to automatically release accumulated air. Include 300-psig (2070-kPa) working-pressure design.
  - C. Air/Vacuum Valve: AWWA C512, direct-acting, float-operated, hydromechanical device with large orifice to automatically release accumulated air or to admit air during filling of piping. Include 300-psig (2070-kPa) working-pressure design.
  - D. Combination Air Valves: AWWA C512, float-operated, hydromechanical device to automatically release accumulated air or to admit air. Include 300-psig (2070-kPa) working-pressure design.
- 2.9 WATER METERS
- A. Water meters will be furnished by utility company.
- 2.10 WATER-METER BOXES
- A. Description: Cast-iron body and cover for disc-type water meter. Include lettering "WATER METER" in cover; and slotted, open-bottom base section of length to fit over service piping.
  - B. Description: Cast-iron body and double cover for disc-type water meter. Include lettering "WATER METER" in top cover; separate inner cover; air space between covers; and slotted, open-bottom base section of length to fit over service piping.
- 2.11 PITS
- A. Description: Precast, reinforced-concrete pit, designed for A-16 load designation according to ASTM C 857, and made according to ASTM C 858.
  - B. Ladder: ASTM A 36 (ASTM A 36M), steel or polyethylene-encased steel steps.
  - C. Manhole: ASTM A 48, Class No. 35 (ASTM A 48M, Class No. 250) minimum tensile strength, gray-iron, traffic frame and cover.
    - 1. Weight and Dimensions: Not smaller than 24-inch (610-mm) diameter, unless otherwise indicated.
  - D. Drain: ASME A112.21.1M, cast-iron area drain, of size indicated. Include body anchor flange, light-duty cast-iron grate, bottom outlet, and integral or field-installed bronze ball or clapper-type backwater valve.
- 2.12 FREESTANDING FIRE HYDRANTS

- A. Description: Cast-iron body, compression-type valve, opening against pressure and closing with pressure, 6-inch (DN150) mechanical-joint inlet, and 150-psig (1035-kPa) minimum working-pressure design.
- B. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
- C. Operating and Cap Nuts: Pentagon 1-1/2 inch (40 mm) point to flat.
- D. Direction of Opening: Open hydrant valve by turning operating nut to left or counterclockwise.
- E. Exterior Finish: Red alkyd-gloss enamel paint, unless otherwise indicated.
- F. Dry-Barrel Fire Hydrants: UL 246, FM-approved, two 2-1/2-inch NPS (DN65) and one 4-1/2-inch NPS (DN115) outlets, 5-1/4-inch (133-mm) main valve, drain valve, and 6-inch NPS (DN150) mechanical-joint inlet.

#### 2.13 FIRE DEPARTMENT CONNECTIONS

- A. Exposed, Freestanding, Fire Department Connections: UL 405, cast-brass body, with thread inlets according to NFPA 1963 and matching local fire department hose threads, and threaded bottom outlet. Include lugged caps, gaskets, and chains; lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch- (460-mm-) high brass sleeve; and round escutcheon plate.
  - 1. Connections: Two 2-1/2-inch NPS (DN65) inlets and 4-inch NPS (DN100) outlet.
  - 2. Inlet Alignment: Square.
  - 3. Finish Including Sleeve: Polished chrome-plated.
  - 4. Escutcheon Plate Marking: "AUTO SPKR."

#### 2.14 DETECTOR CHECK VALVES

- A. Detector Check Valves: UL 312, galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends; designed for 175-psig (1200-kPa) working pressure. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.
  - 1. Water Meter: AWWA C700, disc type, of size at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.

#### 2.15 BACKFLOW PREVENTERS

- A. General: Manufactured backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.
- B. Working Pressure: 150 psig (1035 kPa) minimum, unless otherwise indicated.
- C. 2-Inch NPS (DN50) and Smaller: Bronze body with threaded ends.
- D. 2-1/2-Inch NPS (DN65) and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.
- E. Interior Lining: AWWA C550, epoxy coating for backflow preventers with cast-iron or steel body.
- F. Interior Components: Corrosion-resistant materials.
- G. Strainer on inlet if strainer is indicated.
- H. Hose-Connection Vacuum Breakers: ASSE 1011, nickel plated, with nonremovable and manual drain features, and ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet. Units attached to rough-bronze-finish hose connections may be rough bronze.



- I. Reduced-Pressure-Principle Backflow Preventer: ASSE 1013, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include test cocks and pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves for continuous-pressure application.
  - 1. Pressure Loss: 12 psig (83 kPa) maximum through middle third of flow range.
- J. Double-Check Backflow Prevention Assemblies: ASSE 1015, with valves on inlet and outlet and strainer on inlet. Include test cocks with 2 positive-seating check valves for continuous-pressure application.
  - 1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.
- K. Double-Check-Valve Assembly: UL 312, FM approved. Assembly has two UL 312, FM-approved, iron-body, 175-psig (1200-kPa) working-pressure, flanged-end check valves, with two UL 262, FM-approved, iron-body, OS&Y, flanged, 175-psig (1200-kPa) working-pressure gate valves.
  - 1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.
- L. Antisiphon, Pressure-Type Vacuum Breakers: ASSE 1020, with valves, spring-loaded check valve, and spring-loaded floating disc. Include test cocks and atmospheric vent for continuous-pressure application.
  - 1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.
- M. Reduced-Pressure Detector Assembly Backflow Preventers: ASSE 1047, FM approved or UL listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include pressure-differential relief valve with ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves, test cocks, and bypass with displacement-type water meter, valves, and reduced-pressure backflow preventer, for continuous-pressure application.
  - 1. Pressure Loss: 12 psig (83 kPa) maximum through middle third of flow range.
- N. Double-Check Detector Assembly Backflow Preventers: ASSE 1048, FM approved or UL listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include 2 positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and double-check backflow preventer, for continuous-pressure application.
  - 1. Pressure Loss: 5 psig (34 kPa) maximum through middle third of flow range.

#### 2.16 ANCHORAGES

- A. Clamps, Straps, and Washers: ASTM A 506, steel.
- B. Rods: ASTM A 575, steel.
- C. Rod Couplings: ASTM A 197 (ASTM A 197M), malleable iron.
- D. Bolts: ASTM A 307, steel.
- E. Cast-Iron Washers: ASTM A 126, gray iron.
- F. Concrete Reaction Backing: Portland cement concrete mix, 3000 psig (20.7 MPa).
  - 1. Cement: ASTM C 150, Type I.
  - 2. Fine Aggregate: ASTM C 33, sand.
  - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
  - 4. Water: Potable.

#### 2.17 IDENTIFICATION

- A. Refer to Division 2 Section "Earthwork" for underground warning tape materials.

- B. Arrange for warning tapes made of solid blue film with continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

### PART 3 - EXECUTION

#### 3.1 EARTHWORK

- A. Refer to Division 2 Section "Earthwork" for excavation, trenching, and backfilling.
- B. Refer to Division 2 Section "Hot-Mix Asphalt Paving" for cutting and patching of existing paving.
- C. Refer to Division 2 Section "Portland Cement Concrete Paving" for cutting and patching of paving.

#### 3.2 PIPING APPLICATIONS

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications:
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.
- C. Do not use flanges or keyed couplings for underground piping.
  - 1. Exception: Piping in boxes and structures, but not buried, may be joined with flanges or keyed couplings instead of joints indicated.
- D. Flanges, keyed couplings, and special fittings may be used on aboveground piping.
- E. Potable Water-Service Piping: Use the following:
  - 1. 3/4- to 2-Inch NPS (DN20 to DN50): Copper tube, Type K (Type A); copper fittings; and brazed joints.
  - 2. 2-1/2- to 3-1/2-Inch NPS (DN65 to DN90): Copper tube, Type K (Type A); copper fittings; and brazed joints.
  - 3. 4-Inch to 8-Inch NPS (DN100 to DN200): Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed joints or Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
- F. Fire-Protection Water-Service Piping: Use the following:
  - 1. 4- to 12-Inch NPS (DN100 to DN300): Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed joints or Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.
- G. Combined Potable-Water and Fire-Protection Water-Service Piping: Use the following:
  - 1. 6- to 12-Inch NPS (DN150 to DN300): Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed joints or Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

#### 3.3 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  - 1. Underground Valves, 3-Inch NPS (DN80) and Larger: AWWA, gate valves, nonrising stem, with valve box.
  - 2. Underground Valves, 4-Inch NPS (DN100) and Larger: UL/FM, gate valves, nonrising stem, with indicator post.
  - 3. Pit and Aboveground Installation Valves, 3-Inch NPS (DN80) and Larger: AWWA, OS&Y gate valves.

4. Pit and Aboveground Installation Valves, 2-1/2-Inch NPS (DN65) and Larger: UL/FM, OS&Y gate valves.
5. Pit and Aboveground Installation Valves, 2-Inch NPS (DN50) and Smaller: MSS, nonrising-stem gate valves.
6. Pit and Aboveground Installation Valves, 2-Inch NPS (DN50) and Smaller: UL/FM, OS&Y gate valves.

#### 3.4 JOINT CONSTRUCTION

- A. Refer to Division 2 Section "Utility Materials" for basic piping joint construction.
- B. Ductile-Iron Piping, Gasketed Joints: According to AWWA C600.
- C. Ductile-Iron Piping, Gasketed Joints for Fire-Service Piping: According to UL 194 and AWWA C600.
- D. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.
- E. Threaded Joints: Thread pipes with tapered pipe threads according to ASME B1.20.1, apply tape or joint compound, and apply wrench to fitting and valve ends into which pipes are being threaded.
- F. Ductile-Iron, Keyed-Coupling Joints: Cut-groove pipes. Assemble joints with keyed couplings, gaskets, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- G. Copper Tubing, Brazed Joints: According to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
- H. Copper Tubing, Soldered Joints: According to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube."
- I. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, OD, and system working pressure. Refer to "Piping Systems - Common Requirements" Article below for joining piping of dissimilar metals.

#### 3.5 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.
- B. Install piping at indicated slope.
- C. Install components with pressure rating equal to or greater than system operating pressure.
- D. Install piping free of sags and bends.
- E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- F. Install fittings for changes in direction and branch connections.
- G. Piping Connections: Unless otherwise indicated, make piping connections as specified below:
  1. Install unions, in piping 2-inch NPS (DN50) and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS (DN50) or smaller threaded pipe connection.
  2. Install flanges, in piping 2-1/2-inch NPS (DN65) and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
  3. Install dielectric fittings to connect piping of dissimilar metals.

#### 3.6 SERVICE ENTRANCE PIPING

- A. Extend water-service piping and connect to water-supply source and building water piping systems at outside face of building wall in locations and pipe sizes indicated.
  - 1. Terminate water-service piping at building wall until building water piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water piping systems when those systems are installed.
- B. Sleeves and mechanical sleeve seals are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- C. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- D. Anchor service-entry piping to building wall.

### 3.7 PIPING INSTALLATION

- A. Water-Main Connection: Arrange for tap in water main, of size and in location indicated, from water utility.
- B. Make connections larger than 2-inch NPS (DN50) with tapping machine according to the following:
  - 1. Install tapping sleeve and tapping valve according to manufacturer's written instructions.
  - 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
  - 3. Install gate valve onto tapping sleeve. Comply with AWWA C600. Install valve with stem pointing up and with cast-iron valve box.
  - 4. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
- C. Comply with NFPA 24 for fire-protection water-service piping materials and installation.
- D. Install ductile-iron piping according to AWWA C600.
  - 1. Encase piping with PE film according to ASTM A 674 or AWWA C105.
- E. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- F. Install AWWA PVC plastic pipe according to AWWA M23 and ASTM F 645.
- G. Install PE plastic pipe according to ASTM D 2774, ASTM F 645, and manufacturer's written instructions.
- H. Install PEX plastic tubing according to ASTM D 2774, ASTM F 645, and manufacturer's written instructions.
- I. Bury piping with depth of cover over top at least 30 inches (750 mm), with top at least 12 inches (300 mm) below level of maximum frost penetration, and according to the following:
  - 1. Under Driveways: With at least 36 inches (900 mm) cover over top.
  - 2. Under Railroad Tracks: With at least 48 inches (1200 mm) cover over top.
  - 3. In Loose Gravelly Soil and Rock: With at least 12 inches (300 mm) additional cover.
- J. Install piping under streets and other obstructions that cannot be disturbed, by tunneling, jacking, or combination of both.

### 3.8 ANCHORAGE INSTALLATION

- A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
  - 1. Gasketed-Joint, Ductile-Iron, Potable-Water Piping: According to AWWA C600.
  - 2. Fire-Service Piping: According to NFPA 24.

- B. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.
- 3.9 VALVE INSTALLATION
- A. General Application: Use mechanical-joint-end valves for 3-inch NPS (DN80) and larger underground installation. Use threaded- and flanged-end valves for installation in pits. Use nonrising-stem UL/FM gate valves for installation with indicator posts. Use bronze corporation stops and valves, with ends compatible with piping, for 2-inch NPS (DN50) and smaller installation.
  - B. AWWA-Type Gate Valves: Comply with AWWA C600. Install underground valves with stem pointing up and with cast-iron valve box.
  - C. UL/FM-Type Gate Valves: Comply with NFPA 24. Install underground valves and valves in pits with stem pointing up and with vertical cast-iron indicator post.
  - D. Bronze Corporation Stops and Curb Stops: Comply with manufacturer's written instructions. Install underground curb stops with head pointed up and with cast-iron curb box.
- 3.10 FIRE HYDRANT INSTALLATION
- A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.
  - B. UL/FM-Type Fire Hydrants: Comply with NFPA 24.
- 3.11 ROUGHING-IN FOR WATER METERS
- A. Rough-in piping and specialties for water-meter installation according to utility company's written instructions and requirements.
- 3.12 PIT CONSTRUCTION AND INSTALLATION
- A. Construct pits of cast-in-place concrete pits, with manhole frame and cover, ladder, and drain. Include sleeves with waterproof mechanical sleeve seals for pipe entry and exit. Refer to Division 3 Section "Cast-in-Place Concrete."
  - B. Install precast concrete pits according to ASTM C 891.
  - C. Connect area drain outlet to storm drainage piping. Refer to Division 2 Section "Sewerage and Drainage."
- 3.13 DETECTOR CHECK VALVE INSTALLATION
- A. Install detector check valves in pits for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
  - B. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.
- 3.14 BACKFLOW PREVENTER INSTALLATION
- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to plumbing and health department authorities having jurisdiction.
  - B. Do not install reduced-pressure-principle type in pit.
  - C. Do not install bypass around backflow preventer.
  - D. Support backflow preventers, valves, and piping on brick or concrete piers.
- 3.15 FIRE DEPARTMENT CONNECTION INSTALLATION
- A. Install fire department connections of types and features indicated.
  - B. Install ball drip valves at each check valve for fire department connection to mains.
- 3.16 ALARM DEVICE INSTALLATION

- A. General: Comply with NFPA 24 for devices and methods of valve supervision. Underground valves with curb boxes do not require supervision.
- B. Supervisory Switches: Supervise valves in open position.
  - 1. Valves: Grind away portion of exposed valve stem. Bolt switch, with plunger in stem depression, to OS&Y gate-valve yoke.
  - 2. Indicator Posts: Drill and thread hole in upper-barrel section at target plate. Install switch, with toggle against target plate, on barrel of indicator post.
- C. Pressure Switches: Drill and thread hole in exposed barrel of fire hydrant. Install switch.
- D. Water-Flow Indicators: Install in water-service piping in pit. Select indicator with saddle and vane matching pipe size. Drill hole in pipe, insert vane, and bolt saddle to pipe.
- E. Connect alarm devices to building fire alarm system. Refer to Division 16 Section "Fire Alarm Systems" for wiring and devices not specified in this Section.

### 3.17 IDENTIFICATION INSTALLATION

- A. Install continuous plastic underground warning tape during back-filling of trench for underground water-service piping. Locate 6 to 8 inches (150 to 200 mm) below finished grade, directly over piping.

### 3.18 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours.
  - 1. Increase pressure in 50-psig (350-kPa) increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psig (0 kPa). Slowly increase again to test pressure and hold for one more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.
- C. Prepare reports for testing activities.

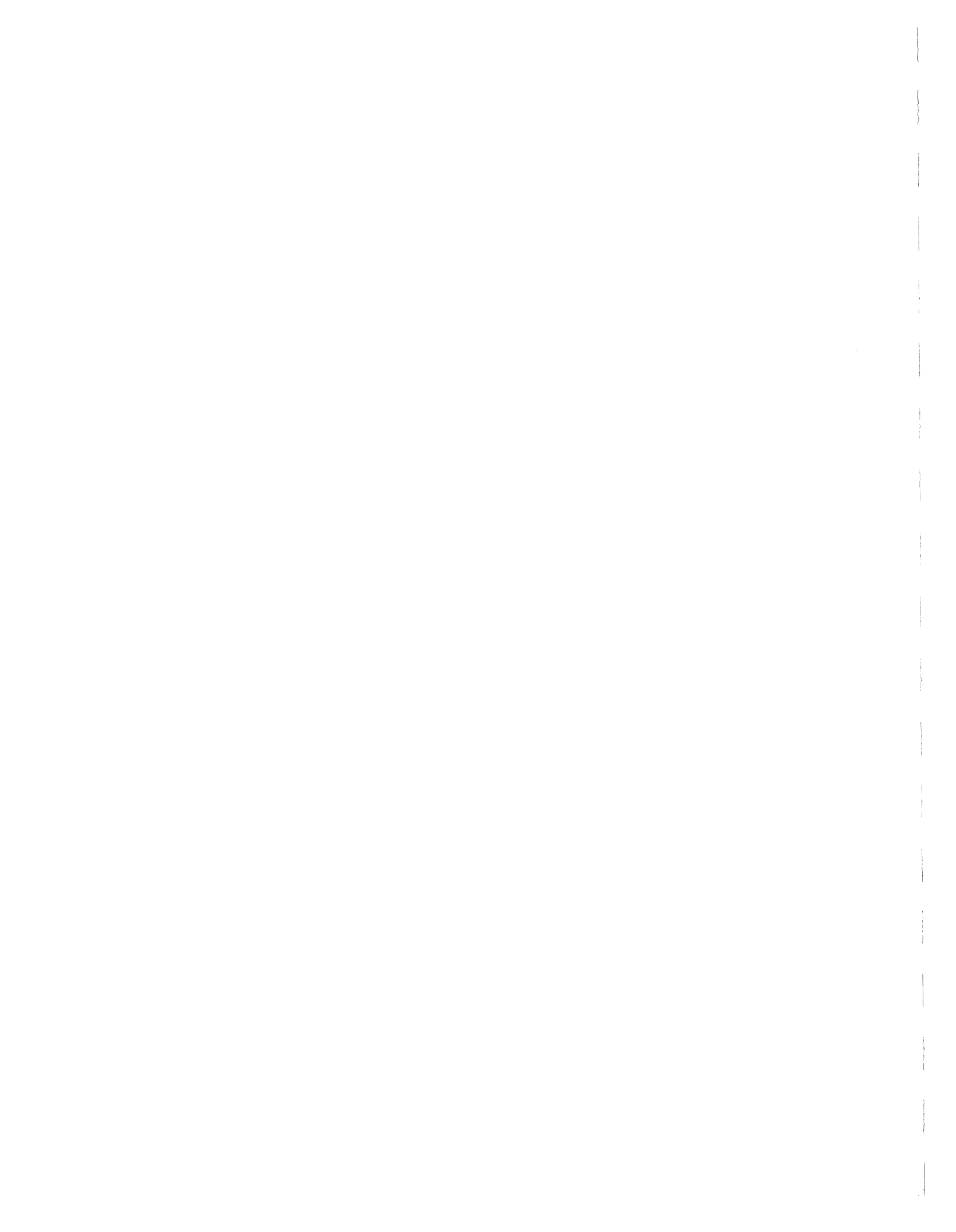
### 3.19 CLEANING

- A. Clean and disinfect water distribution piping as follows:
  - 1. Purge new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
  - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities, use procedure described in AWWA C651 or as described below:
    - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine. Isolate system or part thereof and allow to stand for 24 hours.
    - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
    - c. Following allowed standing time, flush system with clean, potable water until chlorine does not remain in water coming from system.
    - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports for purging and disinfecting activities.

SKRECC Corporate Offices  
Somerset, Kentucky

SECTION 02510  
WATER DISTRIBUTION

END OF SECTION 02510





## SECTION 02530 - SANITARY SEWERAGE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes sanitary sewerage outside the building.
- B. Related Sections include the following:
  - 1. Division 3 Section "Cast-in-Place Concrete" for concrete structures.

#### 1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene-monomer rubber.
- B. PE: Polyethylene plastic.
- C. PVC: Polyvinyl chloride plastic.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

#### 1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Backwater valves and cleanouts.
  - 2. Piping and Fittings.
- B. Design Mix Reports and Calculations: For each class of cast-in-place concrete.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic structures, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

#### 1.7 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.
- B. Locate existing structures and piping to be closed and abandoned.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Architect's written permission.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Gray-Iron Backwater Valves and Cleanouts:
    - a. Josam Co.
    - b. McWane, Inc.; Tyler Pipe; Wade Div.
    - c. Smith: Jay R. Smith Mfg. Co.
    - d. Watts Industries, Inc.; Ancon Drain Div.
    - e. Zurn Industries, Inc.; Hydromechanics Div.
  2. PVC Backwater Valves and Cleanouts:
    - a. Canplas, Inc.
    - b. IPS Corp.
    - c. NDS, Inc.
    - d. Plastic Oddities, Inc.
    - e. Sioux Chief Manufacturing Co., Inc.

## 2.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

## 2.3 PIPES AND FITTINGS

- A. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: ASTM A 74, gray iron, for gasketed joints.
1. Gaskets: ASTM C 564, rubber, compression type, thickness to match class of pipe.
- B. PVC Pressure Pipe: AWWA C900, Class 150, for gasketed joints.
1. PVC Pressure Fittings: AWWA C907, for gasketed joints.
  2. Gaskets for PVC Piping: ASTM F 477, elastomeric seals.
  3. Ductile-Iron, Compact Fittings: AWWA C153, for push-on joints.
  4. Gaskets for Ductile-Iron Fittings: AWWA C111, rubber.
- C. Cellular-Core PVC Pipe: ASTM F 891, Sewer and Drain Series, PS 50 minimum stiffness, for solvent-cemented joints.
1. Fittings: ASTM D 2729 or ASTM D 3034, PVC sewer pipe fittings.
- D. PVC Sewer Pipe and Fittings: According to the following:
1. PVC Sewer Pipe and Fittings, NPS 15 (DN375) and Smaller: ASTM D 3034, SDR 35, for solvent-cemented or gasketed joints.
    - a. Gaskets: ASTM F 477, elastomeric seals.
  2. PVC Sewer Pipe and Fittings, NPS 18 (DN450) and Larger: ASTM F 679, T-1 wall thickness, bell and spigot for gasketed joints.
    - a. Gaskets: ASTM F 477, elastomeric seals.

## 2.4 SPECIAL PIPE COUPLINGS AND FITTINGS

- A. Sleeve-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric sleeve and band assembly fabricated to mate with OD of pipes to be joined, for nonpressure joints.
1. Sleeve Material for Cast-Iron Soil Pipe: ASTM C 564, rubber.
  2. Sleeve Material for Plastic Pipe: ASTM F 477, elastomeric seal.

3. Sleeve Material for Dissimilar Pipe: Compatible with pipe materials being joined.
4. Bands: Stainless steel, at least one at each pipe insert.
- B. Bushing-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric bushing fabricated to mate with OD of smaller pipe and ID of adjoining larger pipe, for nonpressure joints.
  1. Material for Cast-Iron Soil Pipe: ASTM C 564, rubber.
  2. Material for Plastic Pipe: ASTM F 477, elastomeric seal.
  3. Material for Dissimilar Pipe: Compatible with pipe materials being joined.

## 2.5 BACKWATER VALVES

- A. Gray-Iron Backwater Valves: ASME A112.14.1, gray-iron body and bolted cover, with bronze seat.
  1. Horizontal Type: With swing check valve and hub-and-spigot ends.
  2. Combination Horizontal and Manual Gate-Valve Type: With swing check valve, integral gate valve, and hub-and-spigot ends.
  3. Terminal Type: With bronze seat, swing check valve, and hub inlet.
- B. PVC Backwater Valves: Similar to ASME A112.14.1, horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

## 2.6 CLEANOUTS

- A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:
  1. Light Duty: In earth or grass foot-traffic areas.
  2. Medium Duty: In paved foot-traffic areas.
  3. Heavy Duty: In vehicle-traffic service areas.
  4. Extra-Heavy Duty: In roads.
  5. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.
- B. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

### 3.2 IDENTIFICATION

- A. Materials and their installation are specified in Division 2 Section "Earthwork." Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.
  1. Use warning tape or detectable warning tape over ferrous piping.
  2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

### 3.3 PIPING APPLICATIONS

- A. General: Include watertight joints.

- B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.
- C. Gravity-Flow Piping: Use the following:
  - 1. NPS 3 to NPS 6 (DN80 to DN150): Hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  - 2. NPS 3 and NPS 6 (DN80 and DN150): Cellular-core PVC pipe, PVC sewer pipe fittings, and solvent-cemented joints.

### 3.4 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

- A. Special Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.
  - 1. Use the following pipe couplings for nonpressure applications:
    - a. Sleeve type to join piping, of same size, or with small difference in OD.
    - b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.
    - c. Bushing type to join piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
- B. Special Pipe Fittings: Use where indicated. Include PE film, pipe encasement.

### 3.5 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow piping and connect to building's sanitary drains, of sizes and in locations indicated. Terminate piping as indicated.
  - 1. Install piping pitched down in direction of flow, at minimum slope of 2 percent, unless otherwise indicated.
  - 2. Install piping with 36-inch (1000-mm) minimum cover.
- F. Extend sanitary sewerage piping and connect to building's sanitary drains, of sizes and in locations indicated. Terminate piping as indicated.
- G. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.

### 3.6 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. General: Join and install pipe and fittings according to installations indicated.
- B. Refer to Division 2 Section "Utility Materials" for basic piping joint construction and installation.
- C. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: With rubber gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook." Use gaskets that match class of pipe and fittings.

- D. PVC Sewer Pipe and Fittings: As follows:
    - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
    - 2. Join profile sewer pipe fittings with gaskets according to ASTM D 2321 and manufacturer's written instructions.
    - 3. Install according to ASTM D 2321.
  - E. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.
  - F. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.
  - G. Install with top surfaces of components, except piping, flush with finished surface.
- 3.7 CONCRETE PLACEMENT
- A. Place cast-in-place concrete according to ACI 318 and ACI 350R.
- 3.8 BACKWATER VALVE INSTALLATION
- A. Install horizontal units in piping where indicated.
  - B. Install combination units in piping and in structures where indicated.
  - C. Install terminal units on end of piping and in structures where indicated. Secure units to structure walls.
- 3.9 CLEANOUT INSTALLATION
- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
  - B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches (450 by 450 by 300 mm) deep. Set with tops 1 inch (25 mm) above surrounding grade.
  - C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.
- 3.10 TAP CONNECTIONS
- A. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.
  - B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch (150-mm) overlap, with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
  - C. Make branch connections from side into existing piping, NPS 4 to NPS 20 (DN100 to DN500). Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
  - D. Make branch connections from side into existing piping, NPS 21 (DN525) or larger, or to underground structures by cutting opening into existing unit large enough to allow 3 inches (76 mm) of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches (150 mm) of concrete for minimum length of 12 inches (300 mm) to provide additional support of collar from connection to undisturbed ground.
    - 1. Use concrete that will attain minimum 28-day compressive strength of 3000 psi (20.7 MPa), unless otherwise indicated.

2. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
- E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.
- 3.11 CLOSING ABANDONED SANITARY SEWERAGE SYSTEMS
- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
1. Close open ends of piping with at least 8-inch- (200-mm-) thick, brick masonry bulkheads.
  2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Structures: Excavate around structure as required and use one procedure below:
1. Remove structure and close open ends of remaining piping.
  2. Remove top of structure down to at least 36 inches (1000 mm) below final grade. Fill to within 12 inches (300 mm) of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
  3. Backfill to grade according to Division 2 Section "Earthwork."
- 3.12 FIELD QUALITY CONTROL
- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
1. Place plug in end of incomplete piping at end of day and when work stops.
  2. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.
1. Submit separate reports for each system inspection.
  2. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    - c. Crushed, broken, cracked, or otherwise damaged piping.
    - d. Infiltration: Water leakage into piping.
    - e. Exfiltration: Water leakage from or around piping.
  3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  4. Reinspect and repeat procedure until results are satisfactory.
- C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
  2. Test completed piping systems according to authorities having jurisdiction.

3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate reports for each test.
5. If authorities having jurisdiction do not have published procedures, perform tests as follows:
  - a. Sanitary Sewerage: Perform hydrostatic test.
    - 1) Allowable leakage is maximum of 50 gal. per inch of nominal pipe size per mile (4.6 L per millimeter of nominal pipe size per kilometer) of pipe, during 24-hour period.
    - 2) Close openings in system and fill with water.
    - 3) Purge air and refill with water.
    - 4) Disconnect water supply.
    - 5) Test and inspect joints for leaks.
    - 6) Option: Test ductile-iron piping according to AWWA C600, Section "Hydrostatic Testing." Use test pressure of at least 10 psig (69 kPa).
6. Manholes: Perform hydraulic test according to ASTM C 969 (ASTM C 969M).
7. Leaks and loss in test pressure constitute defects that must be repaired.
8. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION 02530





## SECTION 02552 - GROUND-LOOP, HEAT-PUMP PIPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes piping for vertical, direct-buried, ground-loop, heat-pump systems that operate between 23 and 104 deg F (minus 5 and plus 40 deg C).

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
  - 1. Ground-Loop, Heat-Pump Piping: 160 psig (1100 kPa).

#### 1.4 DEFINITIONS

- A. PE: Polyethylene.
- B. PVC: Polyvinyl chloride.

#### 1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Pipe and fittings.
  - 2. Joining method and equipment.
  - 3. Propylene glycol solution.
- B. Field quality-control test reports.
- C. Record Drawings of bore hole and header pipe locations, furnishing dimensions from 2 identifiable locations on the building for each borehole.

#### 1.6 QUALITY CONTROL

- A. Contractor performing this work shall have a minimum of 5 years experience in drilling bore holes and installing earth coupled systems. Contractor shall have the equipment and personnel in his company to perform all work.

#### 1.7 WARRANTY

- A. Contractor shall furnish a written (5) year warranty for the entire ground loop piping system against any leakage or failure. Under this warranty any leakage or failure shall be repaired or replaced at no cost to the Owner including additional bore holes as required and all cutting and patching of paved areas or re-sodding of grass areas. All such work shall meet the approval of the Owner and/or the Architect.

### PART 2 - PRODUCTS

#### 2.1 PIPES AND FITTINGS

- A. PE Pipe: ASTM D 2239, SDR Numbers 5.3, 7, 9, or 11.5; with PE compound number required to achieve required system working pressure.
  - 1. Molded PE Fittings: ASTM D 2683 or ASTM D 3261, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.
- B. U-Bend Assembly: Factory fabricated with embossed depth stamp every 36 inches (900 mm) from U-bend.

## 2.2 BOREHOLE BACKFILL

- A. Surface Seal: Bentonite with thermal conductivity greater than 1.2 Btu/h x sq. ft. x deg F (0.7 W/sq. m x K).
- B. Backfill below Surface Seal: #9 gravel. Meter installation of backfill and record on log.

## 2.3 ANTIFREEZE SOLUTION

- A. Propylene Glycol: Minimum 99 percent propylene glycol with corrosion inhibitors and environmental stabilizer additives to be mixed with water to protect the piping circuit and connected equipment from physical damage from freezing or corrosion.
- B. Quantity: Sufficient solution for initial system startup and for preventive maintenance for one year from date of Substantial Completion.
- C. Dilution Water: Chloride content shall be less than 25 ppm, sulfate less than 25 ppm, and hardness less than 100 ppm.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Excavating, trenching, warning tape, and backfilling are specified in Division 2 Section "Earthwork."
- B. Contain all water and mud generated during drilling operations, keeping it off the adjoining properties.

### 3.2 HORIZONTAL PIPING INSTALLATION

- A. Remove rocks in trenches that could contact pipe.
- B. Encase header piping within 4 inch bedding (below, beside, and above pipe) with sand or #9 gravel. Backfill to sub grade with compacted dense grade aggregate.
- C. Install PE piping in trenches according to ASTM D 2774 or ASTM F 645.
  - 1. Clean PE pipe and fittings and make heat-fusion joints according to ASTM D 2657. Minimize number of joints.
- D. Purge, flush, and pressure test piping before backfilling trenches.
- E. Install continuous detectable warning tape for underground piping. Locate tape a minimum of 24 inches (600 mm) below finished grade, directly over piping.
- F. Common piping installation requirements are specified in Division 2 Section "Piped Utilities - Basic Materials and Methods."

### 3.3 VERTICAL PIPING INSTALLATION

- A. Boreholes shall have a minimum diameter of 6 inches.
- B. Install PE piping in boreholes according to ASTM D 2774 or ASTM F 645.
  - 1. Clean PE pipe and fittings and make heat-fusion joints according to ASTM D 2657. Minimize number of joints.
- C. Purge, flush, and pressure test piping before backfilling boreholes.
- D. Fill piping loop with water or antifreeze solution during installation of loop into borehole, and pump backfill into borehole to discharge at base of borehole.
- E. Fill borehole with backfill to a point at least 25 feet below grade and backfill remainder with surface seal material.
- F. Extend piping and connect to water-source, ground-loop, heat-pump piping systems at outside face of building wall in locations and pipe sizes indicated.

1. Terminate water-service piping at building wall until building water-source, ground-loop, heat-pump piping systems are installed. Terminate piping with caps. Make connections to building water-source, ground-loop, heat-pump piping systems when those systems are installed.
  - G. Wall sleeves and mechanical sleeve seals are specified in Division 15 Section "Basic Mechanical Materials and Methods."
  - H. If existing voids or caves are encountered while drilling bore holes, well casings may be required to be installed in these areas. All casing requirements and lengths shall be verified on the job by the Architect before any extra funds will be allowed for such work.
- 3.4 ANTIFREEZE SOLUTION FILL
- A. Ground loop piping shall be flushed and purged of air. Purging and flushing equipment must be capable of filtering ground loop water and be capable of reversing direction of water flow in the ground loop system without disconnecting the purge unit from the system. After the purging and flushing is completed, fill the system with fresh water containing a 20% propylene glycol solution and charge system to 30 psi.
  - B. Test the dilute solution using gas chromatography to verify concentration of propylene glycol, and forward report to Architect.
- 3.5 CONNECTIONS
- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- 3.6 FIELD QUALITY CONTROL
- A. Perform testing in accordance with piping manufacturer's recommendations.
  - B. Piping Tests: Fill piping 24 hours before testing and apply test pressure to stabilize piping. Use potable water only.
  - C. Hydrostatic Tests: All piping shall be hydrostatically pressure tested at 100 psi prior to installing in the bore hole. After pipe is placed in bore hole, hydrostatic test to 100 psi for 3 hours. The Engineer shall be notified 48 hours in advance of all tests.
  - D. Prepare reports of testing activity.

END OF SECTION 02552



SECTION 02630  
STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes gravity-flow, nonpressure storm drainage outside the building, with the following components:
  - 1. Special fittings for expansion and deflection.
  - 2. Storm pipe.
  - 3. Precast concrete drainage structures.

1.3 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.
- B. HDPE: High Density Polyethylene pipe.
- C. RCP: Reinforced Concrete Pipe

1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: Pipe joints shall be at least silttight, unless otherwise indicated.

1.5 SUBMITTALS

- A. Shop Drawings: For the following:
  - 1. Manholes: Include plans, elevations, sections, details, and frames and covers.
  - 2. Catch Basins and Stormwater Inlets. Include plans, elevations, sections, details, and frames, covers, and grates.
  - 3. Stormwater Detention Structures: Include plans, elevations, sections, details, frames and covers, design calculations, and concrete design-mix report.
  - 4. Downspout Adaptors: Include plans, elevations and sections.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.
- D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

## 1.7 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
  - 1. Notify Landscape Architect no fewer than two (2) days in advance of proposed interruption of service.
  - 2. Do not proceed with interruption of service without Owner's written permission.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

### 2.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, fitting, and joining materials.

### 2.3 HDPE PIPE AND FITTINGS

- A. Corrugated PE Drainage Pipe and Fittings: AASHTO M 252M, Type S, with smooth waterway for coupling joints.
  - 1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.
  - 2. Corrugated PE Pipe and Fittings NPS 12 to NPS 48 (DN 250 to DN 1200): AASHTO M 294M, Type S, with smooth waterway for coupling joints.

## 2.4 REINFORCED CONCRETE PIPE AND FITTINGS

- A. ASTM C 76 with bell-and-spigot ends and gasketed joints with ASTM C 443, rubber gaskets.

## 2.5 NONPRESSURE-TYPE PIPE COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
  - 1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.

## 2.6 MANHOLES

- A. Standard Precast Concrete Manholes: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for sealant joints.
  - 1. Diameter: 48 inches (1200 mm) minimum, unless otherwise indicated.
  - 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
  - 3. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (102-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
  - 4. Riser Sections: 4-inch (102-mm) minimum thickness, and lengths to provide depth indicated.
  - 5. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
  - 6. Joint Sealant: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
  - 7. Resilient Pipe Connectors: ASTM C 923 (ASTM C 923M), cast or fitted into manhole walls, for each pipe connection.
  - 8. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches (1500 mm).
  - 9. Grade Rings: Reinforced-concrete rings, 6- to 9-inch (150- to 225-mm) total thickness, to match diameter of manhole frame and cover.
  - 10. Protective Coating: Plant-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint.
  - 11. Manhole Frames and Covers: Ferrous; 24-inch (610-mm) ID by 7- to 9-inch (175- to 225-mm) riser with 4-inch- (102-mm-) minimum width flange and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."

- a. Material: ASTM A 536, Grade 60-40-18 ductile iron, unless otherwise indicated.
- b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil (0.26-mm) minimum thickness applied to all surfaces, unless otherwise indicated.

## 2.7 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318/318R, ACI 350R, and the following:
  1. Cement: ASTM C 150, Type II.
  2. Fine Aggregate: ASTM C 33, sand.
  3. Coarse Aggregate: ASTM C 33, crushed gravel.
  4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious materials ratio.
  1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (420 MPa), deformed steel.
- C. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with 0.58 maximum water-cementitious materials ratio.
  1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (420 MPa), deformed steel.

## 2.8 CATCH BASINS

- A. Standard Precast Concrete Catch Basins: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for sealant joints.
  1. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (102-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
  2. Riser Sections: 4-inch (102-mm) minimum thickness, 48-inch (1220-mm) diameter, and lengths to provide depth indicated.
  3. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
  4. Joint Sealant: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
  5. Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and grate.
  6. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch (300- to 400-mm) intervals.



Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches (1500 mm).

7. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

## 2.9 CLEANOUTS

- A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.

1. Manufacturers:

- a. Josam Company.
- b. MIFAB Manufacturing Inc.
- c. Smith, Jay R. Mfg. Co.
- d. Wade Div.; Tyler Pipe.
- e. Watts Industries, Inc.
- f. Watts Industries, Inc.; Enpoco, Inc. Div.
- g. Zurn Industries, Inc.; Zurn Specification Drainage Operation.

2. Top-Loading Classification(s): Heavy duty in pavement and medium duty in landscape areas.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

### 3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
  - 1. Install piping pitched down in direction of flow, at minimum slope as indicated.
  - 2. Install HDPE corrugated sewer piping according to CPPA's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."

### 3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following:
  - 1. Join corrugated HDPE piping according to CPPA 100 and the following:
    - a. Use silttight couplings for Type 1, silttight joints.
  - 2. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasket joints.

### 3.4 DRAIN INSTALLATION

- A. Install drains of type and location as indicated on the drawings.
- B. Fasten grates to drains if indicated.
- C. Set drain frames and covers with tops flush with pavement surface.

### 3.5 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections according to ASTM C 891.
- C. Construct cast-in-place manholes as indicated.
- D. Install PE sheeting on earth where cast-in-place-concrete manholes are to be built.
- E. Install FRP manholes according to manufacturer's written instructions.
- F. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches (76 mm) above finished surface elsewhere, unless otherwise indicated.

### 3.6 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

### 3.7 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318/318R.

### 3.8 CONNECTIONS

- A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Division 15 Section "Storm Drainage Piping."

### 3.9 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

- 1. Close open ends of piping with at least 8-inch- (203-mm-) thick, brick masonry bulkheads.
- 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

- B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:

- 1. Remove manhole or structure and close open ends of remaining piping.
- 2. Remove top of manhole or structure down to at least 36 inches (915 mm) below final grade. Fill to within 12 inches (300 mm) of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

- C. Backfill to grade according to Division 2 Section "Earthwork."

### 3.10 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (610 mm) of backfill is in place, and again at completion of Project.

- 1. Submit separate reports for each system inspection.

3.11 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 02630

## SECTION 02722

### SITE SIGNAGE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes furnishing and erecting traffic signs in accordance with these specifications and at the location shown on the plans or directed. Traffic signs include ground-mounted signs.

- 1. Panel signs.

##### 1.2 SUBMITTALS

- A. Product Data: For each product indicated.

- B. Shop Drawings: Include elevations, sections, details, and attachments to other Work.

- 1. Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 2. Provide message list for each sign, including large-scale details of lettering layout.

- C. Samples: For each sign material indicated that involves color selection.

##### 1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

#### PART 2 - PRODUCTS

##### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

## 2.2 PANEL SIGNS

- A. General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Available Manufacturers:
  1. Allenite Signs; Allen Marking Products, Inc.
  2. American Graphics Inc.
  3. Andco Industries Corp.
  4. APCO Graphics, Inc.
  5. ASI Sign Systems, Inc.
  6. Best Manufacturing Co.
  7. Grimco, Inc.
  8. Innerface Sign Systems, Inc.
  9. Kaltech Industries Group, Inc.
  10. Mills Manufacturing, Inc.
  11. Mohawk Sign Systems.
  12. Seton Identification Products.
  13. Signature Signs, Inc.
  14. Supersine Company (The).
- C. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of 5005-H15.
- D. Graphic Content and Style: Provide sign copy that complies with requirements indicated on Drawings for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.

## 2.3 ACCESSORIES

- A. Vinyl Film: Provide opaque reflective vinyl film, 0.0035-inch (0.089-mm) minimum thickness, with pressure-sensitive adhesive backing suitable for both exterior and interior applications.
- B. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

## 2.4 ALUMINUM FINISHES

- A. Baked-Enamel Finish: Manufacturer's standard baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
  - 1. Color: As selected from manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.
  - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.

END OF SECTION





SECTION 02741  
HOT-MIX ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Hot-mix asphalt paving.
- 2. Hot-mix asphalt paving overlay.
- 3. Pavement-marking paint.
- 4. Cold milling of existing hot-mix asphalt pavement.

- B. Related Sections include the following:

- 1. Division 2 Section "Earthwork" for aggregate subbase and base courses and for aggregate pavement shoulders.
- 2. Division 2 Section "Pavement Joint Sealants" for joint sealants and fillers at paving terminations.
- 3. Division 2 Section "Unit Pavers" for bituminous setting bed for pavers.

1.3 DEFINITIONS

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.
- B. DOT: Department of Transportation.

1.4 SYSTEM DESCRIPTION

- A. Provide hot-mix asphalt paving according to materials, workmanship, and other applicable requirements of standard specifications of state or local DOT.
  - 1. Standard Specification: Kentucky Department of Transportation standard specification for Road and Bridge Construction, latest edition.

### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
- B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- C. Job-Mix Designs: For each job mix proposed for the Work.
- D. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international graphics symbol, spaces dedicated to people with disabilities.
- E. Qualification Data: For manufacturer.
- F. Material Test Reports: For each paving material.
- G. Material Certificates: For each paving material, signed by manufacturers.

### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer.
  - 1. Manufacturer shall be a paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of the state in which Project is located.
- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated, as documented according to ASTM E 548.
- C. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

### 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 deg F (15.5 deg C).
  2. Slurry Coat: Comply with weather limitations of ASTM D 3910.
  3. Asphalt Base Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.
  4. Asphalt Surface Course: Minimum surface temperature of 60 deg F (15.5 deg C) at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4 deg C) for oil-based materials, 50 deg F (10 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

## PART 2 - PRODUCTS

### 2.1 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Aggregate leveling course: AASHTO M43, #2 (1 ½" to 2 ½") clean, uniformly graded alone or gravel.
- C. Aggregate base: dense graded aggregate. Comply with Section 806 of the KYDOT standard specification for Road and Bridge Construction.

### 2.2 ASPHALT MATERIALS

- A. Asphalt base course: Complying with Section 806 of the KYDOT standard specification for Road and Bridge Construction.
- B. Asphalt surface course: (copy same as item A).
- C. Prime Coat: Asphalt emulsion prime complying with KYDOT requirements.
- D. Tack Coat: ASTM D 977 or AASHTO M 140, emulsified asphalt or ASTM D 2397 or AASHTO M 208, cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- E. Water: Potable.

### 2.3 AUXILIARY MATERIALS

- A. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, with drying time of less than 20 minutes.
  1. Colors: White, yellow and blue.
- B. Glass Beads: AASHTO M 247, Type 1.

## 2.4 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types"; and complying with the following requirements:
  - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.
- B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

### 3.2 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
  - 1. Mill to a depth of 1-1/2 (19 mm) or 4 inches (51 mm) as indicated on plans.
  - 2. Mill to a uniform finished surface free of gouges, grooves, and ridges.
  - 3. Control rate of milling to prevent tearing of existing asphalt course.
  - 4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
  - 5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
  - 6. Transport milled hot-mix asphalt to asphalt recycling facility.
  - 7. Keep milled pavement surface free of loose material and dust.

### 3.3 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
  - 1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

- B. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. (0.7 to 2.3 L/sq. m). Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure for 72 hours minimum.
  - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
  - 2. Protect primed substrate from damage until ready to receive paving.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).
  - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
  - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

### 3.4 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
  - 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
  - 2. Place hot-mix asphalt surface course in single lift.
  - 3. Spread mix at minimum temperature of 250 deg F (121 deg C).
  - 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
  - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
  - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

### 3.5 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

### 3.6 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
  1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
  1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
  2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

### 3.7 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
  - 1. Base Course: Plus or minus 1/2 inch (13 mm).
  - 2. Surface Course: Plus 1/4 inch (6 mm), no minus.
- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:
  - 1. Base Course: 1/4 inch (6 mm).
  - 2. Surface Course: 1/8 inch (3 mm).
  - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch (6 mm).

### 3.8 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Landscape Architect.
- B. Double solid yellow centerline shall be installed on access road centerlines. Parking stalls shall be marked with white lines. Handicap parking symbols, stalls, and unloading aisles shall be blue.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).
  - 1. Broadcast glass spheres uniformly into wet pavement markings at a rate of 6 lb/gal. (0.72 kg/L).

### 3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.
  - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

- C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.
  - 1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
  - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
    - a. One core sample will be taken for every 1000 sq. yd. (836 sq. m) or less of installed pavement, with no fewer than 3 cores taken.
    - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

### 3.10 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
  - 1. Do not allow excavated materials to accumulate on-site.

END OF SECTION 02741



SECTION 02751  
CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
  - 1. Curb and gutter.
  - 2. Sidewalks.
  - 3. Heavy duty pavement.
  - 4. Dumpster pads.
- B. Related Sections include the following:
  - 1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.
  - 2. Division 2 Section "Pavement Joint Sealants" for joint sealants of joints in concrete pavement and at isolation joints of concrete pavement with adjacent construction.
  - 3. Division 3 Section "Cast-in-Place Concrete" for general building applications of concrete.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Field quality control test reports.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

## 1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
  - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

### 2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
  - 1. Use flexible or curved forms for curves with a radius 100 feet (30.5 m) or less.

- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

### 2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
- C. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.
- D. Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- E. Hook Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
  - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

### 2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use one of the following cementitious materials, of the same type, brand, and source throughout the Project:
  - 1. Portland Cement: ASTM C 150, Type I, gray white.
- B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate, uniformly graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm).
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

## 2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

1. Products:

- a. Axim Concrete Technologies; Cimfilm.
- b. Burke by Edeco; BurkeFilm.
- c. ChemMasters; Spray-Film.
- d. Conspec Marketing & Manufacturing Co., Inc.; Aquafilm.
- e. Dayton Superior Corporation; Sure Film.
- f. Euclid Chemical Company (The); Eucobar.
- g. Kaufman Products, Inc.; Vapor Aid.
- h. Lambert Corporation; Lambco Skin.
- i. L&M Construction Chemicals, Inc.; E-Con.
- j. MBT Protection and Repair, ChemRex Inc.; Confilm.
- k. Meadows, W. R., Inc.; Sealtight Evapre.
- l. Metalcrete Industries; Waterhold.
- m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
- n. Sika Corporation, Inc.; SikaFilm.
- o. Symons Corporation; Finishing Aid.
- p. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.

- E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

1. Products:

- a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
- b. Burke by Edoko; Aqua Resin Cure.
- c. ChemMasters; Safe-Cure Clear.
- d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
- e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
- f. Euclid Chemical Company (The); Kurez DR VOX.
- g. Kaufman Products, Inc.; Thinfilm 420.
- h. Lambert Corporation; Aqua Kure-Clear.
- i. L&M Construction Chemicals, Inc.; L&M Cure R.
- j. Meadows, W. R., Inc.; 1100 Clear.
- k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.

- l. Symons Corporation; Resi-Chem Clear.
- m. Tamms Industries Inc.; Horncure WB 30.
- n. Unitex; Hydro Cure 309.
- o. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

## 2.6 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 3500 psi (24.1 MPa).
  - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
  - 3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
  - 1. Air Content: 5-1/2 percent plus or minus 1.5 percent for 1-1/2-inch (38-mm) nominal maximum aggregate size.
  - 2. Air Content: 6 percent plus or minus 1.5 percent for 1-inch (25-mm) nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
  - 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).
  - 2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).

3. Subbase with soft spots and areas of pumping or rutting exceeding depth of [1/2 inch (13 mm)] require correction according to requirements in Division 2 Section "Earthwork."

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

### 3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

### 3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

### 3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

### 3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
  2. Provide tie bars at sides of pavement strips where indicated.
  3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 50 feet (15.25 m), unless otherwise indicated.
  2. Extend joint fillers full width and depth of joint.
  3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
  4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
  5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
  6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows to match jointing of existing adjacent concrete pavement:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch (6-mm) radius. Repeat grooving of contraction joints after applying surface finishes.
  2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes.

### 3.6 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site.
- F. Do not add water to fresh concrete after testing.
- G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
  - 1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Landscape Architect.
- J. Screed pavement surfaces with a straightedge and strike off.
- K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- L. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.



- M. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
  2. Do not use frozen materials or materials containing ice or snow.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- N. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface by hand floating. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture. Provide window frame edges as indicated on plans.

### 3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written

instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
  - 1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

### 3.9 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
  - 1. Elevation: 1/4 inch (6 mm).
  - 2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
  - 3. Surface: Gap below 10-foot- (3-m-) long, unlevelled straightedge not to exceed 1/4 inch (6 mm).
  - 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch (25 mm).
  - 5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch (6 mm).
  - 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch (13 mm).
  - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches (6 mm per 300 mm).
  - 8. Joint Spacing: 3 inches (75 mm).
  - 9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
  - 10. Joint Width: Plus 1/8 inch (3 mm), no minus.

### 3.10 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Landscape Architect.
- B. Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).
  - 1. Spread glass beads uniformly into wet pavement markings at a rate of 6 lb/gal. (0.72 kg/L).

### 3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. (76 cu. m) or 5000 sq. ft. (465 sq. m) or fraction thereof of each concrete mix placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
  - 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
  - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. Test results shall be reported in writing to Landscape Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Landscape Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Landscape Architect.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.12 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Landscape Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751

SECTION 02764  
PAVEMENT JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Expansion and contraction joints within cement concrete pavement.
  - 2. Joints between cement concrete and other materials.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each type and color of joint sealant required.
- C. Product certificates.
- D. Compatibility and Adhesion Test Reports: From sealant manufacturer.

1.3 QUALITY ASSURANCE

- A. Preconstruction Compatibility and Adhesion Testing: Submit samples of materials that will contact or affect joint sealants to joint-sealant manufacturers for testing according to ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

## 2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
  - 1. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Colors of Exposed Joint Sealants: As selected by Landscape Architect from manufacturer's full range.

## 2.3 COLD-APPLIED JOINT SEALANTS

- A. Multicomponent Jet-Fuel-Resistant Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:
  - 1. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.

## 2.4 JOINT-SEALANT BACKER MATERIALS

- A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
- B. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience.
- C. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

- D. Install backer materials to support sealants during application and at position required to produce optimum sealant movement capability. Do not leave gaps between ends of backer materials. Do not stretch, twist, puncture, or tear backer materials. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.
- E. Install sealants at the same time backings are installed to completely fill recesses provided for each joint configuration and to produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
- G. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 02764





SECTION 02821  
CHAIN-LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Chain-Link Fences: Industrial.
  - 2. Gates: Horizontal slide.
- B. Related Section s include the following:
  - 1. Division 2 Section "Earthwork" for site excavation, fill, and backfill where chain-link fences and gates are located.
  - 2. Division 3 Section "Cast-in-Place Concrete" for concrete equipment bases/pads for gate operators, drives, and controls and post concrete fill.
  - 3. Division 16 Sections for electrical service and connections for motor operators, controls, limit and disconnect switches, and safety features and for system disconnect switches.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Minimum Post Size and Maximum Spacing for Wind Velocity Pressure: Determine based on mesh size and pattern specified, and on the following minimum design wind pressures and according to CLFMI WLG 2445:
    - a. Wind Speed: 80 mph.
    - b. Fence Height: 8 feet.
    - c. Line Post Group: Schedule 40 steel pipe.
    - d. Wind Exposure Category: B.
  - 2. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 12 feet (3.66 m) high, and post spacing not to exceed 10 feet (3 m).

- B. Lightning Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

#### 1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
  - 1. Fence and gate posts, rails, and fittings.
  - 2. Chain-link fabric, reinforcements, and attachments.
  - 3. Gates and hardware.
  - 4. Gate operators, including operating instructions.
  - 5. Accessories: Privacy slats.
  - 6. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
- B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.
  - 1. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
  - 2. Wiring Diagrams: Power and control wiring and communication and access-control features.
  - 3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Initial Selection: Manufacturer's color charts or 6-inch (150-mm) lengths of actual units showing the full range of colors available for components with factory-applied color finishes.
- D. Product Certificates: For each type of chain-link fence, operator, and gate, signed by product manufacturer.
  - 1. Strength test results for framing according to ASTM F 1043.
- E. Qualification Data: For Installer.
- F. Field quality-control test reports.
- G. Maintenance Data: For the following to include in maintenance manuals:
  - 1. Gate operator.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
  - 1. Engineering Responsibility: Preparation of data for chain-link fences and gates, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified according to NETA ETT, or the National Institute for Certification in Engineering Technologies, to supervise on-site testing specified in Part 3.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. UL Standard: Provide gate operators that comply with UL 325.
- E. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators serving as a required means of access.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Include 10 ft. (3 m) length of fence and gate complying with requirements.
    - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
  - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.
- B. Interruption of Existing Utility Service: Do not interrupt utility services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Architect no fewer than two days in advance of proposed interruption of utility services.
  - 2. Do not proceed with interruption of utility services without Architect's written permission.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Chain-Link Cantilever Sliding Gates:
    - a. Structural Cantilever Slide Gate by Tymetal Corporation
  - 2. Gate Operator:
    - a. TYM 1300/1700 by Tymetal Corporation

### 2.2 CHAIN-LINK FENCE FABRIC

- A. General: 8' height. Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:
  - 1. Steel Wire Fabric: Metallic-coated wire with a diameter of 0.148 inch (3.76 mm).
    - a. Mesh Size: 2 inches (50 mm).
    - b. Weight of Metallic (Zinc) Coating: ASTM A 392, Type II, Class 1, 1.2 oz./sq. ft. with zinc coating applied after weaving.
  - 2. Selvage: Twisted top and knuckled bottom.

## 2.3 INDUSTRIAL FENCE FRAMING

- A. Posts and Rails: Comply with ASTM F 1043 for framing, ASTM F 1083 for Group IC round pipe, and the following:
1. Group: IA, round steel pipe, Schedule 40.
  2. Fence Height: 8 feet (2.44 m).
  3. Strength Requirement: Heavy industrial according to ASTM F 1043.
  4. Post Diameter and Thickness: According to ASTM F 1043.
  5. Post Size and Thickness: According to ASTM F 1043.
    - a. Top & Bottom Rail: 1.66 inches (42 mm).
    - b. Line Post: 2.375 inches (60 mm).
    - c. End, Corner and Pull Post: 2.875 inches (73 mm).
    - d. Horizontal-Slide Gate Post: According to ASTM F 1184.
      - 1) Openings Wider Than 12 Feet (3.7 m): Steel post, 4-inch (102-mm) diameter, and 8.65-lb/ft. (12.88-kg/m) weight.
      - 2) Guide posts for Class 1 horizontal-slide gates equal the gate post height, 1 size smaller, but weight is not less than 3.11 lb/ft. (4.63 kg/m); installed adjacent to gate post to permit gate to slide in space between.
  6. Coating for Steel Framing:
    - a. Metallic Coating:
      - 1) Type A, consisting of not less than minimum 2.0-oz./sq. ft. average zinc coating per ASTM A 123/A 123M.

## 2.4 INDUSTRIAL HORIZONTAL-SLIDE GATES

- A. General: Comply with ASTM F 1184 for slide gate types.
1. Classification: Type II Cantilever Slide, Class 1 with external roller assemblies.
  2. Metal Pipe and Tubing: Aluminum. Comply with ASTM F 699 for materials and protective coatings.
- B. Frames and Bracing: Fabricate members from aluminum tubing with outside dimension and weight according to ASTM F 1184 and the following:
1. Gate Fabric Height: 6 feet (1.83 m).
  2. Gate Opening Width: Varies as necessary to accommodate each driveway width.
  3. Frame Members:
    - a. Tubular Aluminum: 2 inches (50 mm) rectangular.
  4. Bracing Members:
    - a. Tubular Aluminum]: 2 inches (50 mm) rectangular.

C. Frame Corner Construction:

1. Welded frame with panels assembled with bolted or riveted corner fittings.

D. Track Assembly: Manufacturer's standard track, with framing supports, bracing, and accessories, engineered to support size, weight, width, operation, and design of gate and roller assemblies.

E. Roller Guards: As required per ASTM F 1184 for Type II, Class 1 gates.

F. Hardware: Latches permitting operation from both sides of gate, locking devices, hangers, roller assemblies and stops fabricated from galvanized steel. Fabricate latches with integral eye openings for padlocking; Owner supplied padlock accessible from both sides of gate.

## 2.5 FITTINGS

A. General: Comply with ASTM F 626.

B. Post and Line Caps: Provide for each post.

1. Line post caps with loop to receive tension wire or top rail.

C. Rail and Brace Ends: Attach rails securely to each gate, corner, pull, and end post.

D. Rail Fittings: Provide the following:

1. Top Rail Sleeves: Pressed –steel or round-steel tubing not less than 6 inches (152 mm) long.
2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.

E. Tension and Brace Bands: Pressed steel.

F. Tension Bars: Steel, length not less than 2 inches (50 mm) shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.

G. Truss Rod Assemblies: Steel, rod and turnbuckle or other means of adjustment.

H. Tie Wires, Clips, and Fasteners: According to ASTM F 626.

1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
  - a. Hot-Dip Galvanized Steel: 0.148-inch- (3.76-mm diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.

I. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. (366 g /sq. m) zinc.

## 2.6 GATE OPERATORS

- A. General: Provide factory-assembled automatic operating system designed for gate size, type, weight, and operation frequency. Provide operation control system with characteristics suitable for Project conditions, with remote-control stations, safety devices, and weatherproof enclosures; coordinate electrical requirements with building electrical system.
  1. Provide operator designed so motor may be removed without disturbing limit-switch adjustment and without affecting auxiliary emergency operator.
  2. Provide operator with UL -approved components.
  3. Provide electronic components with built-in troubleshooting diagnostic feature.
  4. Provide unit designed and wired for both right-hand/left-hand opening, permitting universal installation.
- B. Comply with NFPA 70.
- C. Motor Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, within installed environment, with indicated operating sequence, and without exceeding nameplate rating or considering service factor. Comply with NEMA MG-1 and the following:
  1. Voltage: Coordinate with electrical drawings/specifications.
  2. Horsepower: Up to 1hp, as required for each gate size/weight.
  3. Enclosure: Manufacturer's standard.
  4. Duty: Continuous duty at ambient temperature of 105 deg F (40 deg C) and at altitude of 3300 feet (1005 m) above sea level.
  5. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
  6. Phase: Coordinate with electrical drawings/specifications.
- D. Gate Operators: Gate mounted and as follows:
  1. Mechanical Slide Gate Operators:
    - a. Duty: Heavy duty, commercial/industrial.
    - b. Gate Speed: Minimum 60 feet (18.2 m) per minute.
    - c. Maximum Gate Weight: 1300 lbs. for TYM 1300 and 1700 lbs. for TYM 1700.
    - d. Frequency of Use: Continuous duty.
  2. Remote Controls: Coordinate with electrical drawings/specifications.
- E. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor(s) causes operator to immediately function as follows:
  1. Action: Reverse gate in both opening and closing cycles and hold until clear of obstruction.

2. Internal Sensor: Built-in torque or current monitor senses gate is obstructed.
  - a. Sensor Edge: Contact-pressure-sensitive safety edge, profile, and sensitivity designed for type of gate and component indicated and as required by code.
- F. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop gate at fully retracted and fully extended positions.
- G. Emergency Release Mechanism: Quick-disconnect release of operator drive system of the following type of mechanism, permitting manual operation if operator fails. Design system so control circuit power is disconnected during manual operation.
  1. Type: Integral fail-safe release, allowing gate to be pushed open without mechanical devices, keys, cranks, or special knowledge.
  2. Type: Mechanical device, key, or crank-activated release.
- H. Operating Features:
  1. Digital Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features. Provide unit that is isolated from voltage spikes and surges.
  2. System Integration: With controlling circuit board capable of accepting any type of input from external devices.
  3. Master/Slave Capability: Control stations designed and wired for gate pair operation.
  4. Automatic Closing Timer: With adjustable time delay before closing.
  5. Open Override Circuit: Designed to override closing commands.
  6. Reversal Time Delay: Designed to protect gate system from shock load on reversal in both directions.
  7. Maximum Run Timer: Designed to prevent damage to gate system by shutting down system if normal time to open gate is exceeded.
  8. Clock Timer: Seven-day programmable for regular events.
- I. Accessories:
  1. Warning Module: ADA-compliant, light and alarm sounding three to five seconds in advance of gate operation and continuing until gate stops moving.
  2. Battery Backup System: Battery-powered drive and access control system, independent of primary drive system:
    - a. Fail Secure: Gate cycles on battery power, then fail safe when battery is discharged.
  3. Intercom System: Coordinate with electrical drawings/specifications.
  4. Instructional, Safety, and Warning Labels and Signs: According to UL 325.

## 2.7 CAST-IN-PLACE CONCRETE

- A. Materials: Portland cement complying with ASTM C 150, Type I aggregates complying with ASTM C 33, and potable water for ready-mixed concrete complying with ASTM C 94/C 94M.



1. Concrete Mixes: Normal-weight concrete with not less than 3000-psi (20.7-MPa) compressive strength (28 days), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum size aggregate.
- B. Materials: Dry-packaged concrete mix complying with ASTM C 387 for normal-weight concrete mixed with potable water according to manufacturer's written instructions.

## 2.8 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

## 2.9 FENCE GROUNDING

- A. Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
  1. Material above Finished Grade: Aluminum.
  2. Material on or below Finished Grade: Copper.
  3. Bonding Jumpers: Braided copper tape, 1 inch (25 mm) wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.
- B. Connectors and Grounding Rods: Comply with UL 467.
  1. Connectors for Below-Grade Use: Exothermic welded type.
  2. Grounding Rods: Copper-clad steel.
    - a. Size: 5/8 by 96 inches (16 by 2440 mm).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.
  1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

### 3.3 INSTALLATION, GENERAL

- A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.
  1. Install fencing on established boundary lines inside property line and where otherwise indicated on the plans.

### 3.4 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
  1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
  2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
    - a. Concealed Concrete: Top 2 inches (50 mm) below grade to allow covering with surface material.
- C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.
- D. Line Posts: Space line posts uniformly at maximum 10 feet (3 m) o.c.
- E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.
  1. Locate horizontal braces at midheight of fabric greater than 8 feet, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- F. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive

rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

- G. Bottom Rails: Install, spanning between posts.
- H. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1 inch (25.4 mm) between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches (380 mm) o.c.
- J. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
  - 1. Maximum Spacing: Tie fabric to line posts at 12 inches (300 mm) o.c. and to braces at 24 inches (610 mm) o.c.
- K. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

### 3.5 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

### 3.6 GATE OPERATOR INSTALLATION

- A. General: Install gate operators according to manufacturer's written instructions, aligned and true to fence line and grade.
- B. Excavation for Support Posts or Pedestals: Hand-excavate holes for bases/pads, in firm, undisturbed soil to dimensions and depths and at locations as required by gate-operator component manufacturer's written instructions and as indicated.
- C. Comply with NFPA 70 and manufacturer's written instructions for grounding of electric-powered motors, controls, and other devices.

### 3.7 GROUNDING AND BONDING

- A. Fence Grounding: Install at maximum intervals of 1500 feet (450 m) except as follows:

1. Fences within 100 Feet (30 m) of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet (225 m).
  - a. Gates and Other Fence Openings: Ground fence on each side of opening.
    - 1) Bond metal gates to gate posts.
    - 2) Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches (460 mm) below finished grade.
  - B. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet (45 m) on each side of crossing.
  - C. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2, unless otherwise indicated.
  - D. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches (150 mm) below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location.
  - E. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.
  - F. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
    1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
    2. Make connections with clean, bare metal at points of contact.
    3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
    4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
    5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
  - G. Bonding to Lightning Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor complying with NFPA 780.

### 3.8 FIELD QUALITY CONTROL

- A. Grounding-Resistance Testing: Owner will engage a qualified independent testing and inspecting agency to perform field quality-control testing.
  1. Grounding-Resistance Tests: Subject completed grounding system to a megger test at each grounding location. Measure grounding resistance not less than two

full days after last trace of precipitation, without soil having been moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural grounding resistance. Perform tests by two-point method according to IEEE 81.

2. Excessive Grounding Resistance: If resistance to grounding exceeds specified value, notify Architect promptly. Include recommendations for reducing grounding resistance and a proposal to accomplish recommended work.
3. Report: Prepare test reports certified by a testing agency of grounding resistance at each test location. Include observations of weather and other phenomena that may affect test results.

### 3.9 ADJUSTING

- A. Gate: Adjust gate to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Automatic Gate Operator: Energize circuits to electrical equipment and devices. Adjust operators, controls, safety devices, alarms and limit switches.
  1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  2. Test and adjust controls, alarms and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lubricate hardware, gate operator, and other moving parts.

### 3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain gates. Refer to Division 1 Section "Closeout Procedures" and/or "Demonstration and Training."

END OF SECTION 02821



SECTION 02826  
ORNAMENTAL METAL FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Swing gates.
- B. Related Sections:
  - 1. Division 03 Section "Cast-in-Place Concrete" for concrete post concrete fill.

1.3 PERFORMANCE REQUIREMENTS

- A. Lightning-Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For gates. Include plans, elevations, sections, details, and attachments to other work.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.

## PART 2 - PRODUCTS

### 2.1 ALUMINUM FENCE

- A. Echelon Plus, Monarch style, 2-rail, 4' height, 6' panel width with 4" spacing of pickets and ball caps on posts by Ameristar.
- B. Aluminum, General: Provide alloys and tempers with not less than the strength and durability properties of alloy and temper designated in paragraphs below for each aluminum form required.
- C. Tubing: ASTM B 429, Alloy 6063-T6.
- D. Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- E. Die and Hand Forgings: ASTM B 247 (ASTM B 247M), Alloy 6061-T6.
- F. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

### 2.2 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
  - 1. For aluminum, provide type and alloy as recommended by producer of metal to be welded and as required for strength and compatibility in fabricated items.
- B. Concrete: Normal-weight, air-entrained, ready-mix concrete complying with requirements in Division 03 Section "Cast-in-Place Concrete" with a minimum 28-day compressive strength of 3000 psi (20 MPa), 3-inch (75-mm) slump, and 1-inch (25-mm) maximum aggregate size or dry, packaged, normal-weight concrete mix complying with ASTM C 387 mixed with potable water according to manufacturer's written instructions.
- C. Nonshrink Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107 and specifically recommended by manufacturer for exterior applications.

### 2.3 GROUNDING MATERIALS

- A. Grounding Conductors: Bare, solid wire for No. 6 AWG and smaller; stranded wire for No. 4 AWG and larger.
  - 1. Material above Finished Grade: Aluminum.
  - 2. Material on or below Finished Grade: Copper.
  - 3. Bonding Jumpers: Braided copper tape, 1 inch (25 mm) wide, woven of No. 30 AWG bare copper wire, terminated with copper ferrules.



- B. Grounding Connectors and Grounding Rods: Comply with UL 467.
  - 1. Connectors for Below-Grade Use: Exothermic-welded type.
  - 2. Grounding Rods: Copper-clad steel.
    - a. Size: 5/8 by 96 inches (16 by 2440 mm).

## 2.4 SWING GATES

- A. Gate: To match fence style.
- B. Gate Frame Height: As indicated on Drawings.
- C. Gate Opening Width: As indicated on Drawings.
- D. Aluminum Posts, Frames and Rails: Fabricate members from square extruded-aluminum tubes 4 by 4 inches, 2-1/2 by 2-1/2 inches and U-Channels 1-1/2 by 1-3/8 inches.
- E. Infill: Comply with requirements for adjacent fence.
- F. Picket Size and Spacing: 1" pickets spaced less than 4" face to face.
- G. Hardware: Latches permitting operation from both sides of gate, hinges, and keepers for each gate leaf more than 5 feet (1.52 m) wide. Provide center gate stops and cane bolts for pairs of gates. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.
- H. Hinges: BHMA A156.1, Grade 1, suitable for exterior use.
  - 1. Function: 39 - Full surface, triple weight, antifriction bearing.
  - 2. Material: Wrought steel, forged steel, cast steel, or malleable iron.

## 2.5 ALUMINUM FINISHES

- A. Powder-Coat Finish: Polyester resin based powder coating applied to a minimum dry film thickness of 2.5 mils. Baked finish at 450 degrees F for 20 minutes.
  - 1. Color: Black.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.

- B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Stake locations of gates and posts.
  - 1. Construction layout and field engineering are specified in Division 01 Section "Execution"

### 3.3 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

### 3.4 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

END OF SECTION 02826

SECTION 02870  
SITE AND STREET FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Trash receptacles.
2. Ash urns.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples: For each type of exposed finish and for each color and texture required.
- C. Maintenance data.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  1. Products: Subject to compliance with requirements, provide the products specified, or submit data in order to determine equal products 7 days in advance of bid.

2.2 MATERIALS

- A. Steel:
  1. Plates, Shapes, and Bars: ASTM A 36/A 36M.
  2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53, or electric-resistance-welded pipe complying with ASTM A 135.
  3. Tubing: Cold-formed steel tubing complying with ASTM A 500.
  4. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513, or steel tubing fabricated from steel complying with ASTM A 569/A 569M and complying with dimensional tolerances in ASTM A 500; zinc coated internally and externally.

5. Sheet: Commercial steel sheet complying with ASTM A 569/A 569M.
  6. Baked-Enamel, Powder-Coat Finish: Manufacturer's standard, baked, polyester-TGIC, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.
- B. Anchors, Fasteners, Fittings, and Hardware: Commercial quality; tamperproof, vandal and theft resistant, concealed, recessed, and capped or plugged. Provide as required for site and street furnishings' assembly, mounting, and secure attachment.
1. Material: Stainless steel.
  2. Anchor bolts: For inconspicuously bolting legs of site and street furnishings to on-grade substrate.
  3. Antitheft Hold-Down Brackets: For securing site and street furnishings to substrate.
- C. Nonshrink, Nonmetallic Grout: ASTM C 1107; for exterior applications.

### 2.3 TRASH RECEPTACLES

- A. Products:
1. 36 gallon receptacle by Victor Stanley, Steelsites series, Model: A-36. 1-800-368-2573.
  2. Side door opening.
- B. Steel Facing Surrounds: Evenly spaced, parallel steel straps.
- C. Support Frames: Steel; welded.
- D. Inner Container: High density, rigid plastic container designed to be removable and reusable.
- E. Service Access: Removable lid or top, inner container lifts out for emptying.
- F. Steel Finish: powder-coated.
1. Color: As selected by Landscape Architect from manufacturer's standard colors.

### 2.4 ASH URNS

- A. Products:
1. Stainless steel 10" W x 12.5" H x 3" D box with two cigarette butt openings on front. Available through Belson Outdoors, Inc. ([www.belson.com](http://www.belson.com)) or Smokers Urn World.
  2. Front door opening.

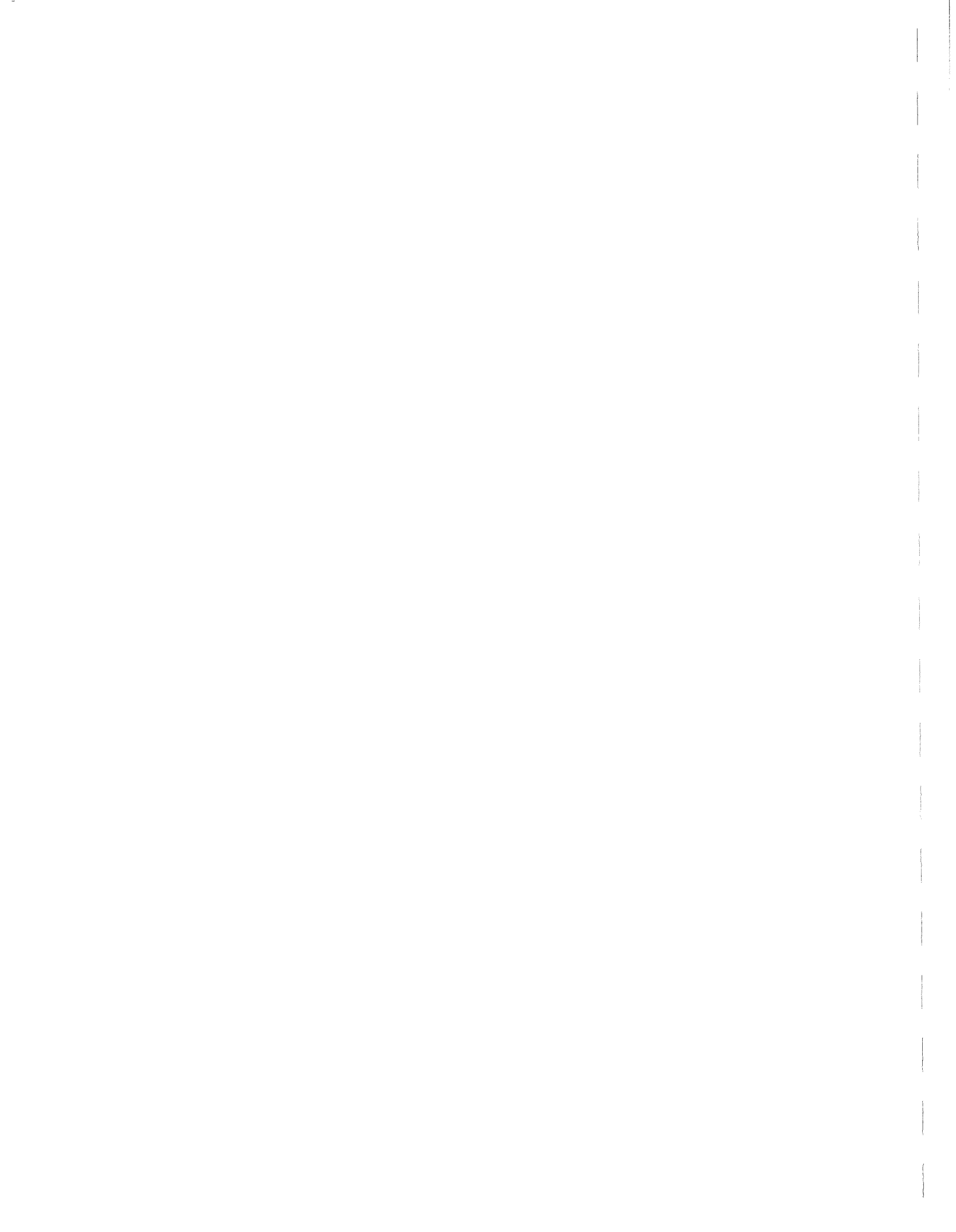
- B. Service Access: Removable, lockable front.
  - 1. Installation Method: Mounted on wall with hardware included by manufacturer.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Complete field assembly of site and street furnishings, where required.
- B. Install site and street furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.

END OF SECTION



SECTION 02920  
LAWNS AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Hydroseeding.
  - 2. Sodding.
  - 3. Lawn renovation.
  - 4. Erosion control blankets and turf reinforcement mats.
- B. Related Sections include the following:
  - 1. Division 2 Section "Site Clearing" for topsoil stripping and stockpiling.
  - 2. Division 2 Section "Earthwork" for excavation, filling and backfilling, and rough grading.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each

species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for sod, identifying source, including name and telephone number of supplier.
- C. Product Certificates: For soil amendments and fertilizers, signed by product manufacturer.
  - D. Qualification Data: For landscape Installer.
  - E. Material Test Reports: For existing surface soil and imported topsoil.
  - F. Planting Schedule: Indicating anticipated planting dates for each type of planting.
  - G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of lawns during a calendar year. Submit before expiration of required maintenance periods.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape contractor with a minimum of three (3) years experience with successful lawn establishment.
  1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
  1. Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce a satisfactory topsoil.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
- E. Contractor shall schedule an inspection by the Landscape Architect of areas following finish grading and prior to seeding. Notifications shall be given two (2) days in advance of seeding operations.
- F. Another inspection by the Landscape Architect shall be required following notification by the Contractor that seeding and mulching operations are complete.



## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."

## 1.7 SCHEDULING

- A. Planting Restrictions: Seed during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
  - 1. Spring Planting: March 1 – May 30
  - 2. Fall Planting: August 1 – October 15
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

## 1.8 LAWN MAINTENANCE

- A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
  - 1. Seeded Lawns: 60 days from date of Substantial Completion.
    - a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.
  - 2. Sodded Lawns: 30 days from date of Substantial Completion.
- B. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.
  - 1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.
- C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches (100 mm) for a minimum of three (3) weeks after seeding or throughout the maintenance period, whichever is greater.
  - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

2. Water lawn at a minimum rate of 1 inch (25 mm) per week, including rainfall. Complete reliance on rainfall, even for large sites, is unacceptable, if less than one inch of rain occurs per week.
  3. Contractor shall provide the water or reimburse the Owner for water usage.
- D. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
1. Mow grass 2 to 3 inches (50 to 75 mm) high.
- E. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) to lawn area.

## PART 2 - PRODUCTS

### 2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
  1. Proportioned by weight as follows:
    - a. 90 percent turf type tall fescue (*Festuca arundinacea*), blend of minimum of three (3) cultivars.
    - b. 10 percent annual rye.
  2. Sow rate: 175 lbs./acre (4 lbs./1000 s.f.)

### 2.2 TURFGRASS SOD

- A. Turfgrass Sod: Certified, complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.
- B. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

1. Turf type tall fescue (*Festuca arundinacea*).

## 2.3 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of one percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth. Provide 6" minimum depth in lawn areas.
  1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
    - a. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from bogs or marshes.

## 2.4 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:
  1. Class: Class T, with a minimum 99 percent passing through No. 8 (2.36-mm) sieve and a minimum 75 percent passing through No. 60 (0.25-mm) sieve.
  2. Provide lime in form of dolomitic limestone.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 6 (3.35-mm) sieve and a maximum 10 percent passing through No. 40 (0.425-mm) sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Aluminum Sulfate: Commercial grade, unadulterated.
- E. Perlite: Horticultural perlite, soil amendment grade.
- F. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.
- G. Sand: Clean, washed, natural or manufactured, free of toxic materials.
- H. Diatomaceous Earth: Calcined, diatomaceous earth, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
- I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

## 2.5 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
  - 1. Organic Matter Content: 50 to 60 percent of dry weight.
  - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
- C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

## 2.6 PLANTING ACCESSORIES

- A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

## 2.7 FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
  - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
  - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

## 2.8 MULCHES

- A. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- B. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

## 2.9 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat stitched to a photodegradable plastic mesh capable of stabilizing up to 2:1 slopes. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long or biodegradable resin stakes by North American Green. Acceptable erosion control blanket manufacturers include: Western Excelsior Corporation ([www.westernexcelsior.com](http://www.westernexcelsior.com)) or North American Green ([www.nagreen.com](http://www.nagreen.com)).
- B. Turf Reinforcement Mats: Composite mat consisting of three UV stable nets stitched to a wood excelsior or coconut-fiber mat capable of withstanding >10 fps flow velocities in drainage channels. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long or biodegradable resin stakes by North American Green. Acceptable turf reinforcement mat manufacturers include: Western Excelsior Corporation ([www.westernexcelsior.com](http://www.westernexcelsior.com)) or North American Green ([www.nagreen.com](http://www.nagreen.com)).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
  - 1. Protect adjacent and adjoining areas from hydroseeding overspray.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

### 3.3 LAWN PREPARATION

- A. Limit lawn subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1 inch (25 mm) in any dimension and large quantities of smaller rock, including remnants of gravel stockpiles, as well as sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
  - 1. Apply fertilizer directly to subgrade before loosening.
  - 2. Spread topsoil, apply fertilizer on surface, and thoroughly blend planting soil mix.

- a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
      - b. Mix lime with dry soil before mixing fertilizer.
    3. Spread planting soil mix to a depth of 6 inches minimum but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
      - a. Spread approximately one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 2 inches (50 mm) of subgrade. Spread remainder of planting soil mix.
      - b. Reduce elevation of planting soil to allow for soil thickness of sod.
  - C. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
    1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
    2. Loosen surface soil to a depth of at least of 6 inches (150 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.
      - a. Apply fertilizer directly to surface soil before loosening.
    3. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter. Also remove large quantities of smaller rock, specifically remnants of gravel stockpiles.
    4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
  - D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. No clods greater than ½" in diameter shall remain. Finish grading shall be performed with appropriate equipment such as box grader, not with a bobcat or backhoe. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.
  - E. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
  - F. Restore areas if eroded or otherwise disturbed after finish grading and before planting.
- 3.4 HYDROSEEDING
- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with nonasphaltic tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 2000-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.
3. Install erosion control blankets over seeded areas on slopes greater than or equal to 3:1 or as indicated on the plans. Install turf reinforcement mat over seeded drainage channels as indicated on the plans. Secure erosion control blankets and turf reinforcement mats with staples or resin stakes as detailed on plans.

### 3.5 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
  1. Lay sod across angle of slopes exceeding 3:1.
  2. Anchor sod on slopes exceeding 6:1 with metal staples or resin stakes spaced as recommended by sod producer but not less than 2 anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within two hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches (38 mm) below sod.

### 3.6 LAWN RENOVATION

- A. Renovate existing lawn.
- B. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
  1. Reestablish lawn where settlement or washouts occur or where minor regrading is required.
- C. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.
- D. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

- E. Mow, dethatch, core aerate, and rake existing lawn.
- F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches (150 mm).
- I. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 4 inches (100 mm) of existing soil. Provide new planting soil to fill low spots and meet finish grades.
- J. Hydroseed as required for new lawns.
- K. Water newly planted areas and keep moist until new lawn is established.

### 3.7 SATISFACTORY LAWNS

- A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm).
- B. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, well-rooted, even-colored, viable lawn has been established, free of weeds, open joints, bare areas, and surface irregularities.
- C. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

### 3.8 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.
- C. Remove erosion-control measures after grass establishment period.

END OF SECTION



SECTION 02930

EXTERIOR PLANTS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide trees, plants, and ground covers as shown and specified. The work includes:
  - 1. Soil preparation.
  - 2. Trees, plants, and ground covers.
  - 3. Planting mixes.
  - 4. Mulch and planting accessories.
  - 5. Maintenance.
- B. Related Work:
  - 1. Section 02300: Earthwork.
  - 2. Section 02920: Lawns and Grasses

1.02 QUALITY ASSURANCE

- A. Comply with Section 02000 requirements.
- B. Plant names indicated, comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed conform generally with names accepted by the nursery trade. Provide stock true to botanical name and legibly tagged.
- C. Comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock". A plant shall be dimensioned as it stands in its natural position.
- D. All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of 2 years.
- E. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional cost, and providing that the larger plants will not be cut back to size indicated. Provide plants indicated by two measurements so that only a maximum of 25% are of the minimum size indicated and 75% are of the maximum size indicated.
- F. Provide "specimen" plants with a special height, shape, or character of growth. Tag specimen trees or shrubs at the source of supply. The Architect will inspect

specimen selections at the source of supply for suitability and adaptability to selected location. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval.

- G. Plants may be inspected and approved at the place of growth, for compliance with specification requirements for quality, size, and variety. Contractor shall pay all associated expenses for Consultant's travel beyond fifty (50) miles of the project site.
  - 1. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work.
- H. Provide and pay for material testing. Testing agency shall be acceptable to the Architect. Provide the following data:
  - 1. Test representative material samples proposed for use.
  - 2. Topsoil:
    - a. pH factor.
    - b. Mechanical analysis.
    - c. Percentage of organic content.
    - d. Recommendations on type and quantity of additives required to establish satisfactory pH factor and supply of nutrients to bring nutrients to satisfactory level for planting.
  - 3. Peat Moss:
    - a. Loss of weight by ignition.
    - b. Moisture absorption capacity.

### 1.03 SUBMITTALS

- A. Submit the following material samples:
  - 1. Mulch.
- B. Submit the following materials certification:
  - 1. Topsoil source and pH value.
  - 2. Peat moss.
  - 3. Plant fertilizer.
- C. Provide plant material record drawings:

1. Legibly mark drawings to record actual construction.
2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.
3. Identify field changes of dimension and detail and changes made by Change Order.

#### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fertilizer materials in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. Store in manner to prevent wetting and deterioration.
- B. Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Spray deciduous plants in foliage with an approved "Anti-Desiccant" immediately after digging to prevent dehydration. Dig, pack, transport, and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival, the certificate shall be filed with the Architect. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss, or in a manner acceptable to the Architect. Water heeled-in plantings daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches.
- C. Cover plants transported on open vehicles with a protective covering to prevent wind burn.
- D. Provide dry, loose topsoil for planting bed mixes. Frozen or muddy topsoil is not acceptable.

#### 1.05 PROJECT CONDITIONS

- A. Work notification: Notify Architect at least 7 working days prior to installation of plant material for approval of proposed plant locations. All plant locations to be staked in field prior to visit. Stakes shall be labeled with plant name.
- B. Protect existing utilities, paving, and other facilities from damage caused by landscaping operations.
- C. A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the drawings. In the event that quantity discrepancies or material omissions occur in the plant materials list, the plant symbols shall govern.

#### 1.06 WARRANTY

- A. Warrant plant material to remain alive and be in healthy, vigorous condition for a period of 1 year after completion and acceptance of the entire project.

1. Inspection of plants will be made by the Landscape Architect at completion of planting.
- B. Replace, in accordance with the drawings and specifications, all plants that are dead or, as determined by the Architect, are in an unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence. The cost of such replacement(s) is at Contractor's expense. Warrant all replacement plants for 1 year after installation.
- C. Warranty shall not include damage or loss of trees, plants, or ground covers caused by fires, floods, freezing rains, lightning storms, or winds over 75 miles per hour, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on the part of the Owner.
- D. Remove and immediately replace all plants, as determined by the Architect, to be unsatisfactory during the initial planting installation.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Plants: Provide plants typical of their species or variety; with normal, densely-developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth during storage.
  1. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock". Cracked or mushroomed balls are not acceptable.
  2. Container-grown stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
    - a. No plants shall be loose in the container.
    - b. Container stock shall not be pot bound.
  3. Provide tree species that mature at heights over 25 feet with a single main trunk. Trees that have the main trunk forming a "Y" shape are not acceptable.
  4. Plants planted in rows shall be matched in form.

5. Plants larger than those specified in the plant list may be used when acceptable to the Architect.
  - a. If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.
6. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the plant list.
7. No pruning wounds shall be present with a diameter of more than 1" and such wounds must show vigorous bark on all edges.
8. Evergreen trees shall be branched to the ground.
9. Shrubs and small plants shall meet the requirements for spread and height indicated in the plant list.
  - a. The measurements for height shall be taken from the ground level to the height of the top of the plant and not the longest branch.
  - b. Single stemmed or thin plants will not be accepted.
  - c. Side branches shall be generous, well-twiggged, and the plant as a whole well-bushed to the ground.
  - d. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other root or branch injuries.

## 2.02 ACCESSORIES

- A. Topsoil for Planting Beds: Fertile, friable, natural topsoil of loamy character, without admixture of subsoil material, obtained from a well-drained arable site, reasonably free from clay, lumps, coarse sands, stones, plants, roots, sticks, and other foreign materials, with acidity range of between pH 6.0 and 6.8 and a minimum organic matter content of 1% and meeting the definition of topsoil of the Kentucky Department of Transportation.
  1. Topsoil that has been stripped and stockpiled on site shall be the topsoil to be utilized on this project. Provide additional topsoil if necessary.
  2. Provide topsoil free of substances harmful to the plants that will be grown in the soil.
- B. Peat Moss: Brown to black in color, weed and seed free granulated raw peat or baled peat, containing not more than 9% mineral on a dry basis.
  1. Provide ASTM D2607 sphagnum peat moss with a pH below 6.0 for ericaceous plants.
- C. Fertilizer:

1. Plant Fertilizer Type "A": Commercial type approved by the Architect, containing 5% nitrogen, 10% phosphoric acid, and 5% potash by weight. 1/4 of nitrogen in the form of nitrates, 1/4 in form of ammonia salt, and 1/2 in form of organic nitrogen.
2. Plant Fertilizer Type "B": Approved acid-base fertilizer.
- D. Anti-Desiccant: Protective film emulsion providing a protective film over plant surfaces; permeable to permit transpiration. Mixed and applied in accordance with manufacturer's instructions.
- E. Mulch: 6 month old well rotted shredded native hardwood bark mulch not larger than 4" in length and 1/2" in width, free of wood chips and sawdust.
- F. Water: Free of substances harmful to plant growth. Hoses or other methods of transportation furnished by Contractor.
- G. Stakes for Staking: Hardwood, 2" x 2" x 8'-0" long.
- H. Stakes for Guying: Hardwood, 2" x 2" x 36" long.
- I. Guying/Staking/Strap: 3/4" flat woven polypropylene material.
- J. Twine: Two-ply jute material.

### PART 3 EXECUTION

#### 3.01 INSPECTION

- A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.

#### 3.02 PREPARATION

- A. Time of planting:
  1. Evergreen material: Plant evergreen materials between September 1 and November 1 or in spring before new growth begins. If project requirements require planting at other times, plants shall be sprayed with anti-desiccant prior to planting operations.
  2. Deciduous material: Plant deciduous materials in a dormant condition. If deciduous trees are planted in-leaf, they shall be sprayed with an anti-desiccant prior to planting operation.
  3. Planting times other than those indicated shall be acceptable to the Architect.

- B. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.
- C. Locate plants as indicated or as approved in the field after staking by the Contractor. If obstructions are encountered that are not shown on the drawings, do not proceed with planting operations until alternate plant locations have been selected.
- D. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide pits at least twice the diameter of the root system for trees and shrubs. Depth of pit shall accommodate the root system. Provide undisturbed subgrade to hold root ball at nursery grade as shown on the drawings. Remove excavated materials from the site.
- E. Provide pre-mixed planting mixture for use around the balls and roots of the plants consisting of planting topsoil and 1/2 lb. plant fertilizer Type "A" for each cu. yd. of mixture.
- F. Provide pre-mixed planting mixture for use around the balls and roots of ericaceous plants consisting of 1 part planting topsoil to 1 part sphagnum peat moss and 1/2 lb. plant fertilizer Type "B" per cu. yd. of mixture.

### 3.03 INSTALLATION

- A. Set plant material in the planting pit to proper grade and alignment. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure. Set plant material 2"-3" above the finish grade. No filling will be permitted around trunks or stems. Backfill the pit with planting mixture. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water.
- B. After balled and burlapped plants are set, muddle planting soil mixture around bases of balls and fill all voids.
  - 1. Remove all burlap, ropes, and wires from the tops of balls.
- C. Mulching:
  - 1. Mulch tree and shrub planting pits and shrub beds with required mulching material 3" deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.
- D. Guying, staking:
  - 1. Staking/Guying:
    - a. Stake/guy all trees immediately after lawn seeding or sodding operations and prior to acceptance. When high winds or other conditions, which may effect tree survival or appearance, occur, the Architect may require immediate staking/guying.

- b. Stake deciduous trees and guy loosely with  $\frac{3}{4}$ " polypropylene strap material. Stake evergreen trees under 8'-0" tall.

2. All work shall be acceptable to the Architect.

E. Pruning:

1. Remove or cut back broken, damaged, and unsymmetrical growth of new wood.
2. Multiple leader plants: Preserve the leader which will best promote the symmetry of the plant. Cut branches flush with the trunk or main branch, at a point beyond a lateral shoot or bud a distance of not less than  $\frac{1}{2}$  the diameter of the supporting branch. Make cut on an angle.
3. Prune evergreens only to remove broken or damaged branches.

3.04 MAINTENANCE

- A. Maintain plantings until completion and acceptance of the entire project.
- B. Maintenance shall include pruning, cultivating, weeding, watering, and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.
  1. Re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
  2. Reconnect and repair guy wires and stakes as required.
  3. Correct defective work as soon as possible after deficiencies become apparent and weather and season permit.
  4. Water trees, plants, and ground cover beds within the first 24 hours of initial planting, and not less than twice per week until final acceptance.

3.05 ACCEPTANCE

- A. Inspection to determine acceptance of planted areas will be made by the Architect, upon Contractor's request. Provide notification at least 10 working days before requested inspection date.
  1. Planted areas will be accepted provided all requirements, including maintenance, have been complied with and plant materials are alive and in a healthy, vigorous condition.
- B. Contractor shall continue maintenance until completion and acceptance of the entire project.

3.06 CLEANING



- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soils, debris, and equipment. Repair damage resulting from planting operations.

END OF SECTION

## SECTION 03130 – PERMANENT FORMS – INSULATED CONCRETE FORMS

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section specifies the provision and installation of insulated concrete forms and the installation of reinforcing steel within formwork.
  - 1. Furnish all labor, materials, tools and equipment to perform the installation of Insulated Concrete Forms.
  - 2. Furnish all labor to include placement of reinforcing steel within forms and final cleanup.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Structural Special Inspection."
  - 2. Division 3 Section "Cast-In-Place Concrete."
  - 3. Division 4 Section "Unit Masonry."
  - 4. Division 7 Section "Thermal and Moisture Protection."
  - 5. Division 7 Section "Exterior Insulation Finishing System."
- C. Coordination: Unless other satisfactory agreements are specifically entered into by contractors concerned, all miscellaneous iron and steel, sleeves, anchors, etc., required by work of other contractors, will be furnished and installed by such other contractors with the cooperation of this contractor.
- D. Products supplied but not specified or installed under this section:
  - 1. *EPS* compatible modified bituminous sheet waterproofing membrane.
  - 2. *EPS* compatible parge coat.
- E. Products installed but not specified or supplied under this section:
  - 1. Reinforcing steel.
  - 2. Window and Door opening bucks.
- F. Adequate bracing and false work shall be provided by the Installing Contractor to comply with all applicable Codes and hold the formwork to proper lines and level.

#### 1.3 DEFINITIONS

- A. *EPS*- Acronym for "Expanded Polystyrene" when referencing the insulating foam component of the Insulated Concrete Form.

- B. *ICF*- Acronym for “Insulated Concrete Form.”
- C. *Access & Form Alignment System*- a form alignment & scaffold system designed exclusively for use with Insulated Concrete Forms.
- D. *Window or Door Opening Buck*- a pre-manufactured or site constructed frame assembly consisting of wood or plastic material (or combination thereof) used to frame a rough opening within the forming system that will retain concrete around the opening. The frame can also provide for subsequent anchorage of doors and windows within the wall assembly.

#### 1.4 SYSTEM DESCRIPTION / PERFORMANCE REQUIREMENTS

- A. Insulated concrete wall forming system shall consist of 2 flame resistant panels of expanded polystyrene (*EPS*) connected by either high-density polypropylene hinged pin foldable webs or *EPS* embedded polystyrene fastening strips interconnected with slide in format - high density polypropylene web connectors.
- B. All web fastening strips to run full height of form and be fitted top and bottom with reversible fitting, “triple-tooth” interlocking mechanisms to enable positive vertical interlocking of forms with each other. Wall system webs to provide min. 1 ½” (38mm) wide fastening strips @ 8” (200mm) o/c approx 1/2” (13mm) below wall face for full wall height to facilitate finish fastening of both interior and exterior finishes.
  - 1. Full height fastening strips also to be positioned within corner forms to provide capability of connecting finishes full height within 4” (100mm) or less of all corner conditions.
- C. All form units may be constructed capable of being shipped to site in folded condition to minimize shipping cost and site storage space requirement. Foldable forms shall be capable of being deployed to installation ready condition by simply unfolding the unit in a single pull motion or pull motion combined with insertion of a single web (at corner condition).
- D. *EPS* foam panels shall be moulded with single socket 1” (25mm) wide reversible tooth interlocks positioned in pairs along top of all panels.
- E. Wall system to provide minimum specified concrete thickness at all locations throughout wall area.
- F. Wall system to provide accurate positioning of steel within form cavity to conform to reinforcing requirements of ACI 318.
  - 1. Reinforcing bar positioners shall be capable of supporting vertical reinforcing placed at any spacing and horizontal reinforcing placed at 18” on center. Alternate reinforcing spacing may be requested of Architect/Engineer; however, Insulated Concrete Form Installer shall be responsible for all additional cost of placing reinforcement size and spacing to as designed by Architect/Engineer to accommodate the form system.

- G. *EPS* foam panels with concrete to provide min. insulation level of R 22.4 across full line of form unit cavity widths.
- H. *EPS* foam to provide maximum vapor permeation of 3.5 Perm-in. (200 ng/Pa.s.m<sup>2</sup>)/25mm.
- I. Finished wall assembly to provide min. rating of STC sound attenuation performance as follows:
  - 1. 4" (100mm) core form STC 45 (when installed without finish).
  - 2. 6" core and thicker - STC 50.

## 1.5 SUBMITTALS

- A. General: Submit according to Conditions of the Contract and Division 1 Specification Sections.
  - 1. Installer shall submit erection drawings showing the placement of all ICF form units, door & window bucks, reinforcing and embedded items in the wall system. Erection drawings shall show elevation views of walls with dimensions of walls and all openings, position of typical and special (e.g. corner) ICF units, and dimensions of reinforcing and embedded item locations. Erection drawings shall show typical details of support system for supporting reinforcing, including support for reinforcing that might not conform to the integral bar supports in the ICF system. It is permissible that erection drawings produced by others (e.g. reinforcing) be submitted on separate drawings from the ICF erection drawings; however, all drawings shall be submitted as one set and shall be coordinated amongst each other prior to submission.
  - 2. Computer generated electronic structural construction document files (ACAD) will be made available to the Contractor. The Contractor will be required to sign the Engineer's standard release of liability form and pay a handling fee of \$50.00 per drawing prior to receiving the drawing files. Rules for use of said files shall be as defined in the CRSI "Code of Standard Practice" Sections 4.19 and 6.4.1.
  - 3. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.
- B. Submit drawings in the form of five (5) prints.
- C. Relevant laboratory tests or data that validate product compliance with performance criteria specified prior to commencement of work under this Section.
- D. Manufacturer's product installation manual.
- E. Valid product evaluation report for applicable code jurisdiction of ICC-ES ESR-2092.
- F. Installer's proof of training documentation by ICF Manufacturer.
- G. Minutes of preinstallation conference.

## 1.6 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified. Each contractor having reference to ACI Documents shall maintain copies of same on project site.

### AMERICAN CONCRETE INSTITUTE

1. ACI 117-90 – Tolerance for Concrete Construction and Material.
2. ACI 315-92 – Details and Detailing of Concrete Reinforcement.
3. ACI 318-05 – Building Code Requirements for Reinforced Concrete and Commentary.

### AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

1. ASTM C31 – Practice for Making and Curing Concrete Test Specimens in the Field.
2. ASTM C236 – Steady State Thermal Performance of Building Assemblies.
3. ASTM C473 - Physical Testing of Gypsum Board Products & Gypsum Lath
4. ASTM E84 - Surface Burning Characteristics of Building Materials

### CONCRETE REINFORCING STEEL INSTITUTE (CRSI):

1. CRSI – Manual of Standard Practice.
2. CRSI 63 – Recommended Practice for Placing Reinforcing Bars.
3. CRSI 65 – Recommended Practice for Placing Bar Nomenclature.

- B. Installer Training: Conduct a thorough training with the manufacturer or the manufacturer's representative for the installer on the project.
- C. Qualifications of Workers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper execution of the work required by this Division.
- D. Preinstallation Conference: ICF Installer shall attend pre-concrete construction conference at Project site to comply with requirements of Division 1 Section "Project Meetings."
1. Installer shall be prepared to coordinate provision of access, storage area, and protection and spatial requirements for form alignment placement steel storage & forming.
- E. Fire-Test-Response Characteristics: Provide insulated concrete forms identical to those tested as part of an assembly for fire resistance per ASTM E 119 by a testing and inspection agency performing testing and follow-up services that is acceptable to the authorities having jurisdiction for the project.
1. Fire-Resistance Ratings: As indicated by design designations listed in UL "Fire Resistance Directory," or by Warnock Hersey or another testing and inspecting agency.
  2. Labeling: Identify forms with appropriate markings of applicable testing and inspecting agency.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect ICF from soiling, deformation, and other damage during delivery, storage, and handling.
- B. Deliver products in original factory packaging, bearing identification of product, manufacturer and batch/lot number.
- C. *Trained Installer* shall furnish product packaging labels to contractor as required to maintain traceability of product for duration of contract.
- D. Protect with a waterproof covering and ventilate. Ensure that UV protection is provided for material should on-site storage extend beyond 30 days.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. NUDURA Corporation, Unit 1, 80 Ellis Drive, Ontario Canada L4M 6E7 Phone: (866) 468-6299 Fax (705) 726-2110.

### 2.2 ICF COMPONENTS

- A. General: Provide manufacturer's standard form units with EPS on both faces, including all corners, caps, tapers, etc. for a complete form installation. Form length, width, and height to be manufacturer's standard. Coordinate form dimensions with spacing of reinforcing and wall dimensions.
  - 1. EPS Thickness: 2 5/8" (66 mm).
  - 2. Structural Concrete Thickness: 4" (101 mm), 6" (152 mm), 8" (203 mm), 10" (254 mm), or 12" (304 mm).
- B. Form products that may be incorporated into work include:
  - 1. Standard Form Unit.
  - 2. 90 Degree Form Unit.
  - 3. 45 Degree Form Unit.
  - 4. T Form Unit.
  - 5. Brick Ledge Extension.
  - 6. End Cap.
  - 7. Height Adjuster.
  - 8. One-Sided Tapered Top Form Unit.
  - 9. Two-Sided Tapered Top Form Unit.
  - 10. Molded Brick Ledge.
  - 11. Custom Radius Form Unit.
  - 12. Molded Brick Ledge and Tapered Top Unit.

### 2.3 ACCESSORIES

- A. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA800, "Specification 810.1, Expanded Cellular Glazing Tape"; minimum ¼ inch thick.
- B. Form Joint Sealant: Elastomeric sealant complying with ASTM C920, Type M or S, Grade NS, which adheres to form joint substrates.

### 2.4 WALL ALIGNMENT SYSTEM

- A. The Installer shall furnish and utilize the ICF manufacturer's recommended Wall Access and Form Alignment System (to be provided as an installation component of the wall system) to facilitate construction of the wall assembly, and to provide adjustment for ensuring plumbness and trueness of the wall during construction.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the ICF system.
- B. Verify that footings are within  $\pm 1/4$ " (6mm) of level and that footing step increments match standard form unit height. Where partial or half course is intended for starting course elevation, ensure footing step increment is equal to cut form unit less ½" (13mm).
- C. If specified, ensure reinforcing steel dowels are in place at specified centers along footing lengths.

### 3.2 PREPARATION

- A. Clean all dirt and debris from top of footings prior to commencing work.

### 3.3 FORMS

- A. General: All work shall be in strict conformance with manufacturer's installation recommendations. Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
  - 1. Provide Class A tolerances for concrete surfaces exposed to view.
  - 2. Provide Class C tolerances for other concrete surfaces.
- B. The installer shall ensure manufacturer's procedures for the following work are employed on site (as outlined in the manufacturer's product Installation manual):

1. First Course Placement.
  2. Horizontal Reinforcement Placement.
  3. Successive Course Placement.
  4. Door & Window Opening Construction.
  5. Form Alignment & Scaffolding Installation.
  6. Vertical Reinforcement Placement.
  7. Pre-Concrete Placement Inspection.
  8. Concrete Placement.
  9. Access & Form Alignment Assembly Removal.
- C. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, reglets, chamfers, anchorages and inserts, and other features required in the Work.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar.
- E. Ensure the form units are tight end to end to maintain proper dimension.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

### 3.4 SERVICE PENETRATIONS

- A. Service penetrations (e.g.- electrical service conduits, water service pipes, air supply and exhaust ducts etc.) shall be installed at the required locations as indicated by the appropriate trade.
- B. Service penetrations exceeding 16" x 16" (400mm x 400mm) in area shall be reinforced.
- C. Prior to concrete placement, install service penetration sleeves (supplied by others) at designated locations to create voids where services can be passed through at later date.

### 3.5 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.



- B. Deliver reinforcement to job site bundled, tagged and marked. Use waterproof tags indicating bar size, length, and mark corresponding to placing drawings.
- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- D. Accurately position, support, and secure reinforcement against displacement.
  - 1. Typical horizontal reinforcement shall be installed into notches provided in the web of the ICF by the manufacturer. The horizontal reinforcement shall be installed with each course of form units. Non-typical horizontal reinforcement (e.g. at openings) shall be securely positioned by other means as indicated in the approved erection drawings.
  - 2. When a single mat of reinforcing is specified to be centered in the wall, alternate the position of the horizontal rebar (each side of the vertical rebar), from one successive course to another, in order to create a cage for maintaining the alignment of the vertical reinforcement.
  - 3. Vertical reinforcement is to be installed after the form units are installed and prior to placement of the concrete.
- E. Lap reinforcement at splices per lap length schedule provide on drawings.
- F. Reinforce around all openings according to details and schedules on drawings.
- G. Place reinforcement to maintain minimum coverage as indicated for concrete protection.
- H. Welding of reinforcing bars will not be permitted without approval of the Architect/Engineer.
- I. When permitted, field bend bars cold, except during cold weather when moderate heating is necessary to avoid brittle failures.

### 3.6 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork anchorage devices, anchor bolts, and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Reinforce forms where embed plates, etc. are required to be mounted flush with exterior face of insulation.

### 3.7 PROTECTION

- A. Provide temporary coverage of installation to reduce exposure to Ultra Violet light should final finish application be delayed longer than 60 days.

END OF SECTION 031300

## SECTION 03131

### INSULATED CONCRETE FORMS ACCESSORIES – INTEGRATED ASSEMBLIES

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. The work required under this Section shall consist of furnishing integrated framing assemblies for use in Insulated Concrete Forms as shown on the Architect's drawings and herein specified.
- B. Work of this section DOES NOT INCLUDE installation of framing assemblies, doors, hardware, glass or glazing, structural steel framing or bracing, field painting, field assembly of spliced frames or wood bucking.
- C. Related Sections:
  - 1. Section 03130 – Insulated Concrete Forms: Permanent Forms.
  - 2. Section 03300 - Cast-in-Place Concrete.
  - 3. Section 04810 – Unit Masonry Assemblies
  - 4. Section 05120 – Structural Steel Framing
  - 5. Section 06001 – Carpentry: wood bucking and framing
  - 6. Section 08114 – Standard Steel Doors
  - 7. Section 08115 - Standard Steel Frames
  - 8. Section 08710 - Door Hardware
  - 9. Section 08450 – All Glass Entrances
  - 10. Section 09900 – Paints & Coatings: Field Painting of integrated framing
  - 11. Division 16 – Electrical: electronic door and security systems

##### 1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. ASTM International:
  - 1. ASTM A591/A591M - Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
  - 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

##### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Include the following:
  - 1. Provide schedule of assemblies using same reference numbers for details and openings as those on contract documents.

2. Indicate coordination of glazing and stops with glass and glazing requirements.
3. Assembly details for each type, including dimensioning profiles, metal types and metal thicknesses.

C. Product Data: For each type of product specified, include details of construction, material descriptions, hardware preparations, internal components, profiles, and finishes. Include details of each assembly type, elevations of assemblies, conditions at openings, location and installation requirements of assembly hardware and reinforcements.

Formatted: Bullets and Numbering

#### 1.4 QUALITY ASSURANCE

- A. Engage the services of an ICF Manufacturer designated Trained Installer or Technical Associate for the duration of the work under this Section.

#### 1.5 PRE-INSTALLATION CONFERENCE.

- A. Section 01300 Administrative Requirements: Preinstallation meetings.
- B. Prior to assembly delivery, conduct an onsite pre-installation meeting of the job superintendent, ICF wall contractor, mason and other trades necessary to coordinate proper installation, form product, and spatial requirements for form assembly, alignment, forming, and bracing.

#### 1.6 MOCK-UP

- A. Section 01400 - Quality Requirements: Requirements for mockup.
- B. Construct mockup, 10 x 10 feet in size, including formwork, form liners, form accessories, exterior brick veneer, window type C, and interior drywall channels.
- C. Locate where the mock-up can remain undisturbed for the duration of the project and on a firm substrate that will not sink or settle.
- D. Remove mockup when work is 90% complete.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Products storage and handling requirements.
- B. Deliver assembly work palletized, wrapped, or crated to provide protection during transit and project-site storage.
- C. Deliver assemblies with two removable spreader bars across the bottom of assemblies, tack welded to jambs and mullions.
- D. Inspect assemblies upon delivery for damage. Remove and replace damaged items as directed.

## 1.8 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

## PART 2 PRODUCTS

### 2.1 HARDWARE LOCATIONS

- A. The location of hardware on assemblies shall be as follows.
  - 1. Hinges
    - a. Top: 5" from head of assembly to top of hinge
    - b. Middle: 10" from finished floor\*\* to bottom of hinge
    - c. Intermediate: centered between top and bottom hinges

Note: \*Finished floor is defined as the top surface of the floor, except when resilient tile or carpet is used, when it is the top of the concrete slab.
  - 2. Type locks and Latches: 40 5/16" to centerline of strike from finished floor
  - 3. Deadlocks: 48" to centerline of strike from finished floor.

### 2.2 ASSEMBLIES

- A. Manufacturers:
  - 1. ICF Framing Assemblies to be Stala Integrated Assemblies, LLC  
Website: [www.stalaframing.com](http://www.stalaframing.com)
- B. Assemblies shall be made of commercial grade zinc coated steel conforming to ASTM Designation A-526, not less than 14 gauge.
  - 1. All assemblies shall be custom made welded units for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on the drawings and schedules. Fabricate assemblies as full welded profile unless otherwise indicated.
  - 2. All finished work shall be strong and rigid, neat in appearance, square, true, and free of defects, warp, or buckle.
  - 3. Alignment anchor flange, jamb depths, trim, profile, and backbends, shall be provided as shown on drawings.
  - 4. Jamb alignment anchor flanges shall be welded and bent at an adequate degree to establish anchorage in the concrete wall for the full height of assembly while allowing unrestricted flow of concrete between EPS wall members. Alignment anchor flanges shall assist in assembling and aligning of ICF wall and shall be constructed such that concrete shall not penetrate or fill hardware reinforcements or preps. Jamb alignment anchor flanges shall be constructed of not less than 16 gauge
  - 5. Head alignment anchor flanges shall run the entire length of the assembly head and allow unrestricted flow of concrete between the EPS wall members. Head alignment flanges shall assist in assembling and

- aligning of ICF wall. Head alignment anchor flanges shall be constructed of not less than 14 gauge, unless hardware preps, reinforcements, etc. are required at head in which case the alignment flange shall be of not less than 12 gauge and shall be positioned in such a way to provide adequate hardware reinforcing as required.
6. Exterior assembly façade shall extend to cover air space and align with exterior building façade in such a way as to eliminate the need for the returning brick.
  7. Where so required by wall conditions, one or both of the interior jambs of the assemblies shall be constructed with drywall channels allowing drywall to easily be aligned and leaving a finished appearance.
  8. Corner joints shall have all contact edges closed tight, with trim faces mitered and continuously welded.
  9. When shipping limitations so dictate, assemblies for larger openings shall be fabricated in sections designed for splicing in the field by erector.
  10. Assemblies for multiple or special openings shall have mullion and/or rail members which are closed tubular shapes. All joints between faces of abutting members shall be securely welded and finished smooth.
  11. Dust Cover boxes of not thinner than 26 gauge steel shall be provided at all hardware mortises on assemblies.
  12. Applied glazing stops shall be of cold rolled steel, not less than 18 gauge thickness, butted at corner joints and secured to the assembly with counter sunk cadmium or zinc plated screws.
  13. All assemblies with sills greater than 24" in width shall be furnished with vibrator pockets as shown on plan details.
- C. Hardware Reinforcements
1. Assemblies shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accord with approved hardware schedule and templates provided by the hardware contractor. Hardware contractor shall furnish physical hardware samples as requested. Where surface mounted hardware is to be applied, assemblies shall have reinforcing plates; all drilling and tapping shall be done by erector.
  2. Minimum thicknesses of hardware reinforcing plates shall be as follows:
    - a. \*Hinge and Pivot Reinforcing – 7 gauge
    - b. \*Strike Reinforcement – 11 gauge
    - c. \*Flushbolt Reinforcement – 11 gauge
    - d. \*Closer, surface mounted hardware, hold open arms – 12 gauge
- D. Floor Anchors
1. Floor Anchors shall be securely welded on the inside of each jamb, with two provided at each jamb for floor anchorage.
  2. Where so scheduled or required by construction methods, the floor anchors shall be securely welded to the outside of each jamb with four holes to fasten below slab. Where required assemblies shall be constructed with 4" bottom extensions to the jambs or as shown on the drawings.

## 2.3 FINISHING

- A. A. Apply manufacturer standard primer immediately after cleaning and pretreating.
  - 1. Finish: After fabrication, all tool marks and surface imperfections shall be removed, and exposed faces of all welded joints shall be dressed smooth. Assemblies shall then be chemically treated to insure maximum paint adhesion and shall be coated on all accessible surfaces with a rust inhibitive primer which is fully cured before shipment.

## PART 3 EXECUTION

### 3.1 SITE PROTECTION AND PREPARATION

- A. It shall be the responsibility of the General Contractor to see that any scratches caused in shipping or handling are promptly cleaned and touched-up with rust inhibitive primer.

### 3.2 INSTALLATION

- A. Place assemblies accurately in position, plumbed, aligned, and braced securely to receive temporary construction loads. Place ICF wall snug and tight in position with wall pushed all the way against the inside of jamb. If outside floor anchors are used, attach as shown and detail below slab.
- B. Assemblies are permanent units and require to be "set" square and plum to receive final doors and hardware as specified in other sections. Assemblies must be periodically checked during wall erection and initial set-up.
- C. Avoid discharging concrete from pump (limit impact and pumping head) directly on assembly head and jambs. Concrete should be placed such that vibration and impact is limited and concrete flows along head and jambs until covered completely.
- D. Concrete placement needs to be "balanced" on both sides of the assembly jambs (with one foot maximum differential). Unbalanced loads could cause twisting and torque on assembly if not braced with sufficient "X-Bracing" or "Bulkhead".
- E. Bracing should occur within the concrete area of the assembly and spread with blocking.
- F. Various bracing options and pour sequences should be discussed, determined, and addressed as specified within Part 1 – Section 1.05 C. Wall thickness, pour sequence, outside jamb floor anchors, concrete load above head, etc. will all determine bracing required for handling temporary construction loads.

3.3 CLEANING AND TOUCH UP

- A. Remove any concrete debris on assembly which occurred during installation.
- B. Immediately after erection, sand smooth any rusted or damaged areas of prime coat on door assemblies and apply touch-up of compatible air-drying primer. Repair with galvanizing repair paint in accordance with manufacturer's written instructions if needed.

3.4 SCHEDULES

- A. Refer to Door and Window details on drawings A6.1, A6.2, A6.3 and A6.4

END OF SECTION

## SECTION 033000 – CAST-IN-PLACE CONCRETE

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section specifies cast-in-place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes. This section applies to concrete work shown on the structural drawings. See Division 2 for site concrete.
- B. Cast-in-place concrete includes the following:
  - 1. Foundations and footings.
  - 2. Slabs-on-grade.
  - 3. Fill for steel deck.
  - 4. Foundation walls.
  - 5. Shear walls.
  - 6. Load-bearing building walls.
  - 7. Building frame members.
  - 8. Equipment pads and bases.
  - 9. Fill for steel pan stairs.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Structural Special Inspection."
  - 2. Division 3 Section "Permanent Forms -- Insulated Concrete Forms."
  - 3. Division 5 Section "Steel Deck."
  - 4. Division 7 Section "Thermal and Moisture Protection."
- D. Coordination: Unless other satisfactory agreements are specifically entered into by contractors concerned, all miscellaneous iron and steel, sleeves, anchors, etc., required by work of other contractors, will be furnished and installed by such other contractors with the cooperation of this contractor.

#### 1.3 SUBMITTALS

- A. General: Submit according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect/Engineer.



- C. Shop drawings for reinforcement detailing, fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.
1. Computer generated electronic structural construction document files (ACAD) will be made available to the Contractor. The Contractor will be required to sign the Engineer's standard release of liability form and pay a handling fee of \$50.00 per drawing prior to receiving the drawing files. Rules for use of said files shall be as defined in the CRSI "Code of Standard Practice" Sections 4.19 and 6.4.1.
  2. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.
- D. Submit drawings in the form of five (5) prints.
- E. Shop drawings for formwork indicating fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.
1. Architect/Engineer's review is for general architectural applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.
- F. Samples of materials as requested by Architect/Engineer, including names, sources, and descriptions, as follows:
1. Color finishes.
  2. Fiber reinforcement.
  3. Reglets.
  4. Waterstops.
  5. Vapor retarder/barrier.
  6. Form liners.
- G. Laboratory test reports for concrete mix design with the following data:
1. Method used to determine the proposed mix design (per ACI 301, Section 4).
  2. Gradation and quantity of fine and coarse aggregates.
  3. Proportions of all ingredients including all admixtures added either at the time of batching or at the job site.
  4. Water/cement ratio and water/cementitious ratio.
  5. Slump – ASTM C143.
  6. Certification and test results of the total water soluble chloride ion content of the design mix – FHWA RD-77 or AASHTO T 260-84.
  7. Air content of freshly mixed concrete by the pressure method, ASTM C231, or the volumetric method, ASTM C173.
  8. Unit weight of concrete – ASTM C138.

9. Strength at 7 and 28 days – ASTM C39. Document strength on basis of previous field experience or trial mixtures, per ACI 301 Section 4. Submit strength test records, mix design materials, conditions, and proportions for concrete used for record of tests, standard calculation, and determination of required average compressive strength.
  10. Complete and include Structural Engineer's standard mix design submittal form for each mix. A blank copy is included at the end of this section.
- H. Laboratory test reports for concrete materials or material certificates in lieu of material laboratory test reports. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
- I. Drawings showing proposed construction and/or contraction joint locations.
- J. Minutes of preinstallation conference.

#### 1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified. Each contractor having reference to ACI Documents shall maintain copies of same on project site.

##### AMERICAN CONCRETE INSTITUTE

1. ACI 117-90 – Tolerance for Concrete Construction and Material.
2. ACI 211.1-91 – Selecting Proportions Normal, Heavyweight and Mass.
3. ACI 301.1-96 – Specification for Structural Concrete for Buildings.
4. ACI 302.1R-96 – Guide for Concrete Floor and Slab Construction.
5. ACI 304.2R-95 – Placing Concrete by Pumping Methods.
6. ACI 305R-91 – Hot Weather Concreting.
7. ACI 306R-88 – Cold Weather Concreting.
8. ACI 308-92 – Standard Practice for Curing Concrete.
9. ACI 209R-87 – Guide for Consolidation of Concrete.
10. ACI 311 – Recommended Practice for Concrete Inspection.
11. ACI 315-92 – Details and Detailing of Concrete Reinforcement.
12. ACI 318-05 – Building Code Requirements for Reinforced Concrete and Commentary.
13. ACI 347R-94 – Guide to Formwork for Concrete.

##### AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

1. ASTM A82 – Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A185 – Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM A615 – Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. ASTM C31 – Practice for Making and Curing Concrete Test Specimens in the Field.
5. ASTM C33 – Specification for Concrete Aggregates.

6. ASTM C39 – Test Method for Compressive Strength of Cylindrical Concrete Specimens.
7. ASTM C94 – Specification for Ready-Mixed Concrete.
8. ASTM C143 – Test Method for Slump of Hydraulic Cement Concrete.
9. ASTM C150 – Specification for Portland Cement.
10. ASTM C171 – Specification for Sheet Materials for Curing Concrete.
11. ASTM C172 – Practice for Sampling Freshly Mixed Concrete.
12. ASTM C231 – Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
13. ASTM C260 – Specification for Air-Entraining Admixtures for Concrete.
14. ASTM C309 – Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
15. ASTM C494 – Specification for Chemical Admixtures for Concrete.
16. ASTM C618 – Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.
17. ASTM C820 – Steel Fibers for Fiber Reinforced Concrete.
18. ASTM C881 – Specification for Epoxy Resin Base Bonding Systems for Concrete.
19. ASTM C1116 – Specification for Fiber-Reinforced Concrete and Shotcrete.
20. ASTM E-329 – Inspecting and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

CONCRETE REINFORCING STEEL INSTITUTE (CRSI):

1. CRSI – Manual of Standard Practice.
  2. CRSI 63 – Recommended Practice for Placing Reinforcing Bars.
  3. CRSI 65 – Recommended Practice for Placing Bar Nomenclature.
- B. Qualifications of Workers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper execution of the work required by this Division.

## PART 2 - PRODUCTS

### 2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: HDO/MDO faced plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
1. Joints in formwork shall align with rustication joints shown on the design drawings. Coordinate placement with Architect/Engineer.
  2. Layout formwork with full form pieces (sheets) at the exposed portion of wall. Partial pieces are to be used as required, with the preferred location being below grade or above ceiling.
- B. Form-facing panels for Exposed (Architectural) Finish Concrete: New exterior grade HDO/MDO faced plywood panels to provide continuous, straight, smooth, and true architectural exposed concrete surfaces, complying with DOC Ps1, "B-B (Concrete Form)", Class 1 or better, mill-applied release agent and edge sealed, with each

piece bearing legible inspection trademark. Furnish in largest practicable sizes to minimize number of joints and to conform to joint pattern and spacing indicated on Drawings.

1. Joints in formwork shall align with rustification joints shown on the design drawings. Coordinate placement with Architect/Engineer.
  2. Layout formwork with full form pieces (sheets) at the exposed portion of wall. Partial pieces are to be used as required, with the preferred location being below grade or above ceiling.
- C. Forms for Unexposed Finish Concrete: Plywood, lumber, metal or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- D. Forms for Textured Finish Concrete: Units of face design, size, arrangement, and configuration to match Architect/Engineer's control sample. Provide solid backing and form supports to ensure stability of textured form liners.
- E. Forms for Cylindrical Columns and Supports: Metal, glass-fiber-reinforced plastic, or paper or fiber tubes that will produce smooth surfaces without joint indications. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.
- F. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to support weight of placed concrete without deformation.
- G. Carton Forms: Biodegradable paper surface, treated for moisture-resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- H. Form Release Agent: Provide commercial formulation form release agent with a maximum volatile organic compounds (VOCs), not to exceed those allowable by jurisdictional regulations, that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- I. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1 ½ inches to the plane of the exposed concrete surface.
1. Coordinate pattern of tie holes with Architect/Engineer on all concrete wall exposed to view.
- J. Chamfer Strips: Dressed wood, ¾ by ¾ inch, minimum and as shown on Drawings; non-staining; in longest practical lengths.
- K. Rustification Strips: Dressed wood with sides beveled and back kerfed as shown on Drawings; non-staining; in longest practical lengths.
- L. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA800, "Specification 810.1, Expanded Cellular Glazing Tape"; minimum ¼ inch thick.

- M. Form Joint Sealant: Elastomeric sealant complying with ASTM C920, Type M or S, Grade NS, that adheres to form joint substrates.
- N. Sealer: Penetrating, clear, polyurethane wood form sealer formulated to reduce absorption of bleed water and prevent migration of set-retarding chemicals from wood.

## 2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Galvanized Reinforcing Bars: ASTM A 767, Class II (2.0 oz. zinc psf), hot-dip galvanized after fabrication and bending.
- C. Epoxy-Coated Reinforcing Bars: ASTM A 775.
- D. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- E. Welded Wire Fabric: ASTM A 185, welded steel wire fabric in flat sheets.
- F. Deformed-Steel Welded Wire Fabric: ASTM A 497 in flat sheets.
- G. Epoxy-Coated Welded Wire Fabric: ASTM A 884, Class A.
- H. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.
  - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
  - 2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).
- I. Weldable Reinforcing Bar: ASTM A 706.

## 2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I. (high early strength when indicated), ASTM C150, Type III.
  - 1. Use one brand of cement throughout Project unless otherwise acceptable to Architect/Engineer.
- B. Fly Ash: ASTM C 618, Type C or F, except maximum loss on ignition: 3%.
- C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling or surface discoloration due to oxidation.
- D. Water: Potable.
- E. Fiber Reinforcement (where indicated): Polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III, not less than  $\frac{3}{4}$  inch long.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Gilco Fibers, Cormix Construction Chemicals.
    - b. Durafiber, Durafiber Corp.
    - c. Fiberstrand, Euclid Chemical Co.
    - d. Fibermesh, Fibermesh Co., Div. Synthetic Industries, Inc.
    - e. Forta, Forta Corp.
    - f. Grace Fibers, W.R. Grace & Co.
    - g. Polystrand, Metalcrete Industries.
- F. Air-Entraining Admixture (where indicated): ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Air-Mix or Perma-Air, Euclid Chemical Co.
    - b. Darex or Daravair Series, W.R. Grace & Co.
    - c. MB-VR or Micro-Air, Master Builders, Inc.
    - d. Sealtight AEA, W.R. Meadows, Inc.
    - e. Sika AER, Sika Corp.
    - f. Catexol A.E. 260, Axim Concrete Technologies.
    - g. RSA-10 or RAE-260, RussTech Admixtures, Inc.
- G. Water-Reducing Admixture: ASTM C 494, Type A.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Chemtard, ChemMasters Corp.
    - b. Eucon WR-75, Euclid Chemical Co.
    - c. WRDA Series, W.R. Grace & Co.
    - d. Pozzolith Normal or Polyheed, Master Builders, Inc.
    - e. Metco W.R., Metalcrete Industries.
    - f. Plastocrete 161, Sika Corp.
    - g. Catexol 1000N, Axim Concrete Technologies
    - h. LC-400P, LC-500, or FINISHEASE NC, RussTech Admixtures, Inc.
- H. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
  - a. Super P, Anti-Hydro Co., Inc.
  - b. Eucon 37, Euclid Chemical Co.
  - c. ADVA or Daracem Series, W.R. Grace & Co.
  - d. Rheobuild or Polyheed, Master Builders, Inc.
  - e. Superslump, Metalcrete Industries.
  - f. Sikament 300, Sika Corp.
  - g. Catexol 1000SP-MN, Axim Concrete Technologies.
  - h. SUPERFLO 2000RM, RussTech Admixtures, Inc.
  
- I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
  1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Q-Set, Conspec Marketing & Manufacturing Co.
    - b. Accelguard 80, Euclid Chemical Co.
    - c. Daraset, W.R. Grace & Co.
    - d. Pozzutec 20, Master Builders, Inc.
    - e. Accel-Set, Metalcrete Industries.
    - f. LCNC-166, RussTech Admixtures, Inc.
  
- J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
  1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Eucon Retarder 75, Euclid Chemical Co.
    - b. Daratard-17, W.R. Grace & Co.
    - c. Pozzolith R, Master Builders, Inc.
    - d. Plastiment, Sika Corporation.
    - e. Catexol 1000R, Axim Concrete Technologies.
    - f. LC-400R or LC-500, RussTech Admixtures, Inc.
  
- K. Shrinkage-Reducing Admixture
  1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Eucon SRA, Euclid Chemical.
    - b. Tetraguard AS20, Master Builders, Inc.
    - c. SRA-157, RussTech Admixtures, Inc.
  
- L. Corrosion Inhibitor: ASTM C494, Type C.
  1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. DCI, W.R. Grace & Co.

- b. Rheocrete CNI, Master Builders, Inc.
  - c. Sika CNI, SIKA.
  - d. RUSSTECH RCI, RussTech Admixtures, Inc.
- M. Prohibited Admixtures: Calcium chloride thiocyanates or admixture containing more than 0.05 percent chloride ions.

#### 2.4 RELATED MATERIALS

- A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (22 gage) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.
- C. Headed Steel Studs: ASTM A 108, Grade 1015 through 1020, cold finished carbon steel, AWS D1.1, Type B. Dimensions shall comply with AISC specifications.
- D. Thermoplastic Elastomeric Rubber Waterstops (For Chemical and Fuel Containment):
- 1. The Waterstop for use in non-moving concrete joints shall be 6" x 3/16" Westec Waterstop by Barrier Technologies, Inc., Petrostop by Vinylex, or other approved.
  - 2. Surfaces shall be reasonably smooth and will have either a formed or float finish.
  - 3. Cut ends square, using a razor knife or circular saw equipped with a carbide tipped blade. Weld splices per manufacturer's recommendations.
- E. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.
- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
    - a. "Acmaseal" Acme Highway Products Corporation.
    - b. Watson Bowman Associates.
    - c. The Burke Co.
    - d. Greenstreak Plastic Products Co.
    - e. W.R. Meadows, Inc.
    - f. Progress Unlimited.
    - g. Schlegel Corp.
    - h. Vinylex Corp.
- F. Premolded Interior and Exterior Joint Filler: Non-impregnated, flexible, synthetic foam with standard bonding agent to hold in place.
- G. Expansion Joint Filler: Open celled, vulcanized elastomeric, polyvinyl chloride seal strip.



- H. Vapor Retarder: Provide vapor retarder where indicated that is resistant to deterioration when tested according to ASTM E 154, as follows:
1. Polyethylene sheet not less than 10 mils thick conforming to ASTM E 1745 Class C.
  2. Polyolefin/Resin or multi-ply extrusion coated polyethylene sheet not less than 10 mils thick conforming to ASTM E 1745 Class A. Maximum water vapor permeance when tested to ASTM E96 and ASTM F1249 of 0.036 perms. Minimum tensile strength when tested to ASTM D882 of 52 lbs-force/inch.
    - a. Perminator Vapor-Mat with Perminator Tape Seal. W.R. Meadows, Inc. Hampshire, Illinois.
    - b. Stego Wrap with Stego Tape Seal. Stego Industries, LLC. San Juan Capistrano, California.
    - c. Viper Vaporcheck with manufacturer's recommended tape seal. Insulation Solutions, Inc. East Peoria, Illinois.
- I. Vapor Barrier: Provide vapor barrier where indicated that is resistant to deterioration when tested according to ASTM E 154, as follows:
1. Polyolefin/Resin sheet not less than 15 mils thick conforming to ASTM E 1745 Class A. Maximum water vapor permeance when tested to ASTM E96 and ASTM F1249 of 0.012 perms. Minimum tensile strength when tested to ASTM D882 of 76 lbs-force/inch. Stego Wrap with Stego Tape Seal. Stego Industries, LLC. San Juan Capistrano, California.
  2. Heavy Duty conforming to ASTM E 1993: Premolded Membrane Vapor Seal with Plasmatic Core and adhesive. Roll stock. W.R. Meadows, Inc., Hampshire, Illinois.
- J. Nonslip Aggregate Finish: Provide fused aluminum oxide granules or crushed emery as the abrasive aggregate for a nonslip finish where indicated, with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rustproof, nonglazing, and unaffected by freezing, moisture, and cleaning materials.
- K. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- L. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
1. Waterproof paper.
  2. Polyethylene film.
  3. Polyethylene-coated burlap.
- M. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
1. Provide material that has a maximum volatile organic compound (VOC) rating not to exceed those allowable by jurisdictional regulations.
  2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

- a. Highseal, Conspec Marketing and Mfg. Co.
  - b. Sealco-VOC, Cormix Construction Chemicals.
  - c. Safe Cure and Seal, Dayton Superior Corp.
  - d. Aqua-Cure, Euclid Chemical Co.
  - e. Dress & Seal WB, L&M Construction Chemicals, Inc.
  - f. Masterkure 100W, Master Builders, Inc.
  - g. Vocomp-20, W.R. Meadows, Inc.
  - h. Metcure, Metalcrete Industries.
  - i. Stontop CS1, Stonhard, Inc.
- N. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Aquafilm, Conspec Marketing and Mfg. Co.
    - b. Eucobar, Euclid Chemical Co.
    - c. E-Con, L&M Construction Chemicals, Inc.
    - d. Confilm, Master Builders, Inc.
    - e. Waterhold, Metalcrete Industries.
    - f. EVRT, RussTech Admixtures Inc.
- O. Bonding Agent: Polyvinyl acetate or acrylic base.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Polyvinyl Acetate (Interior Only):
      - 1) Superior Concrete Bonder, Dayton Superior Corp.
      - 2) Euco Weld, Euclid Chemical Co.
      - 3) Weld-Crete, Larsen Products Corp.
      - 4) Everweld, L&M Construction Chemicals, Inc.
      - 5) Herculox, Metalcrete Industries.
      - 6) Ready Bond, Symons Corp.
    - b. Acrylic or Styrene Butadiene:
      - 1) Acrylic Bondcrete, The Burke Co.
      - 2) Strongbond, Conspec Marketing and Mfg. Co.
      - 3) Day-Chem Ad Bond, Dayton Superior Corp.
      - 4) SBR Latex, Euclid Chemical Co.
      - 5) Daraweld C, W.R. Grace & Co.
      - 6) Hornweld, A.C. Horn, Inc.
      - 7) Everbond, L&M Construction Chemicals, Inc.
      - 8) Acryl-Set, Master Builders, Inc.
      - 9) Intralok, W.R. Meadows, Inc.
      - 10) Acrylpave, Metalcrete Industries.
      - 11) Sonocrete, Sonneborn-Chemrex.
      - 12) Stonlock LB2, Stonhard, Inc.

13) Strong Bond, Symons Corp.

- P. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Burke Epoxy M.V., The Burke Co.
    - b. Spec-Bond 100, Conspec Marketing and Mfg. Co.
    - c. Resi-Bond (J-58), Dayton Superior.
    - d. Euco Epoxy System #452 or #620, Euclid Chemical Co.
    - e. Epoxite Binder 2390, A.C. Horn, Inc.
    - f. Epabond, L&M Construction Chemicals, Inc.
    - g. Concesive Standard Liquid, Master Builders, Inc.
    - h. Rezi-Weld 1000, W.R. Meadows, Inc.
    - i. Metco Hi-Mod Epoxy, Metalcrete Industries.
    - j. Sikadur 32 Hi-Mod, Sika Corp.
    - k. Stonset LV5, Stonhard, Inc.
    - l. R-600 Series, Symons Corp.
- Q. Injection Adhesive System (For Reinforcing Dowels): two-component material consisting of acrylic resin, hardener, cement and water, suitable for use on dry or damp surfaces.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. HIT HY150, Hilti.
    - b. Acrylic-Tie, Simpson StrongTie.
    - c. Acrylic-7, Red Head.
- R. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107, of consistency suitable for application, and a 30-minute working time. Grout to have a minimum compressive strength at 28 days of 5,000 psi when applied in a fluid consistency.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. NS Grout, The Euclid Company.
    - b. Five Star Grout, U.S. Grout Corp.
    - c. Masterflow 713, Master Builders.
    - d. Sikagrout 212, SIKA.
- S. Penetrating Concrete Sealer (where indicated): The sealer shall be a siloxane based compound which has a 92% chloride ion screen and a repellency factor of 92% when tested in accordance with NCHRP #244, Test Method. In addition, the sealer-treated concrete must exhibit no scaling when exposed to 125 cycles of

freezing and thawing. The system shall conform to ASTM C957-81. The tests must be made by an independent testing laboratory.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
  - a. Environseal, Hydrozo Company.
  - b. Euco-Guard, Euclid Chemical Co.

## 2.5 PROPORTIONING AND DESIGNING MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect/Engineer for preparing and reporting proposed mix designs. Trial batch and field experience tests shall have been performed within 12 months of submittal date. Use mix design submittal form included at the end of this section.
  1. Do not use the same testing agency for field quality control testing.
  2. Limit use of fly ash to not exceed 25 percent of the total cementitious material content by weight. Use of fly ash in concrete for use in polished concrete floor systems is prohibited.
- B. Submit written reports to Architect/Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect/Engineer. The approved mix designs shall be used throughout this project unless changes are approved by the Architect/Engineer prior to use.
- C. The specified compressive strengths ( $f'_c$ ) of the concrete for each portion of the Structure and minimum cement content shall be as follows:

CLASS	WHERE USED	REQUIRED 28-DAY STRENGTH	MINIMUM CEMENTIOUS MATERIAL CONTENT-POUNDS PER CUBIC YARD
I	Footings	3,000 psi	470
III	Interior Slabs on Grade, Grade Beams, Framed Slabs, Slabs on Metal Deck, Beams, Columns, and Walls	4,000 psi	550
IV	Exterior and other concrete exposed to weather	4,500 psi (max.w/c=.45)	564

With an approved water-reducing agent, minimum cement content may be reduced by 47 pounds of cement per cubic yard.

- D. Water/Cement Ratio: All concrete subject to freezing and thawing shall have a maximum water/cement ratio of 0.50 (4000 psi by 28 days). All concrete subjected to deicers and/or required to be watertight shall have a maximum water/cement ratio of 0.45 (4500 psi by 28 days). All reinforced concrete subjected to brackish water, salt spray, or deicers shall have a maximum water/cement ratio of 0.40 (5000 psi by 28 days). All trowel finished interior slabs, subjected to vehicular traffic, shall have a maximum w/c ratio of 0.48. All concrete for polished concrete floor system shall have a maximum water/cement ratio of 0.42.
- E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
  - 1. Ramps and sloping surfaces: Not more than 3 inches.
  - 2. Drilled piers: Not less than 4 inches and not more than 6 inches.
  - 3. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
  - 4. Concrete containing mid-range or high-range water-reducing admixture: Not more than 8 inches after adding admixture to 2-to-3-inch slump concrete.
  - 5. Other concrete: Not more than 4 inches.
- F. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect/Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect/Engineer before using in Work.
- G. Fiber Reinforcement: Add at manufacturer's recommended rate but not less than 1.5 lb per cu. yd.
- H. Flowable fill: Provide blend of cement, flyash, and sand with minimum cementitious content as follows:
  - 1. Excavatable flowable fill: 100 lb cement and 250 lb fly ash per cubic yard.
  - 2. Structural flowable fill (250 psi): 175 lb cement and 200 lb fly ash per cubic yard.

## 2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability and in all pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete for polished concrete floor system, and concrete required to be watertight.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).

- C. Use shrinkage-reducing admixture in all concrete for polished concrete floor system. Dosage rate to be 2% by weight cementitious material. Coordinate compatibility with other admixtures and polished floor system.
- D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1 ½ percent within the following limits:
  - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
    - a. 5.5 percent for 1 ½-inch maximum aggregate.
    - b. 6.0 percent for 1-inch maximum aggregate.
    - c. 6.0 percent for ¾-inch maximum aggregate.
    - d. 7.0 percent for ½-inch maximum aggregate.
  - 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
  - 3. Total air content for lightweight concrete: 6±2 percent air.
  - 4. Interior slabs, especially those incorporating dry shake finish and concrete for polished concrete floor system, shall not be air entrained. Total air content in concrete to receive dry shake finish shall be less than 3%.
- E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

## 2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
  - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

### 3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

1. Provide Class A tolerances for concrete surfaces exposed to view.
  2. Provide Class C tolerances for other concrete surfaces.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.
- G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

### 3.3 VAPOR RETARDER INSTALLATION

- A. General: Place vapor retarder sheeting in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.
- C. Install vapor retarder over 4" of compacted crushed stone.

### 3.4 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
  - 1. Avoid cutting or puncturing vapor retarder during reinforcement placement and concreting operations. Repair damages before placing concrete.
- B. Deliver reinforcement to job site bundled, tagged and marked. Use waterproof tags indicating bar size, length, and mark corresponding to placing drawings.
- C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect/Engineer.
  - 1. Chair slab-on-grade welded wire fabric with continuous chairs spaced a maximum of 4 feet on center. Provide additional chairs as required. Lift welded wire fabric back into position between chairs where depressed during concrete placement. Lifting welded wire fabric into position during concrete placement without the use of chairs is not permitted.
- E. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
  - 1. Walls with reinforcing mats on each face shall have bent U-bar spacers tied to each mat to hold spacing between mats. U-bar spacers shall be minimum #3 bars spaced a maximum of 6 feet on center horizontally and vertically with a row of bars placed at the top of any wall over 4 feet tall.
  - 2. All walls shall have chairs or bolsters placed between reinforcing mat(s) and both form faces spaced a maximum of 6 feet on center to maintain clear cover.
- F. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire.
- G. Welding of reinforcing bars will not be permitted without approval of the Architect/Engineer.
- H. When permitted, field bend bars cold, except during cold weather when moderate heating is necessary to avoid brittle failures.

### 3.5 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect/Engineer.



- B. Provide keyways at least 1 ½ inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Waterstops: Provide waterstops in construction joints below grade and as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.
- F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations as indicated.
  - 1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."
  - 2. Hold top of premolded filler material down ½" from top of slab.
  - 3. At locations where drawings do not specifically call for premolded filler, provide bond breaker between slab and vertical surface. The vapor retarder may be turned up and used for this purpose.
- G. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts ¼ inch wide by one-fourth of slab depth, unless otherwise indicated.
  - 1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
  - 2. Contraction joints may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
  - 3. Soft cut method may be used immediately after final finishing.
  - 4. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
  - 5. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

### 3.6 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork anchorage devices, anchor bolts, and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Aluminum conduit shall not be installed in concrete.

- C. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
- D. Install dovetail anchor slots in concrete structures as indicated on drawings.

### 3.7 PREPARING FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
  - 1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.
  - 2. Do not spray reinforcing with form oil.

### 3.8 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified. Concrete delivery tickets shall show:
  - 1. Batch number.
  - 2. Mix by number with cement content in pounds and maximum size aggregate.
  - 3. Admixtures.
  - 4. Air content.
  - 5. Slump.
  - 6. Time dispatched and discharged.
  - 7. Date.
  - 8. Contractor.
  - 9. Ready Mix Supplier.
  - 10. Project Name and Address.
  - 11. Volume of Concrete.
- C. If any water is added to the mix on the job, it must be approved by the Architect/Engineer's representative and delivery ticket noted with the amount of water and signed by the Architect/Engineer's representative. The maximum water/cement ratio of an approved mix design may not be exceeded.
  - 1. When the ambient air temperature is between 80 and 90 degrees Fahrenheit, one (1) gallon of water per cubic yard of concrete may be added at the job site to compensate for water evaporation during transit.

2. When the ambient air temperature exceeds 90 degrees Fahrenheit, two (2) gallons of water per cubic yard of concrete may be added at the job site to compensate for water evaporation during transit.
- D. Discharge concrete within 1 ½ hours after water has been added to the cement, unless a longer time has been authorized by the Architect/Engineer. During hot weather or other conditions contributing to a quick stiffening of the concrete, the Architect/Engineer may require discharge in less than 1 ½ hours.
- E. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location. Do not allow concrete to drop more than 5 feet or from a height which allows concrete to fall against reinforcing.
- F. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Do not subject concrete to any procedure that will cause segregation. Deposit concrete as near as possible to the final position to avoid segregation.
1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
  2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- G. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
  2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
  3. Maintain reinforcing in proper position on chairs during concrete placement.
- H. Cold-Weather Placement: When air temperature is expected to fall below 40 degrees Fahrenheit (4 deg C) within the first 72 hours after concrete placement, comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When mean daily air temperature is expected to fall below 40 deg F (4 deg C) for more than three successive days after concrete placement, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature at point of placement as follows:
    - a. Not less than 55 deg F (13 deg C) or more than 75 deg F (24 deg C) for concrete sections less than 12 inches in the least dimension (width or thickness).
    - b. Not less than 50 deg F (10 deg C) or more than 70 deg F (21 deg C) for concrete sections 12 inches or greater in the least dimension (width or thickness).
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- I. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
  3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
  4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect/Engineer.
- J. Pumping Concrete: Grout used to prime a pump shall not be placed in the forms of any concrete exposed to view in the final structure.

### 3.9 INSULATED CONCRETE FORMS

- A. Finish to top of footings to receive permanent insulated concrete forms to within +/- 1/4" (6 mm) of level.
- B. Coordinate footing step increments with standard insulating form height. With Architect/Engineer's permission adjust footing step heights to match form height. Minimum frost depth to footing shall be maintained.
- C. Place concrete half-height of first course of formwork and allow to set overnight prior to placing concrete full height of wall.
- D. Concrete placement rate shall not exceed 4 feet (1.22 m) of lift per hour.

- E. Avoid completing a pour against a buck or in a corner. Terminate concrete pour at the center of the longest wall when possible.

### 3.10 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding  $\frac{1}{4}$  inch in height rubbed down or chipped off.
- B. Smooth-Formed Finish / Grout-Cleaned Finish: Provide a smooth-formed / grout-cleaned finish on formed concrete surfaces exposed to view. Perform grout-cleaned finish immediately after stripping forms and no later than 3 days after initial casting of concrete.
  - 1. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
  - 2. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
  - 3. Thoroughly wet concrete surfaces to prevent absorption of water from the grout. Apply grout with brushes or spray gun uniformly to coat surfaces, and fill small holes. Immediately after applying the grout, float the surface with a cork or other suitable float, scouring the wall vigorously. While the grout is still plastic the surface shall be finished with a sponge rubber float to remove all excess grout. Finishing shall be done at the time when grout will not be pulled from holes or depressions. Next allow the surface to dry thoroughly, then vigorously rub with clean burlap to completely remove any dried grout and so that there is no visible film of grout remaining. The entire cleaning operation for any area must be completed on the day that it is started. Keep damp by fog spray for at least 36 hours after rubbing.
- C. Smooth-Formed Finish / Grout-Cleaned / Abrasive Blast Finish: Provide a smooth-formed / grout-cleaned / abrasive blast finish on formed concrete surfaces exposed to view in public areas. Concrete walls in mechanical and storage type rooms do not require an abrasive finish. Perform grout-cleaned finish immediately after stripping forms and no later than 3 days after initial casting of concrete. Perform abrasive blasting after compressive strength of concrete exceeds 2,000 psi. Coordinate with formwork removal to ensure that surfaces to be abrasive blasted are treated at same age for uniform results.
  - 1. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Special care should be taken to avoid consolidation problems. Where required, repair and patch defective areas with fins and other projections completely removed and smoothed.

2. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of a thick paste. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
  3. Cut out areas of deep honeycomb with segregated aggregate. Repair tie holes, air holes larger than ¼" and honeycombing with grout. Thoroughly wet concrete surfaces to prevent absorption of water from the grout. Apply grout with cork float, scouring vigorously to fill holes and pockets and create a uniform surface. The entire cleaning operation for any area must be completed on the day that it is started. Keep damp by fog spray for at least 36 hours after rubbing. If patching cannot meet an architectural grade finish, Contractor shall replace entire area at no additional cost to Owner.
  4. Once concrete has reached desired compressive strength begin abrasive-blast finish. Perform abrasive-blast finishing in as continuous operation as possible, maintaining continuity of finish on each surface or area of work. Maintain required patterns or variances in depths of blast to match design reference sample or mockup.
  5. Abrasive blast corners and edges of patterns carefully, using backup boards, to maintain uniform corner or edge line. Determine type of nozzle, nozzle pressure, and blasting techniques required to match design reference sample or mockup.
  6. Depth of Cut: Use an abrasive grit of proper type and gradation to expose aggregate and surrounding matrix surfaces to match design reference sample or mockup, as follows:
    - a. Light: Expose fine aggregate with occasional exposure of coarse aggregate and uniform color; with maximum reveal of 1/16 inch. Where directed by Architect/Engineer to correct poor concrete appearance, proceed to medium depth of cut to generally expose coarse aggregate; with a slight reveal, a maximum of ¼" at no additional cost to Owner.
- D. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- E. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- F. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of

formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.11 MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds (thick-set) for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
  - 1. After placing slabs, finish surface to specified tolerances for floor flatness and floor levelness measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.
  
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
  - 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to specified tolerances for floor flatness and floor levelness measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
  
- C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
  - 1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surface to specified tolerances for floor flatness floor levelness measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.
  
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.
  
- E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect/Engineer before application.

- F. Nonslip Aggregate Finish: Apply nonslip aggregate finish to concrete stair treads, platforms, ramps, sloped walks, and where indicated.
1. After completing float finishing and before starting trowel finish, uniformly spread 25 lb of dampened nonslip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as specified.
  2. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose nonslip aggregate.

3.12 FACE FLOOR PROFILE NUMBERS (F-NUMBERS)

- A. Floor Flatness F(F) and Floor Levelness F(L) numbers shall be measured according to ASTM E1155. Unless otherwise shown or noted on the drawings, comply with the following table:

<b>Slabs on grade</b>		
Composite Flatness F(F)	Composite Levelness F(L)	Typical Use
20	15	Mechanical rooms, non-public areas, surfaces to receive thick-set tile floors, parking structure slabs
25	20	Carpeted areas, light traffic (foot) areas in office and industrial buildings
35	25	Thin-set flooring or warehouse floor with moderate to heavy traffic
<b>Formed elevated concrete slabs and/or slabs on metal deck (slabs on metal deck shall be finished level, compensating for the deflection of the steel deck and structure). Floor levelness criteria apply only to non-sloping, formed surfaces and shall be measured within 72 hours of slab placement.</b>		
20	15	Mechanical rooms, non-public areas, surfaces to receive thick-set tile floors, parking structure slabs
25	20	Carpeted areas, light traffic (foot) areas in office and industrial buildings
30	20	Surfaces to receive thin-set flooring



50	50	Surfaces to receive hardwood flooring systems
<i>Minimum local values shall be 2/3 of the specified composite F-number</i>		

### 3.13 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment. Use the specified non-shrink, non-metallic grout.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

### 3.14 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Curing procedures shall conform with ACI 308 Standard Practice For Curing Concrete.
- C. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing.
- D. Curing Methods: Cure concrete by curing compound or by moisture curing as specified.
- E. Provide curing compound on interior slabs, exterior slabs that will not be exposed to de-icing salts, walks, and curbs as follows:
  - 1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to

- manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- F. Provide moisture curing on interior and exterior slab surfaces exposed to deicing salts and on slabs where the finish flooring is not compatible with curing compounds for 7 days by one of the following methods:
1. Keep concrete surface continuously wet by soaking with water.
  2. Keep concrete surface continuously wet with water-saturated absorptive cover.
  3. Keep concrete surface continuously wet by water-fog spray.
- G. Curing Formed Surfaces: Cure formed concrete surfaces, including walls, columns, sides and underside of beams, supported slabs, and other similar surfaces, by moisture curing with forms in place for 7 days or until forms are removed. If forms are removed within the first 7 days, continue moisture curing without forms for the balance of the 7 day curing period.
1. For vertical surfaces, after the concrete has hardened and while the forms are still in place, the form ties shall be loosened and water shall be applied to run down the inside of the form to keep the concrete wet.
  2. After formwork has been removed from vertical surfaces, keep surface continuously wet by water spray or water-saturated absorptive cover.
- H. Curing Unformed Surfaces: Cure unformed surfaces, including the top of exposed walls, beams, etc. by moisture curing for 7 days by one of the following methods:
1. Keep concrete surface continuously wet by soaking with water.
  2. Keep concrete surface continuously wet with water-saturated absorptive cover.
  3. Keep concrete surface continuously wet by water-fog spray.
- I. Cold Weather Concreting ("Cold Weather Concreting", ACI Report 306).
1. All freshly placed concrete shall be kept from freezing for the following periods:
    - a. 3 days for all concrete with an air entraining admixture.
    - b. 4 days for all concrete without an air entraining admixture.
  2. A cumulative curing time of seven days at a minimum surface temperature of 50 degrees F (10 degrees C) shall be provided or until concrete has attained 75% of its design strength. This shall be followed by cooling of concrete in a gradual transition to surrounding conditions. The temperature drop during this period shall not be at a rate exceeding 2 degrees F per hour until the outside or surrounding temperature is reached.
  3. When concrete is placed under conditions of cold weather concreting (defined as a period when the mean daily temperature drops below 40 degrees F for

more than three successive days), take additional precautions as specified in "Cold Weather Concreting" by the American Concrete Institute (ACI Report 306) when placing, curing, monitoring and protecting the fresh concrete.

- J. Hot Weather Concreting ("Hot Weather Concreting" by the American Concrete Institute Committee 305).
  - 1. When concrete is placed under conditions of hot weather concreting, provide extra protection of the concrete against excessive placement temperatures and excessive drying throughout the placing and curing operations. Hot weather is defined as air temperature which exceeds 80 degrees F or any combination of high temperature, low humidity and/or high wind velocity which causes a rate of evaporation in excess of 0.2 pounds per square foot per hour as determined by Figure 2.1.5 of ACI Report 305. Hot weather curing is required if these conditions occur within a 24 hour period after completion of concrete placement.
  - 2. Forms, reinforcing and the air shall be cooled by water fog spraying immediately before placing concrete. The placement temperature of the concrete shall be 75 degrees to 80 degrees F.
  - 3. Immediately following screeding, protect concrete by applying the specified evaporation retarder in accordance with the recommendations of the manufacturer.

### 3.15 PENETRATING CONCRETE SEALER

- A. Apply penetrating concrete sealer to all concrete floor surfaces exposed to view in the finished structure.
- B. Coverage rate shall be 125 square feet per gallon or greater.
- C. Follow manufacturer's recommended installation instructions.

### 3.16 SHORES AND SUPPORTS

- A. General: Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified.
- B. Extend shoring from ground to roof for structures four stories or less, unless otherwise permitted.
- C. Extend shoring at least three floors under floor or roof being placed for structures over four stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this level in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure.
- D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.

- E. Keep reshores in place a minimum of 15 days after placing upper tier, or longer, if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

### 3.17 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

### 3.18 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect/Engineer.

### 3.19 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect/Engineer.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2 ½ parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
  - 1. Cut out honeycombs, rock pockets, voids over ¼ inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
  - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color

match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect/Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
  2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
  3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect/Engineer.
  4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Architect/Engineer for method and procedure, using specified epoxy adhesive and mortar.

- G. Repair methods not specified above may be used, subject to acceptance of Architect/Engineer.

### 3.20 QUALITY CONTROL

- A. General: The Owner will employ a testing agency which meets the requirements of ASTM E329 to perform tests and to submit test reports. The agency will monitor concrete quality by means of site and laboratory tests. They will be authorized to reject plastic concrete not conforming to specifications. Failure to detect any defective materials shall not prevent later rejection when such defect is discovered, or obligate the Architect or Owner for final acceptance.
  - 1. See Section 01410 – Structural Special Inspections for testing and inspection to be performed.
  - 2. Test results will be reported in writing to the Architect, Engineer, ready-mix producer and General Contractor within 24 hours after tests.
  - 3. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect.
- B. The General Contractor shall provide for testing of the floor slab F-number tolerances conducted in accordance with the provisions set forth by ASTM Committee E6.21.10. All tests shall be performed within three working days after concrete placement and prior to any form removal. If in-place floor slabs do not comply with the minimum values shown, the Contractor shall propose remedial measures to bring the surfaces of the floors into compliance. These measures might include grinding, planing, surface repair, retopping, or removal and replacement. Remedial measures shall be approved by the Architect/Engineer prior to the Contractor's commencement of the work.

END OF SECTION 033000



# BROWN + KUBICAN, PSC

## STRUCTURAL ENGINEERS

### CONCRETE MIX DESIGN SUBMITTAL FORM

Project: \_\_\_\_\_  
 City, State: \_\_\_\_\_  
 General Contractor: \_\_\_\_\_  
 Concrete Contractor: \_\_\_\_\_  
 Mix Design Number: \_\_\_\_\_  
 Concrete Strength (Class): \_\_\_\_\_  
 Use (describe): \_\_\_\_\_

#### Design Mix Information

Check  
one

Based on Standard Deviation Analysis   
 Based on Trial Mix Laboratory Test Data

#### Design Characteristics

Density		pcf
Strength		psi (28 days)
Air		%
Slump		inches

*If trial mixes are used, the Mix Design is proportioned to achieve  $f'_{cr} = f'_c + 1200$  psi  
 (1400 psi for strength higher than 5000 psi at 28 days)*

#### Materials

	Type	Source	Specific Gravity	Weight (lb.)	Absolute Vol. (cu. ft.)
	cement				
	flyash				
	silica fume				
	coarse aggregate				
	fine aggregate				
	water				
	other ( )				
	Total				27.0 cu. ft.

Water/Cementitious Ratio (W/C) = \_\_\_\_\_ % (lbs. water /lbs. cementitious)



Admixtures

	Manufacturer	Dosage (oz./cwt)
water reducer		
air entraining agent		
high range water reducer		
non-corrosive accelerator		
other ( )		

Slump before high range water reducer = \_\_\_\_\_ inches  
 Slump after high range water reducer = \_\_\_\_\_ inches

Standard Deviation Analysis (field experience records)

Number of test cylinders evaluated: \_\_\_\_\_ Standard deviation (s): \_\_\_\_\_  
 Required avg. compressive strength ( $f'c + 1.34s$ ): \_\_\_\_\_ Actual avg. compressive strength: \_\_\_\_\_

*(refer to ACI 301 for standard deviation calculation – attach copies of laboratory test reports)*

Trial Mix Laboratory Test Data

Age	Mix #1		Mix #2		Mix #3	
	Date	Compressive Strength	Date	Compressive Strength	Date	Compressive Strength
7 days		psi		psi		psi
7 days		psi		psi		psi
28 days		psi		psi		psi
28 days		psi		psi		psi
28 days average	NA	psi	NA	psi	NA	psi

*(refer to ACI 301 for trial mix procedure – attach copies of laboratory test reports)*

Required Attachments

Please  
check

Coarse aggregate gradation report	<input type="checkbox"/>
Fine aggregate gradation report	<input type="checkbox"/>
Laboratory test reports (strength tests)	<input type="checkbox"/>
Admixture compatibility certification letters	<input type="checkbox"/>

Ready Mix Supplier

Name and Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Miles from project: \_\_\_\_\_ Date: \_\_\_\_\_

SECTION 04065

MASONRY MORTAR AND GROUT

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes mortar and grout for masonry.
- B. Related Sections:
  - 1. Section 01410 – Structural Special Inspections
  - 2. Section 04810 - Unit Masonry Assemblies: Installation of mortar and grout.
  - 3. Section 08115 - Standard Steel Frames: Grouting steel door frames.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM C5 - Standard Specification for Quicklime for Structural Purposes.
  - 2. ASTM C91 - Standard Specification for Masonry Cement.
  - 3. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
  - 4. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
  - 5. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
  - 6. ASTM C150 - Standard Specification for Portland Cement.
  - 7. ASTM C199 - Standard Test Method for Pier Test for Refractory Mortars.
  - 8. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
  - 9. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
  - 10. ASTM C387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
  - 11. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
  - 12. ASTM C476 - Standard Specification for Grout for Masonry.
  - 13. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
  - 14. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
  - 15. ASTM C1019 - Standard Test Method for Sampling and Testing Grout.
  - 16. ASTM C1142 - Standard Specification for Extended Life Mortar for Unit Masonry.
  - 17. ASTM C1314 - Standard Test Method for Constructing and Testing Masonry Prisms Used to Determine Compliance with Specified Compressive Strength of Masonry.
  - 18. ASTM C1329 - Standard Specification for Mortar Cement.
  - 19. ASTM C1357 - Standard Test Method for Evaluating Masonry Bond Strength.

- B. The Masonry Society:
  - 1. TMS MSJC - Building Code for Masonry Structures (ACI 530/ASCE 5/TMS 402), Specification for Masonry Structures (ACI 530.1/ASCE 6/TMS 602) and Commentaries.

### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Manufacturer's Installation Instructions: Submit premix mortar manufacturer's installation instructions.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

### 1.4 MOCK-UP

- A. Section 01400 – Quality Requirements: Mock-up requirements
- B. Construct a masonry wall mockup; coordinate with Section 04810 Unit Masonry Assemblies.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with TMS MSJC Code and TMS MSJC Specification.

### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Hot and Cold Weather Requirements: TMS MSJC Specification.

## PART 2 PRODUCTS

### 2.1 MORTAR AND MASONRY GROUT

- A. Manufacturers:
  - 1. Brixment
  - 2. Kosmortar
  - 3. Medusa
  - 4. Substitutions: Section 01600 - Product Requirements

### 2.2 COMPONENTS

- A. Premix Mortar: ASTM C387, Type S, M and N, using gray color cement.
- B. Grout Aggregate: ASTM C404, fine.

- C. Water: Clean and potable.
- D. Mortar Color: To be selected from manufacturer's full range of options.
- E. Calcium chloride is not permitted.

## 2.3 MIXES

- A. Mortar Mixes:
  - 1. Mortar For Structural Masonry: ASTM C270, Type S or M using Property specification.
  - 2. Mortar For Non-Structural Masonry: ASTM C270, Type N using Property specification.
  - 3. Pointing Mortar: ASTM C270, Type N using Property specification.
- B. Mortar Mixing:
  - 1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
  - 2. Achieve uniformly damp sand immediately before mixing process.
  - 3. Add admixtures to achieve uniformity of mix and coloration.
  - 4. Re-temper only within two hours of mixing.
- C. Grout Mixes:
  - 1. Grout: 3,000 psi strength at 28 days; 8-10 inches slump; mixed in accordance with ASTM C476 Fine grout.
- D. Grout Mixing:
  - 1. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476.
  - 2. Add admixtures; mix uniformly.
  - 3. Do not use anti-freeze compounds to lower the freezing point of grout.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Request inspection of spaces to be grouted.

### 3.2 PREPARATION

- A. Apply bonding agent to existing concrete surfaces.

### 3.3 INSTALLATION

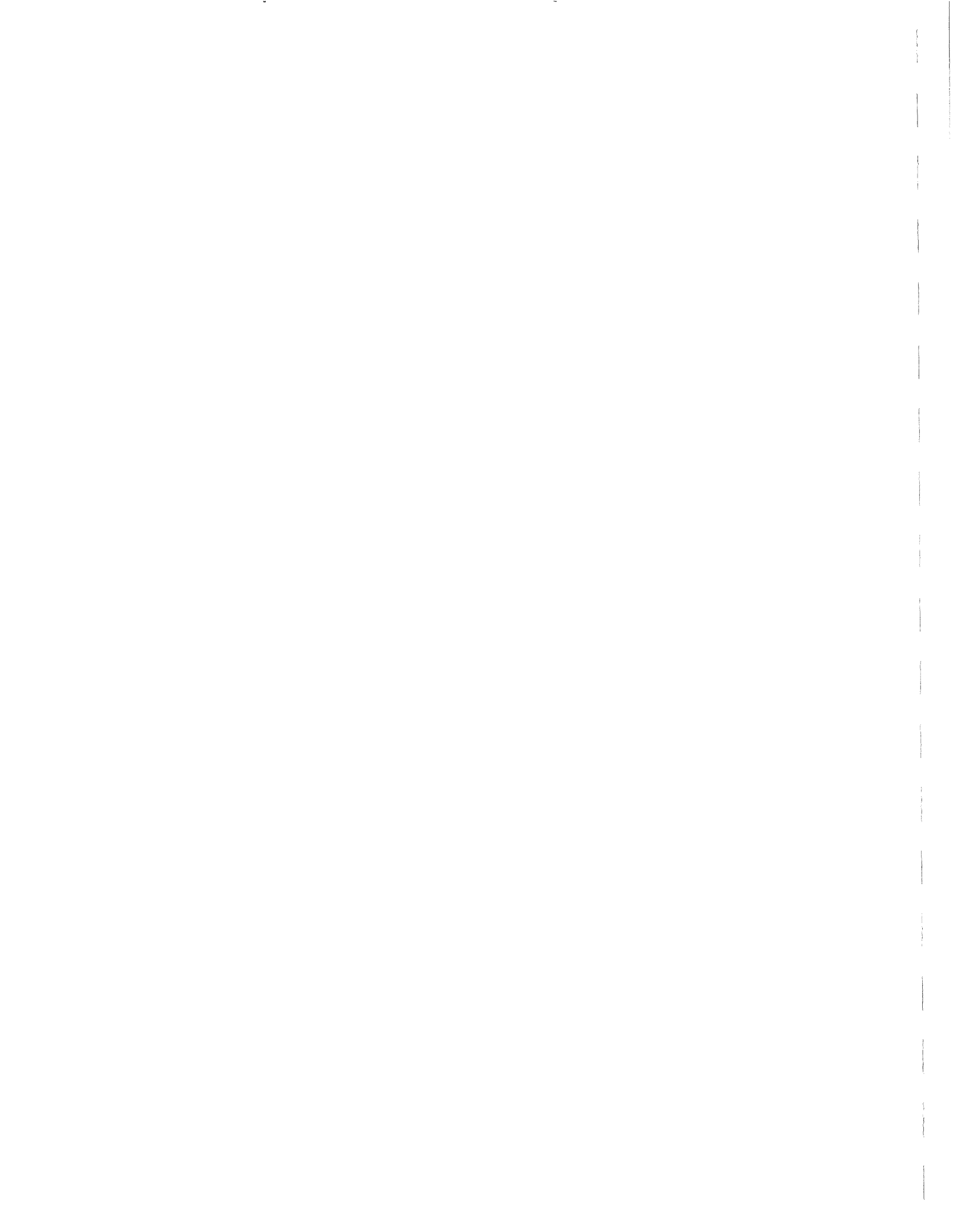
- A. Install mortar and grout in accordance with TMS MSJC Specification.

### 3.4 SCHEDULES

- A. Interior CMU load bearing walls: Type S or M mortar
- B. Interior CMU Non-load bearing walls: Type S or M mortar
- C. Brick Veneer: Type N colored mortar

END OF SECTION





SECTION 04810  
UNIT MASONRY ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes brick and concrete masonry units, cut stone sills & wall panels, copings and other shapes; reinforcement, anchorage, and accessories.
1. Section 01410 – Special Inspections
  2. Section 03130 – Insulated Concrete Forms
  3. Section 03131 – Insulated Concrete Form Accessories
  4. Section 04065 - Masonry Mortar and Grout: Mortar and grout.
  5. Section 05120 - Structural Steel: Product requirements for steel anchors for placement by this section.
  6. Section 05500 - Metal Fabrications: Product requirements for loose steel lintels, and fabricated steel items, for placement by this section.
  7. Section 07110 - Dampproofing: dampproofing masonry surfaces.
  8. Section 07620 - Sheet Metal Flashing and Trim: Product requirements for reglets for flashings for placement by this section.
  9. Section 07900 - Joint Sealers: Rod and sealant at control and expansion joints.
  10. Section 08115 – Standard Steel Frames: Steel frames for placement by this section.
  11. Section 09900 – Painting: Paint finish of designated CMU
  12. Division 15 – Mechanical: Penetrations through masonry assemblies as needed to complete the mechanical work.
  13. Division 16 – Electrical: Raceways and boxes installed in masonry assemblies as needed to complete the electrical work.

1.2 REFERENCES

- A. ASTM International:
1. ASTM A153/A153M - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  2. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  3. ASTM A580/A580M - Standard Specification for Stainless Steel Wire.
  4. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  5. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
  6. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  7. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  8. ASTM A951 - Standard Specification for Masonry Joint Reinforcement.



9. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
  10. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  11. ASTM C34 - Standard Specification for Structural Clay Load-Bearing Wall Tile.
  12. ASTM C55 - Standard Specification for Concrete Brick.
  13. ASTM C56 - Standard Specification for Structural Clay Non-Load-Bearing Tile.
  14. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
  15. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
  16. ASTM C73 - Standard Specification for Calcium Silicate Face Brick (Sand-Lime Brick).
  17. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
  18. ASTM C126 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
  19. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
  20. ASTM C140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units.
  21. ASTM C212 - Standard Specification for Structural Clay Facing Tile.
  22. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
  23. ASTM C315 - Standard Specification for Clay Flue Linings.
  24. ASTM C530 - Standard Specification for Structural Clay Non-Loadbearing Screen Tile.
  25. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  26. ASTM C652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale).
  27. ASTM C744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
  28. ASTM C1261 - Standard Specification for Firebox Brick for Residential Fireplaces.
  29. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
  30. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
  31. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. The Masonry Society:
1. TMS MSJC - Building Code for Masonry Structures (ACI 530/ASCE 5/TMS 402), Specification for Masonry Structures (ACI 530.1/ASCE 6/TMS 602) and Commentaries.

- C. National Fire Protection Association:
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- D. Underwriters Laboratories Inc.:
  - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Product Data: Submit data for masonry, brick and stone units and fabricated wire reinforcement, wall ties, anchors, through wall flashing, vents, weeps, and cleaning products.
- C. CMU Fabricator's Test Reports & Certificate: Submit Independent test results demonstrating mfr's compliance with ASTM standards for maximum weight and strength characteristics associated with Light Weight CMU.

### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with TMS MSJC Code and TMS MSJC Specification.

### 1.5 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum ten years documented experience.

### 1.6 MOCKUP

- A. Section 01400 - Quality Requirements: Mockup requirements.
- B. Construct cavity masonry wall mockup, 10 feet long by 10 feet high, including exterior brick veneer, mortar and accessories, flashings, wall insulation, vents, weeps, reinforcement, wall ties and anchors.
- C. Coordinate installation of mock-up with Sections 03130, 03131, and 08520.
- D. Locate where the mock-up can remain undisturbed for the duration of the project and on a firm substrate that will not sink or settle.
- E. Evaluation will include:
  - 1. Location and placement of brick ties/reinforcement
  - 2. Location and placement of flashings, vents, and weeps
  - 3. Alignment of header joints
  - 4. Cleanliness of air space
  - 5. All tolerances listed in Part 3
- F. Remove mockup when work is 90% complete.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Accept CMU and brick units on site. Inspect for damage. Inspect CMU surfaces; do not install material with excessive pitting or chips.

### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Hot and Cold Weather Requirements: TMS MSJC Specification.

### 1.9 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate masonry work with installation of insulated concrete walls and accessories and interior door anchors and frames.

## PART 2 PRODUCTS

### 2.1 UNIT MASONRY ASSEMBLIES: CONCRETE BLOCK

- A. Manufacturers:
  - 1. Lee Block
  - 2. Boyle Block
  - 3. Ready Mix Concrete
  - 4. Substitutions: Section 01600 - Product Requirements

### 2.2 UNIT MASONRY ASSEMBLIES: BRICK

- A. Face Brick Products
  - 1. Type 1: Belden Modular Beacon Grey Velour A 07-35
  - 2. Type 2: Belden Modular Lighthouse Velour
  - 3. Type 3: Belden Modular glazed face Rum Raisin Velour

### 2.3 COMPONENTS – BRICK AND CONCRETE BLOCK

- A. Face Brick: ASTM C216, Type FBS, Grade SW; color as specified.
- B. Brick Size and Shape: Nominal size of 2 1/2" x 3 1/2" x 7 1/2 inches. Furnish special units for 90 degree corners.
- C. Hollow Load Bearing Concrete Masonry Units (CMU): ASTM C90, Type II - Non-moisture Controlled; light weight.

- D. Solid Load-Bearing Concrete Masonry Units (CMU): ASTM C90, Type II - Non-moisture Controlled; light weight.
- E. Hollow Non-Load Bearing Concrete Masonry Units (CMU): ASTM C129, Type II - Non-moisture Controlled; light weight.
- F. Concrete Masonry Unit Size and Shape: Nominal modular size as indicated on the drawings and as required to complete the work. Furnish special units for 90 degree corners, bond beams, and lintels. Base shapes to be straight. All corners to be bullnosed unless otherwise indicated.

#### 2.4 LIMESTONE SUPPLIER

- A. Company specializing in quarrying and fabricating cut limestone with five years documented experience, and a current member in good standing of the Indiana Limestone Institute of America.

#### 2.5 LIMESTONE

- A. Limestone: Cut Indiana Oolitic Limestone
- B. Color: Buff
- C. Surface Finish: Smooth
- D. Grade: Standard, free of defects
- E. Size and Shape: as indicated on drawings.

#### 2.6 ACCESSORIES

- A. Single Wythe Joint Reinforcement: Ladder type; steel wire, hot dip galvanized to ASTM A641 Class 1 after fabrication, cold drawn steel wire conforming to ASTM A951, 9 gauge rods with 9 gauge cross ties. D/A 320 Ladur as manufactured by DUR-O-Wal, Inc. or approved equal.
- B. Multiple Wythe Joint Reinforcement: Ladder type; with adjustable wall ties; hot dip galvanized after fabrication (1.5 oz or better zinc coating) cold drawn steel conforming to ASTM A951, No. 9 side rods with No. 9 cross ties. D/A 360 Ladur Eye as manufactured by DUR-O-Wal, Inc. or approved equal.
- C. Reinforcing Steel: ASTM A615 60 ksi yield grade, deformed billet bars, uncoated finish.
- D. Strap Anchors: Bent steel shape, 2 inch size x 1/4 inch thick, hot dip galvanized to ASTM A153, B2 finish.
- E. Limestone Wall Panel Anchors: Adjustable stainless steel stone anchors top and bottom of all panels as manufactured by Dor-O-Wall, Heckmann, or equal.

- F. Limestone Coping anchorage: stainless steel rods, 1/2 inch diameter
- G. Anchor Bolts: Headed, J-shaped or L-shaped.
- H. Mortar and Grout: As specified in Section 04065.
- I. Copper/Kraft Paper Flashings: 5 oz/sq ft rolled sheet copper bonded to fiber reinforced asphalt treated Kraft paper.
- J. Preformed Control Joints: Rubber material. Furnish with corner and tee accessories, cement fused joints.
- K. Joint Filler: Closed cell rubber; oversized 50 percent to joint width; self expanding.
- L. Building Paper: ASTM D226, No. 30 asphalt saturated felt.
- M. Nailing Strips: Softwood, preservative treated for moisture resistance, dovetail shape, sized to masonry joints.
- N. Weeps: cotton rope.
- O. Cavity Vents: Molded polyvinyl chloride grilles; insect resistant.
- P. Cavity Wall Insulation: One inch thickness, extruded polystyrene. ASTM C578, extruded cellular type, manufactured by Dow Corning, Amoco, or UC Industries and confirming to the following
  - 1. R: 5.0 per inch
  - 2. Compressive Strength: 30 psi
  - 3. Water Absorption (ANSI/ASTM D2842) 0.3% by volume, max.
  - 4. Square edges
- Q. Mortar and Grout: as specified in Section 04065.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive work.
- C. Verify items provided by other sections of work are properly sized and located.
- D. Verify built-in items are in proper location, and ready for roughing into masonry work.

### 3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other sections.
- B. Furnish temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.

### 3.3 INSTALLATION

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.
- C. Coursing of Concrete Masonry Units:
  - 1. Bond: Running for new work.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches.
  - 3. Mortar Joints: Concave.
- D. Coursing of Brick Units:
  - 1. Bond: Running.
  - 2. Coursing: Three units and three mortar joints to equal 8 inches.
  - 3. Mortar Joints: Concave.
- E. Placing And Bonding:
  - 1. Lay solid masonry units in full bed of mortar, with full head joints.
  - 2. Lay hollow masonry units with face shell bedding on head and bed joints.
  - 3. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
  - 4. Remove excess mortar as work progresses.
  - 5. Interlock intersections and external corners.
  - 6. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
  - 7. Perform job site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
  - 8. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, cavity insulation is applied, or bitumen dampproofing is applied.
  - 9. Isolate masonry from vertical structural framing members with movement joint.
  - 10. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler.
- F. Weeps and Vents: Furnish weeps and vents in outer wythe at 24 inches oc horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and as indicated on drawing wall sections.

- G. Cavity Wall: Do not permit mortar to drop or accumulate into cavity air space or to plug weeps. Build inner wythe ahead of outer wythe to receive cavity insulation and air/vapor barrier adhesive.
- H. Joint Reinforcement And Anchorage - Single Wythe Masonry:
1. Install horizontal joint reinforcement 16 inches oc.
  2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
  3. Place joint reinforcement continuous in first and second joint below top of walls.
  4. Lap joint reinforcement ends minimum 6 inches.
- I. Joint Reinforcement And Anchorages - Cavity Wall Masonry:
1. Install horizontal joint reinforcement 16 inches oc.
  2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
  3. Place joint reinforcement continuous in first and second joint below top of walls.
  4. Lap joint reinforcement ends minimum 6 inches.
  5. Embed anchors in concrete. Attach to structural steel members. Embed anchorages in every second block, or sixth brick joint.
- J. Masonry Flashings:
1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, under parapet caps, at bottom of walls, and cut flush with face of brick.
  2. Turn flashing up minimum 8 inches and bed into mortar joint of masonry backing.
  3. Lap end joints minimum 6 inches and seal watertight.
  4. Turn flashing, fold, and seal at corners, bends, and interruptions.
- K. Lintels:
1. Install loose steel lintels over openings.
  2. Openings Up To 42 inches Wide: Place No. 4 reinforcing bars 1 inch from bottom web.
  3. Openings From 42 inches Up To 78 inches Wide: Place two No. 5 reinforcing bars 1 inch from bottom web.
  4. Openings Over 78 inches: Reinforce openings as indicated on Drawings.
  5. Do not splice reinforcing bars.
  6. Support and secure reinforcing bars from displacement.
  7. Place and consolidate grout fill without displacing reinforcing.
  8. Allow masonry lintels to attain specified strength before removing temporary supports.
  9. Maintain minimum 8 inch bearing on each side of opening.
- L. Grouted Components:
1. Reinforce bond beam with 2, No. 5 bars, 1 inch from bottom web.

2. Reinforce pilasters as indicated on structural drawings.
  3. Lap splices as indicated on structural drawings.
  4. Support and secure reinforcing bars from displacement.
  5. Place and consolidate grout fill without displacing reinforcing.
  6. At bearing locations, fill masonry cores with grout for minimum 12 inches both sides of opening.
- M. Reinforced Masonry:
1. Lay masonry units with cells vertically aligned and cavities between wythes clear of mortar and unobstructed.
  2. Place reinforcement bars as indicated on Drawings.
  3. Splice reinforcement as indicated on structural drawings.
  4. Support and secure reinforcement from displacement.
  5. Place and consolidate grout fill without displacing reinforcing.
  6. Place grout in accordance with TMS MSJC Specification.
- N. Control And Expansion Joints:
1. Do not continue horizontal joint reinforcement through control and expansion joints.
  2. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
  3. Size control joint in accordance with Section 07900 for sealant performance.
  4. Form expansion joint by omitting mortar and cutting unit to form open space.
- O. Built-In Work:
1. As work progresses, install built-in metal door and glazed frames, fabricated metal frames, wood nailing strips, anchor bolts, plates, and other items to be built-in the work and furnished by other sections.
  2. Install built-in items plumb and level.
  3. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
  4. Do not build in materials subject to deterioration.
- P. Cutting And Fitting:
1. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.
  2. Obtain Architect/Engineer's approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### 3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Alignment of Pilasters: 1/4 inch.



- C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- G. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- I. Maximum Variation for Steel Reinforcement:
  - 1. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
  - 2. Plus or minus 1 inch when distance is between 8 and 24 inches.
  - 3. Plus or minus 1 1/4 inch when distance is greater than 24 inches.
  - 4. Plus or minus 2 inches from location along face of wall.

### 3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Replace defective mortar. Match adjacent work.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.

### 3.6 SCHEDULES

- A. Unit Masonry Assemblies include, but are not necessary limited to:
  - 1. Exterior Brick Veneer.
  - 2. Interior Partitions: Single wythe concrete masonry units with reinforcing as specified on drawings.
  - 3. Interior Load Bearing Walls: Refer to Drawings
  - 4. Cut Stone copings, sills, wall panels and trim as detailed on the drawings. Head and bed joints of all stone to be raked and finished with tooled sealant joints.

END OF SECTION

## SECTION 05100 – STRUCTURAL ANCHORS

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes post-installed metal anchors in concrete, masonry, and steel, as shown on drawings including schedules, notes, and details showing size and location of anchors, typical connections, and types of anchors required.
  - 1. Adhesive anchors.
  - 2. Wedge anchors.
  - 3. Undercut anchors.
  - 4. Concrete screw anchors.
  - 5. Sleeve anchors.
  - 6. Powder actuated fasteners.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Structural Special Inspection."
  - 2. Division 3 Section "Cast-in-Place Concrete."
  - 3. Division 4 Section "Unit Masonry."
  - 4. Division 5 Section "Structural Steel Framing."
  - 5. Division 6 Section "Rough Carpentry."

#### 1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified. Include manufacturer's specifications, load charts, and other data to show compliance with the specifications (including specified standards).
- C. Installer Qualifications and Procedures: Submit a letter of procedure stating method of drilling, the product proposed for use, the complete installation procedure, manufacturer training date, and a list of the personnel to be trained on anchor installation.
- D. ICBO ES Evaluation Reports/Certificates.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Anchors shall be installed by an installer with at least 1 year of experience performing installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Installer Training: Conduct a thorough training with the manufacturer or the manufacturer's representative for the installer on the project. Training to consist of a review of the complete installation process for drilled-in anchors, to include but not limited to:
  - 1. Hole drilling procedure.
  - 2. Hole preparation & cleaning technique.
  - 3. Adhesive injection technique & dispenser training / maintenance.
  - 4. Rebar dowel preparation and installation.
  - 5. Proof loading/torquing.
- C. Certifications: Unless otherwise authorized by the Engineer, anchors shall have an ICBO ES Evaluation Report indicating conformance with current applicable ICBO ES Acceptance Criteria.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver anchors to Project site in such quantities and at such times to ensure continuity of installation.
- B. Store materials to permit easy access for inspection and identification. Protect anchors and packaged materials from erosion and deterioration.

#### 1.6 SEQUENCING

- A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

### PART 2 - PRODUCTS

#### 2.1 FASTENERS AND HARDWARE

- A. Anchor Rods, Bolts, Nuts, and Washers: As follows:
  - 1. Non-High Strength Rods (Hooked, Straight, Headed or Threaded): ASTM F1554 Grade 36 and heavy hex carbon-steel nuts.
  - 2. High Strength Headed Bolts: ASTM A325, Type 1, heavy hex steel structural bolts and heavy hex carbon-steel nuts.
  - 3. Washers: ASTM A36.
- B. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.

1. Finish: Plain, noncoated.
  2. Finish: Hot-dip zinc coating, ASTM A 153, Class C.
  3. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.
- C. High-Strength Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.
1. Finish: Plain, uncoated, except where indicated to be galvanized.
  2. Galvanized Finish: Hot-dip zinc-coating, ASTM A153, Class C or mechanically deposited zinc-coating, ASTM B695, Class 50.
- D. Carbon Steel Threaded Rod: ASTM A36 or ASTM A193 Grade B7.
- E. Wedge Anchors: ASTM A510 or ASTM A108.
- F. Stainless Steel Bolts, Hex Cap Screws, and Studs: ASTM F593.
- G. Stainless Steel Nuts: ASTM F594.

## 2.2 ADHESIVE ANCHORS

- A. Cartridge Injection Acrylic Adhesive Anchors: two-component material consisting of acrylic resin, hardener, cement and water, suitable for use on dry or damp surfaces, concrete and solid grouted concrete masonry.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. HIT HY 150 Max System with HAS Super (ASTM A193 Gr B7) threaded rods, Hilti.
    - b. Acrylic-Tie System with ASTM A193 Gr B7 threaded rods, Simpson/Strong-Tie.
    - c. Acrylic-7 with ASTM A193 Gr B7 threaded rods, Red Head.
  2. ASTM A563 heavy hex carbon-steel nuts; ASTM F436 hardened carbon-steel washers; and ASTM A36 plate washers.
- B. Cartridge Injection Hybrid Adhesive Anchors: two-component material consisting of resin, hardener, cement and water, suitable for fastening into material containing voids and holes, hollow concrete masonry, brick with holes, and multi-wythe brick construction.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. HIT HY 20 System with HAS Super (ASTM A193 Gr B7) threaded rods, Hilti.
  2. ASTM A563 heavy hex carbon-steel nuts; ASTM F436 hardened carbon-steel washers; and ASTM A36 plate washers.

- C. Cartridge Injection Epoxy Adhesive Anchors: two-component epoxy adhesive, suitable for use on oversize, cored, and wet holes and in submerged applications.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. HIT RE500 System with HAS Super threaded rods, Hilti.
    - b. ET Epoxy-Tie System with A193 Gr B7 threaded rods, Simpson/Strong-Tie
  2. ASTM A563 heavy hex carbon-steel nuts; ASTM F436 hardened carbon-steel washers; and ASTM A36 plate washers.
- D. Capsule Adhesive Anchors: Threaded steel rod, inserts and reinforcing dowels with 45 degree chisel point, complete with nuts, washers, glass or foil capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, and manufacturer's installation instructions. Type and size as indicated on Drawings.
1. Interior Use: Unless otherwise indicated on the Drawings, provide chisel-pointed carbon steel rods conforming to ASTM A36 or ASTM A 193 Type B7 with zinc plating in accordance with ASTM B633, Type III Fe/Zn 5 (SC1).
  2. Exterior Use: As indicated on the Drawings, provide chisel-pointed stainless steel anchors. Stainless steel anchors shall be AISI Type 304 and Type 316 stainless steel provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener. All nuts shall conform to ASTM F594 unless otherwise specified. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
  3. Reinforcing dowels shall be A615 Grade 60, with 45-degree chisel-points at embedded end.
  4. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Hilti HVA Adhesive System with HVU capsules, ICBO ER-5369.

### 2.3 MECHANICAL ANCHORS

- A. Wedge Anchors: Wedge type, torque-controlled, with impact section to prevent thread damage and wedge dimples to prevent spinning during installation, complete with required nuts and washers. Provide anchors with length identification markings conforming to ICBO ES AC01. Type and size as indicated on Drawings. Suitable for fastening into concrete and solid grouted concrete masonry; cored, damp, or wet holes.
1. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors manufactured from materials conforming to ASTM A510 or ASTM A108 with zinc plating in accordance with ASTM B633, Type III Fe/Zn 5 (SC1).
  2. Exterior Use: As indicated on the Drawings, provide stainless steel anchors. Stainless steel anchors shall be AISI Type 304 and Type 316 stainless steel provided with stainless steel nuts and washers of matching alloy group and

minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener. Stainless steel nuts shall conform to ASTM F594 unless otherwise specified. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.

3. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Hilti Kwik Bolt III.
    - b. Red Head Trubolt.
- B. Heavy Duty Sleeve Anchors: Torque-controlled, exhibiting follow-up expansion under load, with provision for rotation prevention during installation. Type and size as indicated on Drawings. Suitable for fastening into non-cracked or cracked concrete; cored, damp, or wet holes.
1. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors manufactured from materials conforming to ISO 898 Part 1, with zinc plating equivalent to ASTM B633, Type III Fe/Zn 5 (5 $\mu$ m min.).
  2. Exterior Use: As indicated on the Drawings, provide stainless steel anchors. Stainless steel anchors shall be manufactured from materials conforming to ISO 3506 Part 1 and having corrosion resistance equivalent to AISI Type 304 and Type 316 stainless steel. Stainless steel anchors shall be provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener. All nuts shall conform to ISO 3506 Part 2 unless otherwise specified. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
  3. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Hilti HSL, HSLG, or HSLB, ICBO ER-3987.
- C. Heavy Duty Undercut Anchors: Bearing-type. Installed anchor shall have a minimum tension bearing area in the concrete, measured as the horizontal projection of the bearing surface, not less than two times the net tensile area of the anchor bolt. The installed anchor shall exhibit a form fit between the bearing elements and the undercut in the concrete. Type and size as indicated on Drawings. Suitable for fastening into non-cracked or cracked concrete; cored, damp, or wet holes.
1. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors manufactured from materials conforming to ISO 898 Part 1, with zinc plating equivalent to ASTM B633, Type III Fe/Zn 5 (5 $\mu$ m min.).
  2. Exterior Use: As indicated on the Drawings, provide sherardized or stainless steel anchors. Sherardized anchors shall be manufactured from materials conforming to ISO 898 Part 1 and having corrosion resistance equivalent to ASTM A153 with sherardized dry diffusion zinc coating (50  $\mu$ m min.). Stainless steel anchors shall be manufactured from materials conforming to ISO 3506 Part 1 and having corrosion resistance equivalent to AISI Type 304 and Type 316 stainless steel. Stainless steel anchors shall be provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength

of the externally threaded fastener. All nuts shall conform to ISO 3506 Part 2 unless otherwise specified. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.

3. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
  - a. Hilti HDA, ICBO ER-5608.
- D. Concrete Screw Anchors: Carbon steel, screw type anchor with double lead thread and zinc-rich coating. Anchor shall bear the diameter and length on the bolthead that is visible after installation. Size as indicated on Drawings. Suitable for fastening into concrete with drilled damp or wet holes.
  1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Hilti HUS-H.
- E. Sleeve Anchors: Torque-controlled, exhibiting follow-up expansion under load, with provision for rotation prevention during installation. Type and size as indicated on Drawings. Suitable for fastening into material containing voids and holes, hollow concrete, hollow concrete masonry, and solid brick.
  1. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors manufactured from materials conforming to ISO 898 Part 1, with zinc plating equivalent to ASTM B633, Type III Fe/Zn 5 (5 $\mu$ m min.).
  2. Exterior Use: As indicated on the Drawings, provide stainless steel anchors. Stainless steel anchors shall be manufactured from materials conforming to ISO 3506 Part 1 and having corrosion resistance equivalent to AISI Type 304 stainless steel. Stainless steel anchors shall be provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener. All nuts shall conform to ISO 3506 Part 2 unless otherwise specified. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
  3. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Hilti HLC.
    - b. Powers Rawl Lok/Bolt.

#### 2.4 POWDER ACTUATED FASTENERS

- A. Drive Pins: Modified AISI 1060, 1062, or 1070 steel, hardness 49-61 Rockwell C, minimum tensile strength of 282 ksi, and minimum shear strength of 162 ksi; with zinc plating equivalent to ASTM B633, Type III Fe/Zn 5 (5 $\mu$ m min.).
  1. For fastening light gauge metal to concrete or concrete masonry: Minimum 0.143" shank diameter, 1 1/4" long, with premounted plastic washer.

- a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
  - 1) X-DNI 32 P8 by Hilti.
  - 2) No. 50032 by Powers Rawl.
2. For fastening light gauge metal to steel: Minimum 0.143" knurled shank diameter, 3/4" long, with premounted plastic washer.
  - a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - 1) X-EDNI 19 P8 by Hilti.
    - 2) No. 50022 by Powers Rawl.
3. For fastening 2x dimension lumber to concrete or concrete masonry: Minimum 0.143" shank diameter, 2 3/4" long, with premounted plastic washer.
  - a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - 1) X-DNI 72 P8 by Hilti.
    - 2) No. 50046 by Powers Rawl.
4. For fastening 2x dimension lumber to steel equal to or less than 5/16" in thickness: Minimum 0.143" knurled shank diameter, 2" long, with premounted plastic washer.
  - a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - 1) X-EDNI 52 P8 by Hilti.
    - 2) No. 50038 by Powers Rawl.
5. For fastening 2x dimension lumber to steel greater than 5/16" in thickness: Minimum 0.171" knurled shank diameter, 2 1/4" long, with premounted plastic washer.
  - a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - 1) DS 57 P10, by Hilti.
    - 2) No. 50172 by Powers Rawl.



## PART 3 - EXECUTION

### 3.1 INSTALLATION

#### A. General

1. Drill holes with rotary impact hammer drills using carbide-tipped bits and core drills using diamond core bits. **Drill bits shall be of diameters as specified by the anchor manufacturer.** Unless otherwise shown on the Drawings, all holes shall be drilled perpendicular to the concrete surface.
2. Cored Holes: Where anchors are to be installed in cored holes, use core bits with matched tolerances as specified by the manufacturer. Acrylic Adhesive Anchors shall not be installed in core drilled holes.
3. Embedded Items: Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging prestressing tendons, electrical and telecommunications conduit, and gas lines.
4. Base Material Strength: Unless otherwise specified, do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
5. Observe manufacturer recommendations with respect to installation temperatures for cartridge injection adhesive anchors and capsule anchors.
6. Perform anchor installation in accordance with manufacturer instructions.

B. Cartridge Injection Adhesive Anchors: **Clean all holes per manufacturer instructions** to remove loose material and drilling dust prior to installation of adhesive. Holes may be dry, damp or wet. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive. Follow manufacturer recommendations to ensure proper mixing of adhesive components. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface. Shim anchors with suitable device to center the anchor in the hole. Do not disturb or load anchors before manufacturer specified cure time has elapsed.

C. Capsule Anchors: Perform drilling and setting operations in accordance with manufacturer instructions. Clean all holes to remove loose material and drilling dust prior to installation of adhesive. Remove water from drilled holes in such a manner as to achieve a surface dry condition. Capsule anchors shall be installed with equipment conforming to manufacturer recommendations. Do not disturb or load anchors before manufacturer specified cure time has elapsed.

D. Wedge Anchors, Heavy-Duty Sleeve Anchors, and Undercut Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in part to be fastened. Set anchors to manufacturer's recommended torque, using a torque wrench. Following attainment of 10% of the specified torque, 100% of the specified torque shall be reached within 7 or fewer complete turns of the nut. If the specified torque is not achieved within

the required number of turns, the anchor shall be removed and replaced unless otherwise directed by the Engineer.

- E. Powder Actuated Fasteners: Perform anchor installation in accordance with manufacturer instructions. Adjust fastener shank diameter and length to achieve manufacturer's minimum recommended penetration of base material.

### 3.2 QUALITY CONTROL

- A. General: The General Contractor shall **[Owner will]** engage an independent testing and inspecting agency to perform inspections and tests and to prepare test reports. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements. Failure to detect any defective materials shall not prevent later rejection when such defect is discovered, or obligate the Architect or Owner for final acceptance.
  - 1. See Section 01410 – Structural Special Inspections for testing and inspection to be performed.
  - 2. Provide access for testing agency to places where structural anchors are being installed so that required inspection and testing can be accomplished.
  - 3. The General Contractor shall provide the testing agency a complete set of approved shop drawings.
  - 4. Reports will be delivered to the Architect, Engineer, and the General Contractor within one week of inspection.
  - 5. Deviations from requirements of the contract documents will be reported in writing to the General Contractor within 24 hours.
- B. Testing: 25% of each type and size of drilled-in anchor shall be proof loaded by the independent testing laboratory. Adhesive anchors and capsule anchors shall not be torque tested unless otherwise directed by the Engineer. If more than 10% of the tested anchors fail to achieve the specified torque or proof load within the limits as defined on the Drawings, all anchors of the same diameter and type as the failed anchor shall be tested, unless otherwise instructed by the Engineer.
  - 1. Torque shall be applied with a calibrated torque wrench.
  - 2. Proof loads shall be applied with a calibrated hydraulic ram. Displacement of adhesive and capsule anchors at proof load shall not exceed  $D/10$ , where D is the nominal anchor diameter.
- C. Correct deficiencies in or remove and replace anchors that inspections and test reports indicate do not comply with specified requirements.

END OF SECTION 05100



## SECTION 051200 – STRUCTURAL STEEL FRAMING

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.
  - 1. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
  - 2. Furnish bearing plates and anchors for steel joists and joist girders where required.
  - 3. Furnish and install shelf and relieving angles.
  - 4. Furnish loose lintels and loose beam bearing plates.
  - 5. Furnish and install shear connectors.
- B. This Section includes architecturally exposed structural steel.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Structural Special Inspection."
  - 2. Division 3 Section "Cast-in-Place Concrete."
  - 3. Division 4 Section "Unit Masonry."
  - 4. Division 9 Section "Painting."

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated.
- B. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer to supervise preparation of shop drawings and perform structural calculations as required for selection of structural steel connections.

#### 1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

- B. Product Data for each type of product specified. Include manufacturer's specifications, installation instructions, laboratory test reports, and other data to show compliance with the specifications (including specified standards).
- C. Shop Drawings detailing fabrication and erection of structural steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data in accordance with AISC Specifications and the AISC "Detailing for Steel Construction", latest edition.
  - 2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
  - 3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.
  - 4. Include erection plans and details.
  - 5. Include ASTM material specifications and grade of steel.
  - 6. Provide setting drawings, templates, and directions for installation of anchor rods and other anchorages.
  - 7. Provide erection details of all field connections.
  - 8. Indicate surface preparation for primer and primer to be used.
  - 9. Submit a schedule of shop drawing submittal dates which allows the Architect reasonable time for review. Schedule shall list size and approximate number of sheets in each submittal.
  - 10. Shop drawings which show the Architect's or Engineer's title block, logo and/or seal will be rejected and returned unchecked.
  - 11. Computer generated electronic structural construction document files (ACAD) will be made available to the Contractor. The Contractor will be required to sign the Engineer's standard release of liability form and pay a handling fee of \$50.00 per drawing prior to receiving the drawing files. Rules for use of said files shall be as defined in the AISC "Code of Standard Practice for Steel Buildings and Bridges," Section 4.3.
  - 12. Submit shop drawings in the form of five (5) sets of prints.
  - 13. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Mill test reports signed by manufacturers certifying that their products, including the following, comply with requirements.
  - 1. Structural steel, including chemical and physical properties.
  - 2. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
  - 3. Direct-tension indicators.
  - 4. Twist-off tension control assembly.
  - 5. Shear stud connectors.
  - 6. Weld filler materials.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
1. Installer must participate in the AISC Quality Certification Program and be designated an AISC-Certified *Certified Steel Erector (CSE)*.
- B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.
1. Fabricator must participate in the AISC Quality Certification Program and be designated an AISC-Certified *Standard for Steel Building Structures (STD)* Plant.
- C. Comply with applicable provisions of the following specifications and documents:
1. AISC's "Specification for Structural Steel Buildings
  2. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  3. Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
  4. American Welding Society's (AWS) D1.1-2004 "Structural Welding Code – Steel."
  5. ASTM A 6 "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
  6. AGA – American Galvanizers Association publication "Recommended Details for Galvanized Structures".
  7. AISC –Steel Construction Manual, 13<sup>th</sup> Edition.
  8. SSPC – Steel Structures Painting Manual, Vol. 2 Systems and Specifications; Steel Structures Painting Council; 1995, Seventh Edition.
  9. SSPC-VIS 1-89 – Visual Standard for Abrasive Blast Cleaned Steel; Steel Structures Painting Council; 1989.
  10. SSPC-VIS 3 – Visual Standard for Power and Hand Tool Cleaned Steel; Steel Structures Painting Council; 1993.
  11. OSHA Steel Erection Standard
- D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the State of Kentucky and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.
- E. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code – Steel."
1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."
1. The Contractor shall require reasonable representatives of every party who are concerned with the steel work to attend the Conference, including but not limited to, the following:
    - a. Contractor's Superintendent – Structural Steel Fabricator – Structural Steel Installer – Testing and Inspection Agency – Structural Engineer.
  2. Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within five days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes: Owner's Representative and Architect.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
  1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
  2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

#### 1.7 SEQUENCING

- A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. All structural steel shapes shall be new, unused and perfect stock, free from millscale, rust, flake, pitting, and imperfections, without bends, kinks, and distortions. Shop splicing of members will only be permitted if the member exceeds maximum mill length.
- B. Wide Flange and Tee Shapes (Designated as W and WT): ASTM A992.  
Wide Flange and Tee Shapes (Designated as M, S, HP, MT and ST): ASTM A36.
- C. Channels, Angles, Plates and Bars: ASTM A36.
- D. Column Base Plates: ASTM A36 or ASTM A572 Grade 50.

- E. Cold-Formed Structural Steel Tubing: ASTM A500, Grade B.
- F. Steel Pipe: ASTM A53, Grade B.
  - 1. Weight Class: As indicated on Drawings.
  - 2. Finish: Black, except where indicated to be galvanized.
- G. Shear Connectors: ASTM A108, Grade 1015 through 1020, headed-stud type, cold-finished carbon steel, AWS D1.1, Type B. Dimensions shall comply with AISC Specifications.
- H. Anchor Rods, Bolts, Nuts, and Washers: As follows:
  - 1. Non-High Strength Rods (Hooked, Straight, Headed or Threaded): ASTM F1554 Grade 36 and heavy hex carbon-steel nuts.
  - 2. High Strength Headed Bolts: ASTM A325, Type 1, heavy hex steel structural bolts and heavy hex carbon-steel nuts.
  - 3. Washers: ASTM A36.
- I. High-Strength Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.
  - 1. Finish: Plain, uncoated, except where indicated to be galvanized.
  - 2. Galvanized Finish: Hot-dip zinc-coating, ASTM A153, Class C or mechanically deposited zinc-coating, ASTM B695, Class 50.
  - 3. Direct-Tension Indicators: ASTM F959, Type as required. Use as contractor's option.
    - a. Finish: Plain, uncoated, except where indicated to be galvanized.
    - b. Galvanized Finish: Mechanically deposited zinc-coating, ASTM B695, Class 50, or mechanically deposited zinc-coating, ASTM B695, Class 50.
  - 4. Twist-Off-Type Tension-Control Assembly: ASTM F1852. Use at contractor's option.
    - a. Finish: Plain, uncoated, except where indicated to be galvanized.
    - b. Galvanized Finish: Hot dip zinc coating, ASTM A153, Class C or mechanically deposited zinc-coating, ASTM B695, Class 50.
- J. High-Strength Bolts, Nuts, and Washers: ASTM A490, Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers, uncoated.
- K. Welding Electrodes: Comply with AWS requirements.



## 2.2 PRIMER

- A. Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer with good resistance to normal atmospheric corrosion, complying with performance requirements of FS TT-P-664.
- B. Primer: SSPC-Paint 25; red iron oxide, zinc oxide, raw linseed oil and alkyd primer.
- C. Primer: SSPC-Paint 23, latex primer.
- D. Primer: SSPC-Paint 15, Type I, gray.
- E. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
- F. Primer: Nonasphaltic primer complying with SSPC's "Painting System Guide No. 7.00."
- G. Epoxy Primer: SSPC-Paint 22.
- H. Zinc Dust Primer: SSPC-Paint 5 (40% - 45% zinc dust in dried film.)

## 2.3 GALVANIZING MATERIALS

- A. Galvanizing: The zinc used for the coating shall conform to the specifications for slab zinc (Spelter) ASTM designation: B6.
- B. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds and repair painting of galvanized steel, with dry film containing not less than 93 percent zinc dust by weight and complying with DOD-P-21035 A or SSPC-Paint 20, Type II.

## 2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107, of consistency suitable for application, and a 30-minute working time. Grout to have a minimum compressive strength at 28 days of 5,000 psi when applied in a fluid consistency.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:
    - a. NS Grout, The Euclid Company.
    - b. Five Star Grout, U.S. Grout Corp.
    - c. Masterflow 713, Master Builders.
    - d. Sikagrout 212, SIKA.

## 2.5 FABRICATION

- A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.
  - 1. Camber structural steel members where indicated.
  - 2. Identify high-strength structural steel according to ASTM A6 and maintain markings until steel has been erected.
  - 3. Mark and match-mark materials for field assembly.
  - 4. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
  - 5. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
  - 6. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
  
- B. Fabricate steel exposed to view with exposed surfaces smooth, square, and free of surface blemishes, including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness.
  - 1. Remove blemishes by filling, grinding, or by welding and grinding, prior to cleaning, treating and shop priming.
  - 2. Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.
  
- C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  - 1. Plane thermally cut edges to be welded.
  
- D. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.
  
- E. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld shear connectors for composite construction in field, spaced as shown to beams and girders. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's printed instructions. Break off and remove insulators after stud installation. Remove insulators from composite deck prior to placing concrete.
  
- F. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.
  - 1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.
  - 2. Weld threaded nuts to framing and other specialty items as indicated to receive other work.
  - 3. Perimeter columns shall have holes through the column web or other devices attached to the columns at 42-45 inches above the finished floor and at the

midpoint between the finished floor and the top cable to permit installation of perimeter safety cables.

- G. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.

## 2.6 SHOP CONNECTIONS

- A. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
  - 1. Bolts: ASTM A325 (ASTM A325M) high-strength bolts, unless otherwise indicated.
  - 2. Connection Type: Unless snug tight connections are noted on the drawings as being permitted, all bolts shall be tightened to full pretensioning load.
- B. When two structural members on opposite sides of a column web, or a beam web over a column, share common connection holes do not use connections that require either member to be completely disconnected (nuts removed from bolts) for installation of the succeeding member.
- C. Do not reuse ASTM A490 bolts, galvanized A325 bolts or bolts that have been tensioned.
- D. All bolts of same ASTM type shall be of same diameter. In addition, bolts of different ASTM type shall be of different diameter unless otherwise approved by Structural Engineer.
- E. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work. Remove all cracks, pores, slag inclusions, incomplete fusions, and incomplete penetrations over 1/2" long in any weld and reweld.
  - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.
  - 2. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds 1/2 inch (13 mm) and larger. Grind flush butt welds. Dress exposed welds.
  - 3. Furnish all steel members in one piece without splicing, unless otherwise noted on project drawings or approved by Structural Engineer.
  - 4. Design of Members and Connections: Typical AISC connections are to be used except where otherwise shown. Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.
  - 5. Expansion Joints: Provide expansion joints in steel shelf angles when part of structural steel frame; locate at vertical masonry expansion joints as indicated

on drawings. The gap between ends of angles shall equal the width of the masonry expansion joint. The angles shall have support within 8" of the joints.

- F. Where Drawings indicate spliced and/or bent beams, provide AWS D1.1 pre-qualified full penetration welds to develop 100% of the beam's shear and moment capacity.
- G. Connections incorporating any of the following shall be marked with an identifying mark painted on the member.
  - 1. Connections using bolts larger than  $\frac{3}{4}$  inches.
  - 2. ASTM A490 bolted connections.
  - 3. Bearing connections with bolt threads excluded from shear plane.
  - 4. Slip-critical connections.

## 2.7 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
  - 1. Surfaces embedded in concrete or mortar other than column bases. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
  - 2. Surfaces to be field welded.
  - 3. Surfaces to be high-strength bolted with slip-critical connections.
  - 4. Surfaces to receive sprayed-on fireproofing.
  - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC specifications as follows where indicated on drawings:
  - 1. SSPC-SP 2 "Hand Tool Cleaning,"
  - 2. SSPC-SP 3 "Power Tool Cleaning," all steel except as otherwise specified.
  - 3. SSPC-SP 5 "White Metal Blast Cleaning."
  - 4. SSPC-SP 6 "Commercial Blast Cleaning," all steel exposed to view in the finished project. Remove all mill scale.
  - 5. SSPC-SP 8 "Pickling."
  - 6. SSPC-SP 10 "Near-White Blast Cleaning."
  - 7. SSPC-SP 11 "Power Tool Cleaning to Bare Metal."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
  - 2. Apply 2 coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

D. Epoxy Primer

1. Exposed exterior structural steel shall be prime painted with the specified Epoxy Primer.
2. Prepare surfaces to be painted according to Steel Structures Painting Council Specification SSPC-SP 6, SSPC-SP 5 or SSPC-SP 8. The Pictorial Surface Preparation Standards for Painting Steel Surfaces, SSPC-VIS 1-89, shall be the acceptance criteria for the degree of preparation for cleaned surfaces.

2.8 GALVANIZING

- A. All welded assemblies to be galvanized shall be prepared according to Recommended Practice for Providing High Quality Zinc Coatings (Hot-Dip) on Assembled Products (ASTM A385).
- B. Steel shall be thoroughly cleaned by solvent cleaning in accordance with latest edition of Steel Structures Painting Council "Surface Preparation Specification No. 1 (SSPC-SP1).
- C. Steel shall be hot-dip galvanized in accordance with ASTM A123.
- D. Hardware and threaded fasteners shall be galvanized in accordance with ASTM A153.
- E. Safeguard products against steel embrittlement according to ASTM A143.
- F. Handle all articles to be galvanized in such a manner as to avoid any mechanical damage and to minimize distortion.
- G. Coating weight shall conform with paragraph 5.1 of ASTM A123 or Table 1 of ASTM A153, as appropriate.
- H. Surface finish shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect detrimental to the stated end use of the coated article.
- I. Adhesion shall withstand normal handling consistent with the nature and thickness of the coating and normal use of the article.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before erection proceeds, and with the steel erector present, verify elevations of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements.
- B. Do not proceed with erection until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.
  - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

### 3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.
- B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
  - 1. Column base plate anchor rods shall not be repaired, replaced, or field modified without the approval of the Structural Engineer. Prior to erection of a column the Contractor shall provide written notification to the Erector if there has been any repair, replacement or modification to its anchor rods.
  - 2. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
  - 3. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
  - 4. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
    - a. Comply with manufacturer's instructions for proprietary grout materials.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Maintain erection tolerances of architecturally exposed structural steel as defined within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- E. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.
  - 2. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

- F. Splice members only where indicated.
- G. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds, and grind smooth at exposed surfaces.
- H. Do not use thermal cutting during erection unless specifically approved by the Engineer.
- I. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.
- J. Provide all bracing, temporary bracing and accessories required for complete erection. Safety and adequacy of bracing and temporary bracing are the Installer's responsibility.
- K. After erection, remove weld flux, rust, dirt or other foreign material from areas to receive touch-up paint. Repaint areas where protective coating has been damaged or is missing with shop primer paint.

### 3.4 FIELD CONNECTIONS

- A. Install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
  - 1. Bolts: ASTM A325 (ASTM A325M) high-strength bolts, unless otherwise indicated.
  - 2. Connection Type: Unless snug tight connections are noted on the Drawings as being permitted, all bolts shall be tightened to full pretensioning load.
- B. Do not reuse ASTM A490 bolts, galvanized A325 bolts or bolts that have been tensioned.
- C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work. Remove all cracks, pores, slag inclusions, incomplete fusions, and incomplete penetrations over 1/2" long in any weld and reweld.
  - 1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
  - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.
  - 3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds 1/2 inch (13 mm) and larger. Grind flush butt welds. Dress exposed welds.

### 3.5 PREFABRICATED BUILDING COLUMNS

- A. Install prefabricated building columns to comply with AISC specifications referenced in this Section, manufacturer's recommendations, and requirements of the testing and inspecting agency that apply to the fire-resistance rating indicated.

### 3.6 QUALITY CONTROL

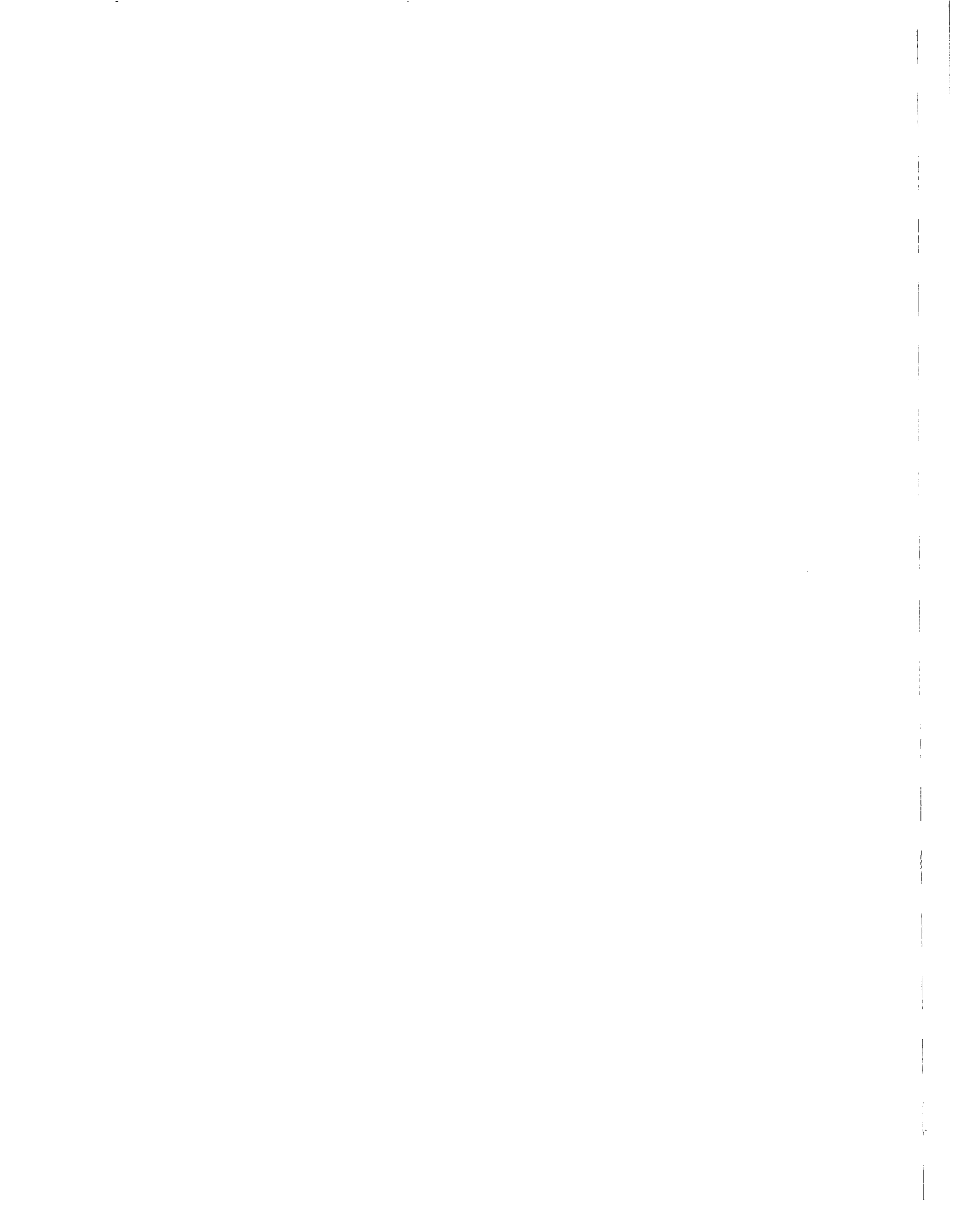
- A. General: The Owner will engage an independent testing and inspecting agency to perform inspections and tests and to prepare test reports. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements. Failure to detect any defective materials shall not prevent later rejection when such defect is discovered, or obligate the Architect or Owner for final acceptance.
  - 1. See Section 01410 – Structural Special Inspections for testing and inspection to be performed.
  - 2. Provide access for testing agency to places where structural steel work is being installed so that required inspection and testing can be accomplished.
  - 3. The General Contractor shall provide the testing agency a complete set of approved shop drawings.
  - 4. Reports will be delivered to the Architect, Engineer, Steel Fabricator and the General Contractor within one week of inspection.
  - 5. Deviations from requirements of the contract documents will be reported in writing to the General Contractor within 24 hours.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

### 3.7 CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
  - 1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils (0.038 mm).
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint according to ASTM A780. Minimum thickness requirements for the repair are those described in ASTM A123, Section 4.6.

END OF SECTION 05120





## SECTION 053100 – STEEL DECKING

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Steel roof deck.
  - 2. Composite steel floor deck.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Structural Special Inspection."
  - 2. Division 3 Section "Cast-in-Place Concrete."
  - 3. Division 5 Section "Structural Steel Framing."
  - 4. Division 9 Section "Painting."

#### 1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data including manufacturer's specifications and installation instructions for each type of deck, accessory, and product specified.
- C. Shop drawings showing layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.
  - 1. For steel deck indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for its preparation.
  - 2. Shop drawings which show the Architect's or Engineer's title block, logo and/or seal will be rejected and returned unchecked.
  - 3. Computer generated electronic structural construction document files (ACAD) will be made available to the Contractor. The Contractor will be required to sign the Engineer's standard release of liability form and pay a handling fee of \$50.00 per drawing prior to receiving the drawing files. Rules for use of said files shall be as defined in the AISC "Code of Standard Practice for Steel Buildings and Bridges," Section 4.3.
  - 4. Submit shop drawings in the form of five (5) sets of prints.

5. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.
- D. Product certificates signed by manufacturers of steel deck certifying that their products comply with specified requirements.

#### 1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated.
1. American Iron and Steel Institute (AISI), "Specification for the Design of Cold-Formed Steel Structural Members."
  2. American Welding Society (AWS), D1.3 "Structural Welding Code – Sheet Steel".
  3. Steel Deck Institute (SDI), "Design Manual for Composite Decks, Form Decks and Roof Decks."
- B. Installer Qualifications: Engage an experienced Installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- C. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code – Steel" and AWS D1.3 "Structural Welding Code – Sheet Steel."
1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- D. Fire-Test-Response Characteristics: Where indicated, provide steel deck panels identical to those tested as part of an assembly for fire resistance per ASTM E 119 by a testing and inspection agency performing testing and follow-up services, that is acceptable to authorities having jurisdiction.
1. Fire-Resistance Ratings: As indicated by design designations listed in UL "Fire Resistance Directory," or by Warnock Hersey or another testing and inspecting agency.
  2. Labeling: Identify steel deck with appropriate markings of applicable testing and inspecting agency.
- E. Electrical Raceway Panels: Provide UL-labeled, cellular metal floor deck panels conforming to UL 209 and listed in UL "Electrical Construction Materials Directory" as approved for use with standard header ducts and outlets for electrical distribution systems.
- F. FM Listing: Provide steel roof deck evaluated by Factory Mutual and listed in Factory Mutual "Approval Guide" for Class 1 fire rating and Class 1-60 windstorm ratings.
- G. Engineer Qualifications: A professional engineer legally authorized to practice in the State of Kentucky and experienced in providing engineering services of the kind

indicated that have resulted in the installation of steel deck similar to this Project in material, design, and extent and that have a record of successful in-service performance.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

### PART 2 – PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. American Buildings Co.
  - 2. Consolidated Systems, Inc.
  - 3. Epic Metals Corp.
  - 4. Marlyn Steel Products, Inc.
  - 5. New Millennium Building Systems, LLC.
  - 6. Robertson A United Dominion Co.
  - 7. Roof Deck, Inc.
  - 8. United Steel Deck, Inc.
  - 9. Verco Manufacturing Co.
  - 10. Vulcraft Div. Of Nucor Corp.
  - 11. Wheeling Corrugating Company.

#### 2.2 ROOF DECK

- A. Steel Roof Deck: Fabricate panels without top-flange stiffening grooves conforming to SDI Publication No. 28 "Specifications and Commentary for Steel Roof Deck" and the following:
  - 1. Prime-Painted Steel Sheet: ASTM A 611, Grade as required to comply with S.D.I. specifications, shop prime as follows:
    - a. Shop Primer: Grey or white baked-on, lead- and chromate-free rust-inhibitive primer, conforming to the performance requirements of Fed. Spec, TT-P-664.
  - 2. Design Uncoated-Steel Thickness: Gauge as indicated on drawings.
  - 3. Span Condition: As indicated on drawings.
  - 4. Side Joints: Stitch screwed as indicated.

### 2.3 FLOOR DECK

- A. Composite Steel Floor Deck: Fabricate panels with integrally embossed or raised pattern ribs and interlocking side laps, conforming to SDI Publication No. 28 "Specifications and Commentary for Composite Steel Floor Deck," the minimum section properties indicated, and the following:
1. Galvanized-Steel Sheet: ASTM A 446, Grade A, G 60 (ASTM A 446M, Grade A, Z 180) zinc coated according to ASTM A 525 (ASTM A 525M).
  2. Profile Depth: As indicated on drawings.
  3. Design Uncoated-Steel Thickness: Gauge as indicated on drawings.
  4. Span Condition: As indicated on drawings.
  5. Side Joints: Button Punch as indicated on drawings

### 2.4 ACCESSORIES

- A. General: Provide accessory materials for steel deck that comply with requirements indicated and recommendations of the steel deck manufacturer.
- B. Mechanical Fasteners: Manufacturer's standard, corrosion-resistant, low-velocity, powder-actuated or pneumatically driven carbon steel fasteners; or self-drilling, self-threading screws.
- C. Self Drilling Steel Screws: Manufacturer's standard hexagonal washer head, self-drilling, carbon steel screws. Screws shall be zinc electroplated to 5 $\mu$ m (minimum) thickness in accordance with ASTM B633 SC1 Type III. Select point type and size and thread length per manufacturer's recommendations to fully engage in the base material.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Hilti S-MD.
- D. Powder or Pneumatic Fasteners: Modified AISI 1070 steel, hardness 52-58 Rockwell C, minimum tensile strength of 282 ksi, and minimum shear strength of 162 ksi; with zinc plating equivalent to ASTM B633, Type III Fe/Zn 5 (5 $\mu$ m min.). Fasteners shall have knurled shanks and minimum 12 mm steel washers.
1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Bar Joist and Structural Steel 1/8" to 1/4" inclusive: Hilti X-EDNK22-THQ12.
    - b. Bar Joist and Structural Steel 3/16" to 3/8" inclusive: Hilti X-EDN19-THQ12.
    - c. Structural Steel 3/8" or thicker: Hilti ENP2-21 L15.
- E. Rib Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.

- F. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip glass fiber or mineral fiber.
- G. Miscellaneous Roof Deck Accessories: Steel sheet, 0.0359-inch- (0.91-mm-) thick minimum ridge and valley plates, finish strips, and reinforcing channels, of same material as roof deck.
- H. Pour Stops and Girder Fillers: Steel sheet, of same material as deck panels, and of thickness and profile as required per SDI Publication No. 28.
- I. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material and thickness as deck panels, unless otherwise indicated.
- J. Hanger Tabs: Manufacturer's standard piercing steel sheet hanger attachment devices for floor deck panels.
- K. Weld Washers: Manufacturer's standard uncoated-steel sheet weld washers, shaped to fit deck rib, 0.0598 inch (1.5 mm) thick with 3/8-inch (9.5-mm) minimum diameter prepunched hole.
- L. Recessed Sump Pans: Manufacturer's standard size, single piece steel sheet 0.071-inch- (1.8-mm-) thick minimum, of same material as deck panels, with 1-1/2-inch- (38-mm-) minimum deep level recessed pans and 3-inch- (76-mm-) wide flanges. Cut holes for drains in the field.
- M. Flat Receiver Pan: Manufacturer's standard size, single-piece steel sheet, 0.071-inch- (1.8-mm-) thick minimum units, of same material as deck panels. Cut holes for drains in the field.
- N. Steel Sheet Accessories: ASTM A 446, G 60 (ASTM A 446M, Z 180) coating class, galvanized according to ASTM A 525 (ASTM A 525M).
- O. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.
- P. Preset Inserts: Manufacturer's standard, UL-labeled single-piece preset inserts, fabricated from either steel sheet galvanized according to ASTM A 525, G 60 (ASTM A 525M, Z180) coating class, or zinc sheet, with removable covers.

### PART 3 – EXECUTION

#### 3.1 EXAMINATION

- A. Examine supporting framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of steel deck.

#### 3.2 PREPARATION

- A. Do not replace deck panels on concrete supporting structure until concrete has cured and is dry.

- B. Locate decking bundles to prevent overloading of supporting members.

### 3.3 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary of SDI Publication No. 28, manufacturer's recommendations, and requirements of this Section.
- B. Install temporary shoring before placing deck panels when required to meet deflection limitations.
- C. Place deck panels on supporting framing and adjust to final position with ends accurately aligned and bearing on supporting framing before being permanently fastened. Do not stretch or contract side lap interlocks.
  - 1. Align cellular deck panels for entire length of run of cells and align cells at ends of abutting panels.
- D. Place deck panels flat and square and fasten to supporting framing without warp or deflection.
- E. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to the decking.
- F. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.
- G. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
- H. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's instructions.
- I. Do not use deck units for storage or working platforms.

### 3.4 ROOF DECK INSTALLATION

- A. Fasten roof deck panels to steel supporting members as follows:
  - 1. Prime-painted deck panels.
    - a. Weld to steel supporting members with not less than 5/8 inch diameter arc spot (puddle) welds or arc seam welds with an equal perimeter, but not less than 1-1/2 inches (38 mm) long.
    - b. Weld Spacing: Weld deck units at ends and all intermediate supports. Space welds a maximum of 12 inches (305 mm) on center, with a minimum of two welds per unit at each support.
    - c. Weld Washers: Install weld washers for deck 26-gage or less in thickness at each weld location.

- B. Side Lap Fastening: Fasten side laps between supports at intervals not exceeding 36 inches (910 mm) with self-drilling No. 10- (4.8-mm-) diameter or larger carbon steel screws.
- C. Perimeter Edge Fastening:
  - 1. Prime-painted deck panels.
    - a. Fasten perimeter edges of deck to steel supporting members and angles by not less than 5/8 inch diameter arc spot (puddle) welds or arc seam welds with an equal perimeter, but not less than 1-1/2 inches (38 mm) long, spaced a maximum of 6 inches (305 mm) on center.
- D. End Bearing: Install deck ends over supporting framing with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
  - 1. End Joints: Lapped 2 inches (51 mm) minimum.
- E. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking, and weld flanges to top of deck. Space welds not more than 12 inches (305 mm) apart with at least one weld at each corner.
- F. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's recommendations. Weld to substrate to provide a complete deck installation.
- G. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's instructions to ensure complete closure.

### 3.5 FLOOR DECK INSTALLATION

- A. Fasten floor deck panels to steel supporting members by not less than 5/8 inch diameter arc spot (puddle) welds or arc seam welds with an equal perimeter, but not less than 1 1/2 inches (38 mm) long, and as follows:
  - 1. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds a maximum of 12 inches (305 mm) apart.
- B. Side Lap Fastening: Fasten side laps between supports at intervals not exceeding 36 inches by button punching.
- C. Perimeter Edge Fastening: Fasten perimeter edges of deck to steel supporting members and angles by not less than 5/8 inch diameter arc spot (puddle) welds or arc seam welds with an equal perimeter, but not less than 1-1/2 inches (38 mm) long, spaced a maximum of 12 inches (305 mm) apart.
- D. End Bearing: Install deck ends over supporting framing with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:



1. End Joints: Butted.
- E. Shear Connectors: Weld shear connectors through deck to support framing according to AWS D1.1 and manufacturer's instructions. Butt end joints of deck panels; do not overlap.
- F. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.
- G. Floor Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck according to SDI recommendations to provide tight-fitting closures at open ends of ribs and sides of decking. Weld cover plates at changes in direction of floor deck panels, unless otherwise indicated.
- H. Install piercing hanger tabs not more than 14 inches (355 mm) apart in both directions, within 9 inches (228 mm) of walls at ends, and not more than 12 inches (305 mm) from walls at sides, unless otherwise indicated.

### 3.6 QUALITY CONTROL

- A. General: The Owner will engage an independent testing and inspecting agency to perform inspections and tests and to prepare test reports. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements. Failure to detect any defective materials shall not prevent later rejection when such defect is discovered, or obligate the Architect or Owner for final acceptance.
  1. See Section 01410 – Structural Special Inspections for testing and inspection to be performed.
  2. Provide access for testing agency to places where steel decking work is being installed so that required inspection and testing can be accomplished.
  3. The General Contractor shall provide the testing agency a complete set of approved shop drawings.
  4. Reports will be delivered to the Architect, Engineer, Steel Fabricator and the General Contractor within one week of inspection.
  5. Deviations from requirements of the contract documents will be reported in writing to the General Contractor within 24 hours.
  6. Correct deficiencies in or remove and replace steel deck that inspections and test reports indicate do not comply with specified requirements.

### 3.7 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces with galvanized repair paint according to ASTM A 780 and the manufacturer's instructions.
- B. Touchup Painting: Wire brush, clean, and paint scarred areas, welds, and rust spots on both surfaces of installed deck panels.
  1. Touch up painted surfaces with same type of shop paint used on adjacent surfaces.

2. Where shop-painted surfaces are exposed in-service, apply touchup paint to blend into adjacent surfaces.

END OF SECTION 05310



## SECTION 05400 – COLD-FORMED METAL FRAMING – STRUCTURAL

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Exterior non-load-bearing curtain-wall framing.
  - 2. Roof rafter framing.
- B. Related Sections include the following:
  - 1. Division 1 Section “Structural Special Inspection.”
  - 2. Division 6 Section “Rough Carpentry.”
  - 3. Division 9 Section “Gypsum Board Assemblies.”
  - 4. Division 9 Section “Gypsum Board Shaft-Wall Assemblies.”

#### 1.3 DEFINITIONS

- A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.
- B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining Work.
  - 1. Shop drawings which show the Architect’s or Engineer’s title block, logo and/or seal will be rejected and returned unchecked.
  - 2. Computer generated electronic structural construction document files (ACAD) will be made available to the Contractor. The Contractor will be required to sign the Engineer’s standard release of liability form and pay a handling fee of \$50.00 per drawing prior to receiving the drawing files. Rules for use of said

files shall be as defined in the AISC "Code of Standard Practice for Steel Buildings and Bridges," Section 4.3.

3. Submit shop drawings in the form of five (5) sets of prints.
  4. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.
- C. Mill certificates signed by steel sheet producer or test reports from a qualified independent testing agency indicating steel sheet complies with requirements.
  - D. Welding Certificates: Copies of certificates for welding procedures and personnel.
  - E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
  - F. Research/Evaluation Reports: Evidence of cold-formed metal framing's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Mill certificates signed by steel sheet producer or test reports from a qualified independent testing agency indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, ductility, and galvanized-coating thickness.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-Steel," and AWS D1.3, "Structural Welding Code-Sheet Steel."
- D. AISI Specifications: Comply with AISI's "AISI Specification Provisions for Screw Connections."
- E. Comply with HUD's "Prescriptive Method for Residential Cold-Formed Steel Framing."
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Allied American Studco, Inc.
  - 2. Clark Steel Framing Industries.
  - 3. Consolidated Fabricators Corp.
  - 4. Consolidated Systems, Inc.
  - 5. Dale Industries, Inc.
  - 6. Dietrich Industries, Inc.
  - 7. Knorr Steel Framing Systems.
  - 8. Scafco Corp.
  - 9. Steel Construction Systems.
  - 10. Steel Developers, LLC.
  - 11. Steeler, Inc.
  - 12. Super Stud Building Products, Inc.
  - 13. Unimast, Inc.
  - 14. United Metal Products, Inc.
  - 15. Western Metal Lath.

### 2.2 MATERIALS

- A. Steel Sheet: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
  - 1. Grade: 33 for minimum uncoated steel thickness of 0.0428 inch and less; **50**, Class 1 or 2 for minimum uncoated steel thickness of 0.0538 inch and greater.
  - 2. Coating: G60.
- B. Steel Studs: Manufacturer's standard C-shaped steel studs, of sizes indicated on drawings, punched, with stiffened flanges, complying with ASTM C 955
- C. Track, Furring Channels and Other Members: As indicated on drawings

### 2.3 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
  - 1. Supplementary framing.
  - 2. Bracing, bridging, and solid blocking.

3. Web stiffeners.
4. End clips.
5. Foundation clips.
6. Gusset plates.
7. Stud kickers, knee braces, and girts.
8. Joist hangers and end closures.
9. Hole reinforcing plates.
10. Backer plates.

#### 2.4 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.
- B. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
  1. Head Type: Low-profile head beneath sheathing, manufacturers' standard elsewhere.
- C. Welding Electrodes: Comply with AWS standards.

#### 2.5 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or ASTM A 780.

#### 2.6 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
  1. Fabricate framing assemblies using jigs or templates.
  2. Cut framing members by sawing or shearing; do not torch cut.
  3. Fasten cold-formed metal framing members by welding. Wire tying of framing members is not permitted. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
  4. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
  5. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  - 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

### PART 3 – EXECUTION

#### 3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  - 1. Bolt or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
  - 1. Cut framing members by sawing or shearing, do not torch cut.
  - 2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.



- E. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- H. Install insulation in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.3 QUALITY CONTROL

- A. General: The Owner will engage an independent testing and inspecting agency to perform inspections and tests and to prepare test reports. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements. Failure to detect any defective materials shall not prevent later rejection when such defect is discovered, or obligate the Architect or Owner for final acceptance.
  - 1. See Section 01410 – Structural Special Inspections for testing and inspection to be performed.
  - 2. Provide access for testing agency to places where cold-formed metal framing work is being installed so that required inspection and testing can be accomplished.
  - 3. The General Contractor shall provide the testing agency a complete set of approved shop drawings.
  - 4. Reports will be delivered to the Architect, Engineer, Metal Framing Erector, and the General Contractor within one week of inspection.
  - 5. Deviations from requirements of the contract documents will be reported in writing to the General Contractor within 24 hours.
- B. Correct deficiencies in or remove and replace cold-formed metal framing that inspections and test reports indicate do not comply with specified requirements.

### 3.4 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400



## SECTION 05475 – SHOP-FABRICATED COLD-FORMED METAL TRUSSES

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes fabrication and erection of cold-formed metal trusses, truss girders, and jacks and other falsework, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of trusses required.
  - 1. Shop-fabricated cold-formed metal trusses include planar structural units consisting of screw connected members which are fabricated from light gauge metal sections and which have been cut and assembled prior to delivery to the Project site.
  - 2. Truss configurations:
    - a. Triangular pitched roof trusses.
    - b. Scissor roof trusses.
    - c. Hip roof trusses.
- B. This Section includes open web cold-formed metal trusses, end anchorages, bracing and connections.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Structural Special Inspection."
  - 2. Division 4 Section "Unit Masonry."
  - 3. Division 5 Section "Structural Steel Framing."
  - 4. Division 6 Section "Rough Carpentry."

#### 1.3 DEFINITIONS

- A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.
- B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer cold-formed metal trusses and connections to support all superimposed dead, live and wind loads as indicated on the drawings. See drawings for loading criteria.
- B. Engineering Responsibility: Engage a manufacturer who utilizes a qualified Professional Engineer to prepare calculations and Shop Drawings for cold-formed metal trusses and their connections.
- C. Specify the location of all required permanent bracing for individual compression web members and truss chords (when in compression). The number of braces, location, and required minimum brace capacity shall be specified on the truss design drawings. Shop drawings will be rejected if brace information is not shown.
- D. Design trusses to withstand design loads without deflections greater than the following:
  - 1. Roof trusses: Vertical deflection of 1/480 of span due to 100% live load and 1/240 of span due to 100% total load.
  - 2. Scissor roof trusses: Horizontal deflection at supports of 3/4 inches due to 100% live load and 1 1/4 inches due to 100% total load.

#### 1.5 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified. Include manufacturer's specifications, installation instructions, laboratory test reports, and other data to show compliance with the specifications (including specified standards).
- C. Shop Drawings detailing fabrication and erection of cold-formed metal trusses.
  - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required; location of any required continuous bracing; shape, gauge, and material strength of each member to be used; splice details; end bearing, anchorage, and truss/rafter to truss girder connection details. Include product data sheets showing configuration and capacity of all premanufactured connection material.
  - 2. Include Shop Drawings signed and sealed by a qualified Professional Engineer responsible for their preparation. The engineer shall be licensed to practice in the State of Kentucky.
  - 3. Shop drawings which show the Architect's or Engineer's title block, logo and/or seal will be rejected and returned unchecked.
  - 4. Computer generated electronic structural construction document files (ACAD) will be made available to the Contractor. The Contractor will be required to sign the Engineer's standard release of liability form and pay a handling fee of \$50.00 per drawing prior to receiving the drawing files.
  - 5. Submit shop drawings in the form of five (5) sets of prints.

6. Shop drawing resubmittals are reviewed for conformance with review marks only. Any changes or questions originating on a resubmittal shall be clearly clouded.
- D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Structural Calculations.
  1. Furnish three (3) copies of structural calculations of all cold-formed metal trusses at time of Shop Drawing submittal.
  2. Show loading, section modulus, assumed allowable stress, stress diagrams and calculations, maximum axial compressive and tensile forces in truss members, calculated deflection ratio for live and total load, and similar information needed for analysis and to ensure that trusses comply with requirements.
  3. Calculations shall be signed and sealed by a qualified Professional Engineer licensed to practice in the State of Kentucky.
  4. Architects and Engineers review of the calculations is for general conformance with the contract documents. Actual calculations are the responsibility of the cold-formed metal truss design engineer and will not be reviewed for content or accuracy by the Architect or Engineer.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed cold-formed metal truss work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fabricator Qualifications: Engage a firm experienced in fabricating cold-formed metal trusses similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate cold-formed metal trusses without delaying the Work.
- C. Comply with applicable provisions of the following specifications and documents:
  1. Cold Formed Steel Engineers Institute (CFSEI) publications:
    - a. Field Installation Guide for Cold-Formed Steel Roof Trusses.
    - b. Design Guide for Construction Bracing of Cold-Formed Steel Trusses.
- D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the State of Kentucky and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with cold-formed metal truss framing that are similar to that indicated for this Project in material, design, and extent.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver cold-formed metal trusses to Project site in such quantities and at such times to ensure continuity of installation.
- B. Handle and store trusses with care, and in accordance with manufacturer's instructions to avoid damage from bending, overturning, or other cause for which truss is not designed to resist or endure.
- C. Trusses shall be unloaded on level ground to avoid lateral strain. Trusses shall be protected from damage that might result from on-site activities and environmental conditions. Prevent toppling when banding is removed.
- D. Report truss damage to Architect prior to installation.
- E. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying work of other trades.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into Work include, but are not limited to, the following:
  - 1. Alpine Engineered Products, Inc.
  - 2. Kintec, Inc.
  - 3. MiTek Industries, Inc.
  - 4. Tri-Chord, Inc.
  - 5. Progressive Systems, Inc.

### 2.2 METAL FRAMING ANCHORS

- A. Provide metal framing anchors fabricated from hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation, and of structural capacity, and type indicated that comply with requirements specified, including the following:
  - 1. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.
  - 2. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

### 2.3 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.

- B. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- C. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- D. Provide all fasteners required to properly and completely erect, anchor, and connect the truss work for this Project, including, but not limited to, screws, bolts, nuts, washers, and similar items, whether specifically mentioned herein or not.

## 2.4 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close fitting joints with metal-to-metal bearing in assembled units.
- B. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with close fitting joints. Position members to produce design camber indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Before erection proceeds, and with the cold-formed metal truss erector present, verify elevations of concrete bearing surfaces and locations of anchorages for compliance with requirements.
- B. Do not proceed with erection until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep cold-formed metal trusses secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports as required when permanent connections and bracing are in place.

### 3.3 ERECTION

- A. Splice trusses delivered to site in more than one (1) piece before installing.
- B. Erect and brace trusses to comply with recommendations of manufacturer and the Truss Plate Institute.
- C. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacing indicated.



- D. Hoist units in place by means of lifting equipment suited to sizes and types of trusses required, applied at designated lift points as recommended by fabricator, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- E. Do not place concentrated loads (including roof sheathing bundles) atop trusses until all specified bracing has been installed and roof sheathing is permanently screwed in place.
- F. Install permanent bracing and related components to enable trusses to maintain design spacing, withstand live and dead loads including lateral loads, and to comply with other indicated requirements.
- G. Do not cut or remove truss members.

### 3.4 QUALITY CONTROL

- A. General: The General Owner will engage an independent testing and inspecting agency to perform inspections and tests and to prepare test reports. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements. Failure to detect any defective materials shall not prevent later rejection when such defect is discovered, or obligate the Architect or Owner for final acceptance.
  - 1. See Section 01410 – Structural Special Inspections for testing and inspection to be performed.
  - 2. Provide access for testing agency to places where prefabricated cold-formed metal truss work is being installed so that required inspection and testing can be accomplished.
  - 3. The General Contractor shall provide the testing agency a complete set of approved shop drawings.
  - 4. Reports will be delivered to the Architect, Engineer, Steel Fabricator and the General Contractor within one week of inspection.
  - 5. Deviations from requirements of the contract documents will be reported in writing to the General Contractor within 24 hours.
- B. Correct deficiencies in or remove and replace prefabricated cold-formed truss work that inspections and test reports indicate do not comply with specified requirements.

END OF SECTION 054753

SECTION 05500  
METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes shop fabricated metal items.
  - 1. Lintels.
  - 2. Ledge and shelf angles.
  - 3. Bollards.
  - 4. Structural supports for miscellaneous attachments.
  - 5. Steel channel dock protection.
  
- B. Related Sections:
  - 1. Section 05120 - Structural Steel: Structural steel and anchor bolts.
  - 2. Section 05202 - Steel Joists: Structural joists, and bearing plates including anchorage.
  - 3. Section 05320- Steel Floor Deck: Bearing plates and angles for metal deck bearing, including anchorage.
  - 4. Section 05510 - Metal Stairs and Ladders.
  - 5. Section 05520 - Handrails and Railings.
  - 6. Section 09900 - Paints and Coatings: Field applied paint finish.
  - 7. Section 03010 - Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in concrete.
  - 8. Section 04810 - Unit Masonry Assemblies: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in masonry.

1.2 REFERENCES

- A. Aluminum Association:
  - 1. AA DAF-45 - Designation System for Aluminum Finishes.
  
- B. American Architectural Manufacturers Association:
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
  
- C. ASTM International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
6. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
7. ASTM A297/A297M - Standard Specification for Steel Castings, Iron-Chromium and Iron-Chromium-Nickel, Heat Resistant, for General Application.
8. ASTM A283/283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
9. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
10. ASTM A312/A312M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
11. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
12. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
13. ASTM A479/A479M - Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
14. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
15. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
16. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing.
17. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
18. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
19. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings.
20. ASTM B85 - Standard Specification for Aluminum-Alloy Die Castings.
21. ASTM B177 - Standard Guide for Chromium Electroplating on Steel for Engineering Use.
22. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
23. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
24. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
25. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

26. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  27. ASTM F436 - Standard Specification for Hardened Steel Washers.
  28. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- D. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
  2. AWS D1.1 - Structural Welding Code - Steel.
  3. AWS D1.6 - Structural Welding Code - Stainless Steel.
- E. National Ornamental & Miscellaneous Metals Association:
1. NOMMA Guideline 1 - Joint Finishes.
- F. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
  2. SSPC SP 1 - Solvent Cleaning.
  3. SSPC SP 10 - Near-White Blast Cleaning.
  4. SSPC Paint 15 - Steel Joist Shop Paint.
  5. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

### 1.4 QUALITY ASSURANCE

- A. Finish joints in accordance with NOMMA Guideline 1.

### 1.5 QUALIFICATIONS

- A. Design under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Kentucky.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.

- C. Protect metal fabrications from damage by exposure to weather.

## 1.7 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

## PART 2 PRODUCTS

### 2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53, Grade B Schedule 40.
- E. Fasteners: Type recommended by fabricator
- F. Bolts, Nuts, and Washers: ASTM A325 galvanized to ASTM A153/A153M for galvanized components.
- G. Welding Materials: AWS D1.1; type required for materials being welded.
- H. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.

### 2.2 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221, Alloy 6063, Temper T5.
- B. Sheet Aluminum: ASTM B209.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210, Alloy 6063, Temper T6.
- D. Bolts, Nuts, and Washers: Stainless steel.
- E. Welding Materials: AWS D1.1; type required for materials being welded.

### 2.3 LINTELS

- A. Lintels: Steel sections, size and configuration as indicated on Drawings, length to allow 8 inches minimum bearing on both sides of opening.
  - 1. Exterior Locations: Galvanized.
  - 2. Interior Locations: Prime paint, one coat.

#### 2.4 LEDGE AND SHELF ANGLES

- A. Ledge and Shelf Angles, Channels and Plates Not Attached to Structural Framing: For support of metal decking joists &/or masonry; prime paint, one coat.

#### 2.5 BOLLARDS

- A. Bollards: Steel pipe, concrete filled, crowned cap, 8 inches diameter, length as indicated on Drawings; galvanized.
- B. Concrete Fill: 3,000 psi as specified in Section 03300.
- C. Anchors: Concealed type as indicated on Drawings.

#### 2.6 STRUCTURAL SUPPORTS

- A. Toilet Partition Members: Aluminum tubing; mill finish.
- B. Other Structural Supports: Steel sections, shape and size required to support applied loads with maximum deflection of 1/240 of the span; prime paint.

#### 2.7 ANCHOR BOLTS

- A. Anchor Bolts: ASTM A307; 3/4 inch steel bolt, standard J-hook, with nut and washer; unfinished.

#### 2.8 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by intermittent welds and plastic filler.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

#### 2.9 FACTORY APPLIED FINISHES - STEEL

- A. Prepare surfaces to be primed in accordance with SSPC SP 2.

- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with two coats except where galvanizing is specified.
- D. Galvanized Structural Steel Members: Galvanize after fabrication to ASTM A123. Furnish minimum 1.25 oz/sq ft galvanized coating.
- E. Galvanized Non-structural Items: Galvanized after fabrication to ASTM A123. Furnish minimum 1.25 oz/sq ft galvanized coating.

#### 2.10 FACTORY APPLIED FINISHES - ALUMINUM

- A. Finish coatings to conform to AAMA 611. Comply with AA DAF-45.
- B. Interior Aluminum Surfaces: AAMA anodized, to clear color.
- C. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

#### 2.11 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive Work.

#### 3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal and aluminum where site welding is required.
- B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

### 3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.
- C. Field weld components indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain approval of Architect/Engineer prior to site cutting or making adjustments not scheduled.
- F. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.

### 3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.
- C. Maximum Offset From Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

### 3.5 SCHEDULE

- A. The following is a list of principal items only. Refer to Drawing details for item not specifically schedule.
  - 1. Ledge and Shelf Angles, Channels and Plates not attached to Structural Framing: For support of metal decking, at floor or roof penetrations where no specific detail is included in the drawings. Prime paint finish.
  - 2. Lintels: Including, but not limited to lintels detailed in drawings for masonry wall openings, lintels required for all mechanical &/or electrical masonry wall penetrations in new and/or existing walls and/or roof. Galvanized finish
  - 3. Bollards: Refer to Site Drawings for size, location and quantity. Galvanized finish.
  - 4. MC 10x6.5 at Loading Docks.

END OF SECTION





## SECTION 05510

### METAL STAIRS AND LADDERS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes aluminum stair frame of structural sections, with open risers; solid aluminum stair treads; and integral balusters and handrailing.
- B. Related Sections:
  - 1. Section 03010 - Concrete: Execution requirements for placement of metal anchors specified in this section in concrete.
  - 2. Section 04810 - Unit Masonry Assemblies: Execution requirements for placement of metal anchors specified in this section in masonry.
  - 3. Section 05520 - Handrails and Railings: Handrails and balusters other than specified in this section.

##### 1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- B. ASTM International:
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
  - 2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - 3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 5. ASTM A283/283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
  - 6. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  - 7. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - 8. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  - 9. ASTM A501. - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
  - 10. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
  - 11. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
  - 12. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

13. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  14. ASTM F436 - Standard Specification for Hardened Steel Washers.
  15. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
  16. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
  17. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- C. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
  2. AWS D1.1 - Structural Welding Code - Steel.
- D. National Association of Architectural Metal Manufacturers:
1. NAAMM AMP 510 - Metal Stairs Manual.
  2. NAAMM MBG 531 - Metal Bar Grating Manual.
- E. National Ornamental & Miscellaneous Metals Association:
1. NOMMA Guideline 1 - Joint Finishes.
- F. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
  2. SSPC SP 1 - Solvent Cleaning.
  3. SSPC SP 10 - Near-White Blast Cleaning.
  4. SSPC Paint 15 - Steel Joist Shop Paint.
  5. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

### 1.3 DESIGN REQUIREMENTS

- A. Fabricate stair assembly to support uniform live load of 100 lb/sq ft and concentrated load of 300 lb/sq ft with deflection of stringer or landing framing not to exceed 1/240 of span. Test in accordance with ASTM E935.
- B. Railing assembly, wall rails, and attachments to resist lateral force of 75 lbs at any point without damage or permanent set. Test in accordance with ASTM E935.
- C. Fabricate stair assembly to NAAMM AMP 510, Class - Service

### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
- C. Design Data: Submit design calculations.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM E985 - Permanent Metal Railing Systems and Rails for Buildings.
- B. Finish joints in accordance with NOMMA Guideline 1.

## 1.6 QUALIFICATIONS

- A. Prepare Shop Drawings under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Kentucky.

## 1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

## PART 2 PRODUCTS

### 2.1 METAL STAIRS

- A. Manufacturers:
  - 1. Precision Ladders, LLC
  - 2. O'Keefe's Inc.
  - 3. Substitutions: Section 01600 - Product Requirements.

### 2.2 COMPONENTS

- A. Stringers: 5" x 2" x 3/16" aluminum
- B. Treads: 26" wide x 5 3/16" deeply serrated for traction, aluminum
- C. Handrails: 1 1/2" OD aluminum pipe featuring internal fittings for smooth finish.
- D. Angle of Incline: 63 degrees for interior ladders, 90 degrees for exterior ladders.
- E. Handrail Extension: 42" handrail extensions.
- F. Finish: Mill finish aluminum
- G. Bolts, Nuts, and Washers: As recommended by manufacturer.
- H. Security Options: 1/8 inch aluminum door on continuous piano hinge.

### 2.3 FABRICATION

- A. Fit and shop assemble components in largest practical sections, for delivery to site.
- B. Fabricate components with joints tightly fitted and secured.

- C. Continuously seal joined pieces.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- F. Accurately form components required for anchorage of stairs and railings to each other and to building structure.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive work.

#### 3.2 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Install anchors, plates and angles required for connecting stairs to structure.
- C. Allow for erection loads. Install sufficient temporary bracing to maintain framing safe, plumb, and in alignment.
- D. Obtain approval of Architect prior to site cutting or creating adjustments not scheduled.

#### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- C. Maximum Offset From Alignment: 1/4 inch.

#### 3.4 SCHEDULES

END OF SECTION

SECTION 05520  
HANDRAILS AND RAILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes steel and aluminum pipe railings, and handrails.
- B. Section includes custom railings and infill panel for floor opening located in Corridor 205. **THIS WILL BE A 3-FORM RAILING WITH VARIA INFILL PANEL WITH BENT (CURVED) PANELS. DETAILING AND SPECIFICATION IS NOT YET COMPLETE!!!**
- C. Related Sections:
  - 1. Section 03010 - Concrete: Execution requirements for placement of anchors specified in this section in concrete.
  - 2. Section 04810 - Unit Masonry Assemblies: Execution requirements for placement of anchors specified in this section in masonry.
  - 3. Section 05510 - Metal Stairs and Ladders: Handrails other than those specified in this section.
  - 4. Section 09900 - Paints and Coatings: Paint finish.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International:
  - 1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  - 4. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
  - 5. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.

6. ASTM B177 - Standard Guide for Chromium Electroplating on Steel for Engineering Use.
  7. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
  8. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  9. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
  10. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications.
  11. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
- C. National Ornamental & Miscellaneous Metals Association:
1. NOMMA Guideline 1 - Joint Finishes.
- D. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
  2. SSPC Paint 15 - Steel Joist Shop Paint.
  3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

### 1.3 DESIGN REQUIREMENTS

- A. All handrail and guard rails shall conform to minimum Kentucky Building Code design requirements, including, but not limited to:
1. Handrails and guardrails shall resist a load of 50 lb/ft applied in any direction at the top and transfer this load through the supports to the structure.
  2. All handrails and guardrails shall be able to resist a single concentrated load of 200 lb., applied in any direction at any point along the top.
  3. Intermediate rails shall be designed to withstand a horizontally applied normal load of 50 lb on an area not to exceed 1 foot square including opening and space between rails.

### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

### 1.5 QUALITY ASSURANCE

- A. Finish joints in accordance with NOMMA Guideline 1.

### 1.6 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

## PART 2 PRODUCTS

### 2.1 ALUMINUM RAILING SYSTEM COMPONENTS

- A. Rails and Posts: 1-1/4 inch diameter, extruded tubing.
- B. Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast aluminum.
- C. Mounting: brackets and flanges. Prepare backing plate for mounting in CMU and/or framed wallboard construction.
- D. Splice Connectors: Concealed spigot; cast aluminum.
- E. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- F. Finish coatings to conform to AAMA 611.
- G. Interior and Exterior Aluminum Surfaces: anodized to clear color.
- H. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

### 2.2 STEEL RAILING SYSTEM COMPONENTS

- A. Handrails: 2 inch diameter (nominal) steel pipe; welded joints
- B. Fittings: Elbows, T-shapes, wall brackets, escutcheons; cast steel
- C. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing
- D. Splice Connectors: Steel concealed spigots.

### 2.3 FABRICATION

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Fabricate components with joints tightly fitted and secured. Furnish spigots and sleeves to accommodate site assembly and installation.
- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations not encouraging water intrusion.



- F. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
- G. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- H. Accurately form components to suit stairs and landings, to each other and to building structure.
- I. Accommodate for expansion and contraction of members and building movement without damage to connections or members.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive work.
- C. Verify concealed blocking and reinforcement is installed and correctly located to receive wall mounted handrails.

#### 3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete and or embedded in masonry with setting templates, to appropriate sections.

#### 3.3 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Anchor railings to structure with specified mounting brackets.
- C. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
- D. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Assemble with spigots and sleeves to accommodate tight joints and secure installation.

#### 3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.

- B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- C. Maximum Offset From Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

3.5 SCHEDULES

END OF SECTION



## SECTION 05580

### ARCHITECTURAL METAL COLUMN COVERS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Work of this section includes materials, accessories and related items for the complete installation of column covers.
- B. Related work specified elsewhere includes internal post structure for solid support of column covers.
- C. Related Sections:
  - 1. Section 05120 - Structural Steel: Structural steel and anchor bolts.
  - 2. Section 09260 – Gypsum Board Assemblies: light gage metal stud framing supports.
  - 3. Section 09900 - Paints and Coatings: Field applied paint finish.

##### 1.2 SUBMITTALS

- A. Submit complete shop drawings indicating quantities, finishes, dimensions, and attachment relationships.
- B. Submit manufacturers product data, specifications and installation instructions.
- C. Submit color and finish samples to determine range of texture and consistency of color and finish to be expected in the finished work. Standard sample size shall be 3" x 3".

##### 1.3 QUALITY ASSURANCE

- A. Manufacturer shall have a minimum of 5 years experience in manufacturing architectural metals.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components in clearly marked containers and packages suitable for shipment of specified products so as to prevent finish damage in transit. Provide protective wrapping or film to provide protection.
- B. Store components in locations that will avoid damage from job-site traffic, moisture, stacking or other job-site contamination.
- C. Handle components to avoid racking, twisting, denting or scratching of finished surfaces.

## 1.5 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

## PART 2 PRODUCTS

### 2.1 MANUFACTURER

- A. Fry Reglet Corporation, Series FF
- B. Pittcon Corporation: equivalent product
- C. Substitutions: Section 01600 - Product Requirements

### 2.2 PRODUCT

- A. SERIES FF – Field Finished Taped and Spackled Joint
  - 1. Galvanized steel: Commercial grade electro- galvanized steel meeting ASTM A525, Coating Designation A-40 or A-60 with surfaces chemically treated for paint adhesion in accord with ASTM D2092, Method A, crystalline zinc phosphate treatment.
    - a. Thickness: 16 gage.
    - b. Finish: Primer ready
  - 2. MANUFACTURED UNITS:
    - a. Configuration: varies, refer to drawings
    - b. Diameter: 15" OD
    - c. Joint type: Monolithic field finished, taped and finished.
    - d. Horizontal: Ceiling: Flush to ceiling.
    - e. Floor: Flush to floor.
  - 3. FABRICATION
    - a. Form column covers to specified dimensions and diameters as indicated on shop drawings.
    - b. Provide column covers in sections a maximum 12'-0" tall per section.
    - c. Columns shall have no exposed fasteners.
    - d. Provide additional bracing components as necessary to stiffen substructure and insure solid mid-span bracings and connections. (Work of Specification Section 09260).

## PART 3 EXECUTION

- A. Examine job-site conditions for conditions that may adversely affect installation of column covers.
- B. Verify dimensions of column covers prior to installation to assure compatibility with job-site conditions.

- C. Verify post structure is plumb, level, and parallel prior to installation of column covers.
- D. Visually examine finished surfaces to assure that blemished or dented surfaces are not present prior to installation.

### 3.2 PREPARATION

- A. Verify/coordinate with other trades prior to installation insofar as they are affected by column cover installation.

### 3.3 INSTALLATION

- A. Install components in accord with manufacturer's installation instructions and approved shop drawings.
- B. Anchor components to related structures such as floors, walls and beams as indicated on approved shop drawings. Use anchors with holding strength to provide a solid installation. Use only plated, galvanized or stainless steel anchors.

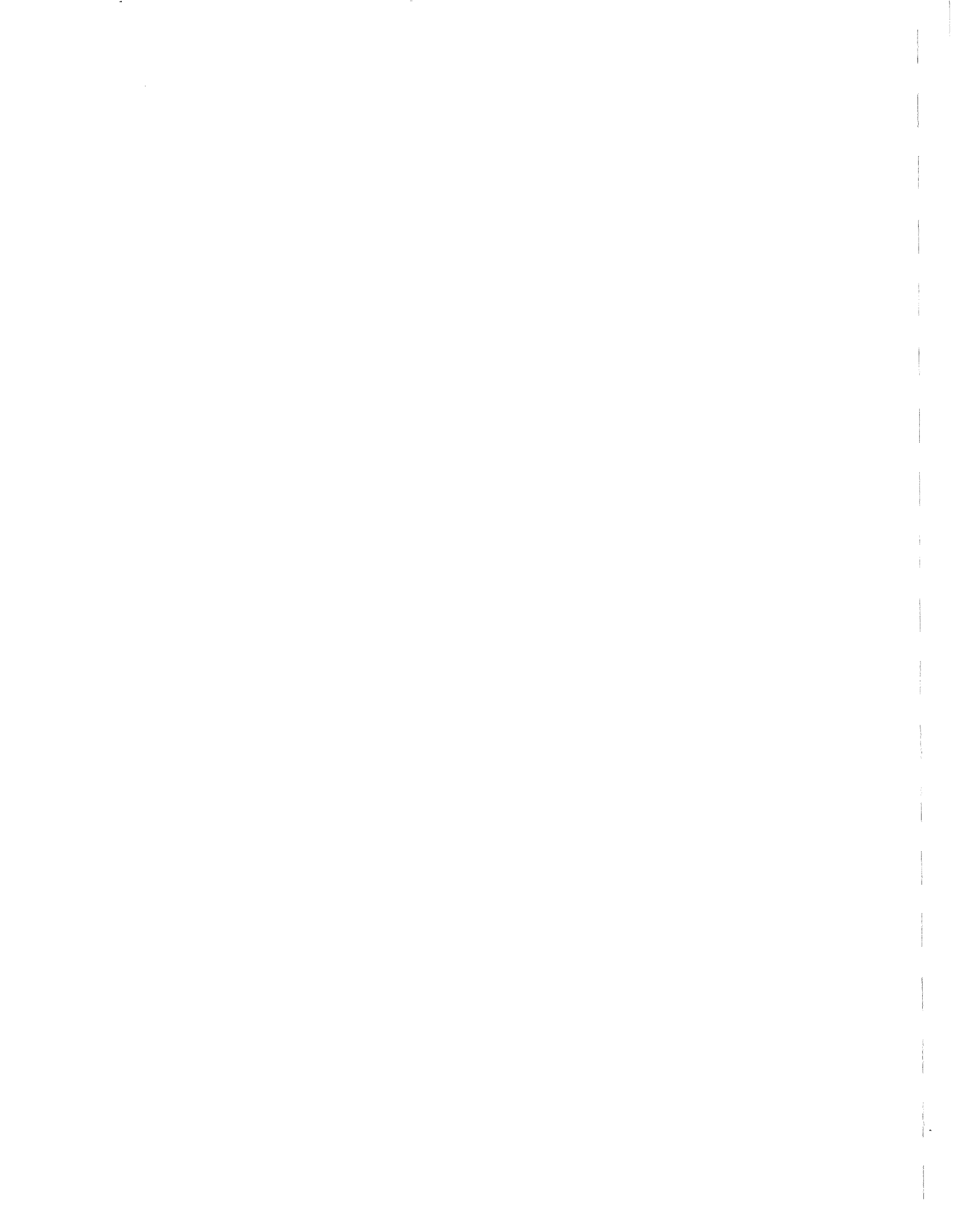
### 3.4 CLEANING

- A. Remove protective coverings and clean column covers to remove adhesives and tape residue. Test all solvents on non-exposed surfaces prior to use.
  - 1. For painted surfaces, use a mild detergent solution on a soft cloth.
  - 2. For stainless steel, use a glass cleaner and a soft cloth.
  - 3. For other surfaces, contact manufacturer for proper cleaning procedures.
- B. Visually inspect all exposed surfaces for scratches or blemishes.
- C. Protect column covers from damage during remainder of construction period.

### 3.5 SCHEDULE

- A. Four column covers required in Museum/Exhibit 101. Refer to drawings for locations, configurations, and details.

END OF SECTION



SECTION 06001

CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section preservative treatment of wood; miscellaneous framing and sheathing; telephone and electrical panel back boards; and concealed wood blocking for support of toilet and accessories, wall cabinets, and wood trim.
- B. Section includes roof perimeter nailers; blocking in wall and roof openings; wood furring and grounds.
- C. Section includes finish carpentry items; wood casings and moldings.
- D. Related Sections:
  - 1. Section 03010-Concrete Work: Setting anchors in concrete and concrete openings to receive wood blocking.
  - 2. Section 04810 – Unit Masonry Assemblies: Setting anchors in masonry and masonry openings to receive wood blocking.
  - 3. Section 05320 – Metal Roof Deck: Metal roof decking to receive wood blocking and/or nailers.
  - 4. Section 08115 – Standard Steel Frames: Door openings to receive wood blocking.
  - 5. Section 08520 – Aluminum Windows: Window openings to receive wood blocking.
  - 6. Section 06410 - Custom Cabinets: Shop fabricated custom cabinet work.
  - 7. Section 08212 - Flush Wood Doors.
  - 8. Section 09900 - Paints and Coatings: Painting and finishing of finish carpentry items.

1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A135.4 - Basic Hardboard.
  - 2. ANSI A208.1 - Mat-Formed Wood Particleboard.
- B. APA-The Engineered Wood Association:
  - 1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.
- C. Architectural Woodwork Institute:
  - 1. AWI - Quality Standards Illustrated.
- D. Hardwood Plywood and Veneer Association:
  - 1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.



- E. American Wood-Preservers' Association:
  - 1. AWPA C1 - All Timber Products - Preservative Treatment by Pressure Process.
  - 2. AWPA C20 - Structural Lumber - Fire-Retardant Treatment by Pressure Processes.
- F. National Institute of Standards and Technology:
  - 1. NIST PS 20 - American Softwood Lumber Standard.
- G. Northeastern Lumber Manufacturers Association:
  - 1. NELMA - Standard Grading Rules for Northeastern Lumber.
- H. National Lumber Grades Authority:
  - 1. NLGA - Standard Grading Rules for Canadian Lumber.
- I. The Redwood Inspection Service:
  - 1. RIS - Standard Specifications for Grades of California Redwood Lumber.
- J. Southern Pine Inspection Bureau:
  - 1. SPIB - Standard Grading Rules for Southern Pine Lumber.
- K. West Coast Lumber Inspection Bureau:
  - 1. WCLIB - Standard Grading Rules for West Coast Lumber.
- L. Western Wood Products Association:
  - 1. WWPA G-5 - Western Lumber Grading Rules.

### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit technical data on all manufactured items.

### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
  - 1. Lumber Grading Agency: Certified by NIST PS 20.
  - 2. Wood Structural Panel Grading Agency: Certified by EWA - The Engineered Wood Association.
  - 3. Plywood Grading Agency: Certified by APA/EWA.
- B. Perform finish carpentry work in accordance with AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated, Custom Grade.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.

- B. Store finish carpentry items indoors, in ventilated areas with constant, minimum temperature of 60 degrees F, maximum relative humidity of 25 to 55 percent.

## PART 2 PRODUCTS

### 2.1 LUMBER MATERIALS

- A. Lumber Grading Rules: PS 20; graded in accordance with established grading rules; maximum moisture content of 13 percent; of following species and grade:
  - 1. Structural Light Framing: Stress group S4S; select structural; No. 2 grade.
  - 2. Non-structural Light Framing: Stress group S4S; structural grade.
  - 3. Studding: Stress group S4S; stud grade.
  - 4. Structural Joists: Stress group S4S; select structural; No. 2 grade.
  - 5. Beams and Stringers: Stress group S4S; structural; No. 1 grade.

### 2.2 SHEATHING MATERIALS

- A. Telephone and Electrical Panel Boards: Plywood.
- B. Plywood: APA/EWA Rated Sheathing Structural I, Grade C-D; Exposure Durability 1; sanded.

### 2.3 FINISH CARPENTRY COMPONENTS

- A. Softwood Lumber: NIST PS 20. AWI Grade II maximum moisture content of 6-8 percent; and the following:

1. Exterior Trim	Redwood	Clear
2. Interior Trim	Pine, white	D-Select
	Poplar	
- B. Softwood Plywood: APA/EWA PS 1 Grade A-C softwood plywood, with veneer core; type of glue recommended for application.
- C. Wood Particleboard: ANSI A208.1; composed of wood chips or sawdust, medium density, made with water resistant adhesive; sanded faces.
- D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, tempered grade, 1/4 inch thick, smooth one side.

### 2.4 ACCESSORIES

- A. Fasteners and Anchors:
  - 1. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
  - 2. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

## 2.5 FACTORY WOOD TREATMENT

- A. Wood Preservative: Exterior blocking and any wood member used in an exterior application except exposed trim shall be pressure treated as called for by Federal Spec TT-W-571 or the published standards of the American Wood preserver's Associations and the following:
  - 1. Maximum moisture content 30%.
  - 2. Use paintable type treatment where wood is scheduled for paint or which will come in contact with finish materials,
  - 3. All treated lumber shall be identified as to name of treated, preservative used and retention of preservative in pounds per cubic foot of lumber.
  - 4. All lumber shall be seasoned after treatment to content required for non-treated lumber.
- B. Fire Retardant Treatment: Pressure treatment, AWPA C20 for lumber and AWPA C27 for plywood, chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25/450.

## 2.6 FABRICATION OF FINISH CARPENTRY WORK

- A. Fabricate to AWI Custom standards.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. Fit exposed sheet material edges with matching hardwood edging. Use one piece for full length only.
- D. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

## PART 3 EXECUTION

### 3.1 FRAMING

- A. Set structural members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- C. Place horizontal members, crown side up.
- D. Construct load bearing framing members full length without splices.
- E. Double members at openings over 24 inches wide. Space short studs over and under opening to stud spacing.

- F. Construct double joist headers at floor and ceiling openings and under wall stud partitions parallel to floor joists. Frame rigidly into joists.
- G. Bridge framing in excess of 8 feet span. Fit solid blocking at ends of members.
- H. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- I. Coordinate curb installation with installation of decking and support of deck openings, and parapet construction.

### 3.2 SHEATHING

- A. Install telephone and electrical panel back boards with wood structural panel sheathing material where required. Size back boards 12 inches beyond size of electrical panel.

### 3.3 INSTALLATION: FINISH CARPENTRY

- A. Install work in accordance with AWI Custom quality standard.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install components/trim with countersunk finish nails at 6 inch on center.
- E. Preparation For Site Finishing:
  - 1. Set exposed fasteners. Apply wood filler in exposed fastener indentations. **Sand work smooth.**
  - 2. Site Finishing: Refer to Section 09900.
  - 3. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

### 3.4 TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Framing Members: 1/4 inch from indicated position, maximum.
- C. Surface Flatness of Floor: 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

### 3.5 SCHEDULES

- A. The following schedule is a list of principal items only. Refer to the drawings for a detailed description of carpentry requirements.

1. Roof Nailers, Fascias, Rakes Curbs and Blocking: Pressure preservative treatment, 19 percent maximum moisture content; refer to drawings for locations.
2. Wall Blocking: All locations where wall mounted fixtures or products are specified to be mounted on framed wall construction including, but not limited to casework, toilet accessories, display boards, TV/VCR brackets, shelving, and cubbies. Provide wall blocking in masonry cavity walls for new windows.
3. Telephone and Electrical Panel Boards: 3/4 inch thick, square edges, site brush applied preservative treated.

END OF SECTION

SECTION 06170  
HEAVY TIMBER ROOF DECKING

PART 1 GENERAL

1.1 SCOPE

- A. This section includes all labor, materials, equipment, and related items required for the furnishing and installation of the solid wood roof deck as shown on the Drawings and specified herein.
  - 1. Included also are anchorages fastening wood to framing members.
- B. This section does not include the following related items.
  - 1. Supporting structural steel.
  - 2. Wood framing, blocking, and other rough wood framing.
  - 3. Finish carpentry work.
  - 4. custom millwork.

1.2 STANDARDS OF QUALITY

- A. Wood decking shall conform to requirements of the American Institute of Timber Construction for Heavy Timber Decking, AITC 112.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Wood decking shall be nominal 2" x 6" minimum E=1,600,000 psi Southern Yellow Pine, Select Quality, solid heavy timber decking, and shall be machined to a double tongue and groove pattern with face side V-joint. Deck shall be pre-drilled at the factory for special 8" angularly grooved spikes furnished by the deck manufacturer.
  - 1. Design loads. Decking shall be for two-span continuous layup, and shall resist the following loads without overstressing or excessive deflection: live load – 25lbs./sq. ft.; wind load – 20 lbs./sq. ft.; dead load – 5 lbs./sq. ft plus weight of deck. Deflection shall not exceed 1/240'th of span.
  - 2. Deck shall be factory stained. Color to be selected by the Architect from the manufacturer's standard colors. Samples shall be submitted showing the actual finish and color for the Architect's approval prior to fabrication.
- 2.2 A. Shop drawings. Contractor shall submit complete shop drawings, in five (5) copies, shown at ample scale necessary to show details of deck layout, supports, and connections, etc. to the Architect for approval prior to furnishing any materials.

### 2.3 HARDWARE

- A. The wood roof deck manufacturer shall furnish all connecting appurtenances required for joining deck units to each other and to supports provided by others. Refer to the Drawings for specific requirements. All hardware must be galvanized.

### 2.3 PROTECTION

- A. Wood decking shall be stored under cover in a ventilated space, protected from damage prior to installation, and covered promptly following installation to protect from the elements.
- B. Follow manufacturer's instructions.

### 2.4. INSTALLATION

- A. Wood decking shall be installed in directions indicated on the Drawings, with tongues facing up the slope of the roof planes when perpendicular to the slope, with patterned faces down and exposed to the underside. Each piece shall be attached at each support as indicated on the Drawings. Courses shall be spiked to each other with 8" spikes, at intervals not to exceed 30", through pre-drilled edge holes, and with one spike at a distance not exceeding 10" from each end of each piece. Courses shall also be glued together with an elastomeric adhesive consisting of a 3/8" bead, 12" long at 3'-0" spacing (refer to Drawings).
  - 1. Provide temporary waterproof covering of deck surfaces until permanent roofing assembly can be installed

END OF SECTION

SECTION 06410  
CUSTOM CABINETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes custom-fabricated cabinet units; counter tops; cabinet hardware; preparation for installing utilities in cabinets.
- B. Related Sections:
  - 1. Section 06001 - Carpentry: Grounds, support framing and related trim not specified in this section.
  - 2. Division 15: Plumbing fixtures
  - 3. Division 16: Power, signal, and data wiring.

1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A156.9 - Cabinet Hardware.
  - 2. ANSI A208.1 - Mat-Formed Wood Particleboard.
- B. Architectural Woodwork Institute:
  - 1. AWI - Quality Standards Illustrated.
- C. ASTM International:
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. Federal Specification Unit:
  - 1. FS A-A-1936 - Adhesive, Contact, Neoprene Rubber.
- E. National Electrical Manufacturers Association:
  - 1. NEMA LD 3 - High Pressure Decorative Laminates.
- F. National Fire Protection Association:
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
  - 2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- G. Underwriters Laboratories Inc.:
  - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
- H. Woodwork Institute:
  - 1. WI - Manual of Millwork.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.



- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Submit data for hardware accessories.
- D. Samples: Submit full range of color options available for all plastic laminate and solid surfacing items.
- E. Certification: Submit copy of fabricator's AWI Quality Certification Program license and Project specific letters.

#### 1.4 QUALITY ASSURANCE

- A. Perform work in accordance with AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated, Custom Grade, unless where more restrictive requirements are specified.
- B. Surface Burning Characteristics: Comply with the following when tested in accordance with NFPA 286.
  - 1. During 40 kW Exposure: No flame spread to ceiling.
  - 2. During 160 kW Exposure: No flame spread to perimeter of tested sample and no flashover.
  - 3. Total Smoke Release: Maximum 1,000 cu m.

#### 1.5 QUALIFICATIONS

- A. Fabricator: Licensed by AWI Quality Certification Program.

#### 1.6 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Protect units from moisture damage.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.

#### 1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

## PART 2 PRODUCTS

### 2.1 COMPONENTS

- A. Softwood Lumber: PS 20; graded in accordance with AWI Custom Grade; average moisture content of 6 percent; species and grade as follows:
  - 1. Cabinet Blocking/Frame: Poplar or White Pine, Clear
- B. Hardwood Lumber: Graded in accordance with AWI Custom; average moisture content of 6 percent; species and grade as follows:
  - 1. Cabinet Blocking/Frame: Birch, Clear. Countertop and/or panel edging where identified on the drawings to be oak, quarter sawn.
- C. Wood Particleboard: ANSI A208.1, 48 lb. Density composed of western fir wood chips made with high resins, waterproof binders; water resistant adhesive; grade to suit application; sanded faces. 3/4 inch thickness, typical. Exceptions: Use 1 inch thick for adjustable shelves and 1 1/2 inch composite for countertops if they are not continuously supported by base cabinets.
  - 1. Door and Drawer Fronts, Cabinet and Countertop construction: Plastic laminate on all exposed surfaces.
  - 2. Shelving: Plastic laminate all sides.
- D. Hardwood Plywood: PS 1; graded in accordance with AWI, core materials of veneer; species and cut as follows:
  - 1. Drawer Box Construction: Birch, A-B Grade, 1/2 inch thick, staples not acceptable.
  - 2. Where oak finish panels are specified on the drawings, provide 3/4 inch thick plywood with rift cut oak veneer and clear finish.
- E. Hardboard: ANSI A135.4; pressed wood fiber with resin binder, tempered grade, 1/4 inch thick, smooth one side, thermofused melamine on exposed side.
  - 1. Drawer Bottoms: 1/4 inch thick thermofused melamine, dado into drawer sides.
  - 2. Gables and Backs: Thermofused melamine on cabinet interior.
- F. High Pressure Decorative Laminate: NEMA LD 3, GP50 for horizontal surfaces, GP28 for vertical surfaces, CL20 for cabinet liner surfaces. Matte surface texture. Color and pattern as selected.
- G. Synthetic Surfacing: Solid, non-porous surfacing material homogeneously composed of a blend of high performance acrylic, polyester, or composite material as manufactured by DuPont, Wilsonart, Formica, Avonite, Pionite or approved equal.

### 2.2 ACCESSORIES

- A. Adhesive for High Pressure Decorative Laminates: FS A-A-1936 contact adhesive. Type recommended by laminate manufacturer to suit application.
- B. Plastic Edge Trim: 3 mil vinyl as by Thermoweb or equal; width to match component thickness; color as selected by Architect.

- C. Fasteners: Size and type to suit application; concealed.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; economy finish in concealed locations and stainless steel finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Grommets: Hafele or equal; plastic cable grommet cover and ring, #429.99; 60 mm diameter. Color by Architect. Coordinate quantity and location requirements with Architect in the field.
- G. Shelf Standards and Rests: Pre-drilled 5 mm holes at 32 mm OC with steel pin shelf supports for adjustable shelving.
- H. Drawer and Door Pulls: HEWI #548.17.96 – nylon or approved equal. Color by Architect.
- I. Sliding Door Pulls: Circular shape, nylon. Color by Architect.
- J. Cabinet Locks: Keyed cylinder, two keys for each lock, master keyed, by National or approved equal. Key locks located in the same room alike.
- K. Catches: Magnetic.
- L. Drawer Slides: Galvanized steel construction, ball bearings separating tracks, full extension type, Accuride C 3800 or approved equal.
- M. Hinges: Recessed, self-closing type, 170 degree swing steel with chrome finish and stainless steel pin, as manufactured by Blum. Doors under 36 inch height shall be equipped with (2) hinges; doors between 36 and 72 inches in height shall be equipped with (3) hinges; doors over 72 inches in height shall be equipped with (4) hinges.
- N. Articulating Keyboard Arm: As manufactured by Comfortease #MDH-28300 or approved equal. 360 degree rotation, 25 degree tilt, 6 inch height adjustment, 21 inches wide x 10.5 inches deep keyboard platform, precision ball bearing slides, roll out 14 inches, lock securely into keying position. Spring assisted lever-lock height control. Detachable palm rest. 9 inch wide x 8.5 deep mouse platform slides out for right or left hand use.

### 2.3 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. Fit shelves edges with matching veneer edging. Use one piece for full length only.
- C. Cap exposed high pressure decorative laminate finish edges, including doors and drawer fronts with 3mm PVC edge banding, machine applied with melt

adhesive and radiused by automatic trimmers. Hand tool application and trimming is not acceptable except at corners.

- D. Door and Drawer Fronts: 3/4 inch thick; overlay style unless otherwise indicated on drawings.
- E. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.
- F. All drawer construction shall be 1/2 inch plywood sides, clear finish, bottom to be tempered hardboard with melamine finish. Finish front shall have interior side of 1/2 inch plywood finished clear on 3/4 inch MDF board with plastic laminate all sides.
- G. Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.
- H. Mechanically fasten back splash to counter tops with steel brackets at 16 inches on center.
- I. Fabricate cabinets and counter tops with cutouts for plumbing fixtures, grommets, and outlet boxes. Verify locations of cutouts from on-site dimensions. Seal cut edges. Fabricate countertops in maximum possible lengths without consideration to "economical" use laminate.
- J. Provide filler strips of same material and finish as adjacent cabinet components as required to make allowances for all door and drawer clearances, including hardware and pulls. Identify clearance requirements on shop drawings.

#### 2.4 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler matching surrounding surfaces and of types recommended for applied finishes.
- D. Seal and varnish exposed to view surfaces and semi-concealed surfaces with not less than two coats of polyurethane. Brush apply only.
- E. Seal surfaces in contact with cementitious materials.
- F. Finish work in accordance with AWI – Section 1500: System #7.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify adequacy of backing and support framing.
- C. Verify location and sizes of utility rough-in associated with work of this section.

### 3.2 INSTALLATION

- A. Set and secure casework in place; rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose. This includes recessed laminate toe kicks. Scribe to floor to compensate for floors that are not level.
- E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- G. Apply caulk to fill voids between cabinets/backsplash and walls. Caulk to match cabinet laminate or veneer color.
- H. Mechanically secure all countertops fabricated in more than one piece together at the seam. Comply with requirements for "premium" tolerances for countertop seams.

### 3.3 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust moving or operating parts to function smoothly and correctly.

### 3.4 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

3.5 SCHEDULE

END OF SECTION



SECTION 07212  
BOARD INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes board insulation for foundation insulation at Pre-Engineered Metal Buildings and under architectural standing seam metal roofing.
- B. Related Sections:
  - 1. Section 03130 Insulating Concrete Forms: Foundation Insulation
  - 2. Section 07214 Foamed-In-Place Insulation: Sprayed Insulation between roof and wall assemblies & on underside of Pre-Engineered metal wall and roofing panels.

1.2 REFERENCES

- A. American Society for Testing and Materials:
  - 1. ASTM C240 - Standard Test Methods of Testing Cellular Glass Insulation Block.
  - 2. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation.
  - 3. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  - 4. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
  - 5. ASTM C1013 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Roof Insulation.
  - 6. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.
  - 7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 8. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- B. National Fire Protection Association:
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- C. Underwriters Laboratories Inc.:
  - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.



- B. Product Data: Submit data on product characteristics, performance criteria, limitations, and adhesives.
- C. Manufacturer's Installation Instructions: Submit special environmental conditions required for installation, and installation techniques.

#### 1.4 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install board insulation when temperature or weather conditions are detrimental to successful installation.

#### 1.5 SEQUENCING

- A. Section 01100 - Summary: Work sequence.
- B. Sequence Work to ensure firestopping, and vapor retarder, materials are in place before beginning Work of this section.

#### 1.6 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with Section 07613 Manufactured Sheet Metal Roofing for installation of roofing panels immediately following installation of board insulation.

### PART 2 PRODUCTS

#### 2.1 EXTRUDED POLYSTYRENE BOARD INSULATION

- A. Manufacturers:
  - 1. DiversiFoam Products - Extruded-Polystyrene Insulation
  - 2. Dow Chemical - Extruded-Polystyrene Insulation
  - 3. Tenneco Foam Products - Extruded-Polystyrene Insulation
  - 4. UC Industries/Owens Corning - Extruded-Polystyrene Insulation
  - 5. Substitutions: Section 01600 - Product Requirements

#### 2.2 COMPONENTS

- A. Extruded Polystyrene Insulation: ASTM C578 Type VI cellular type, conforming to the following:
  - 1. Foundation Insulation Board Size: refer to drawings
  - 2. Board Thickness: 1 inch.
  - 3. Thermal Resistance: R of 5.0.
  - 4. Water Absorption: In accordance with ASTM D2842 0.3 percent by volume maximum.

5. Compressive Strength: Minimum 30 psi
6. Board Edges: Square edges.

## 2.3 POLYISOCYANURATE BOARD INSULATION

- A. Manufacturers:
1. Atlas Roofing Corporation – Polyisocyanurate Insulation
  2. Celotex - Polyisocyanurate Insulation
  3. NRG Barriers/Johns Manville - Polyisocyanurate Insulation
  4. Rmax - Polyisocyanurate Insulation
  5. Substitutions: Section 01600 - Product Requirements

## 2.4 COMPONENTS

- A. Polyisocyanurate Insulation: ASTM C1013, rigid board, glass fiber reinforced type, conforming to the following:
1. Board Density: 2.0 lb/cu ft.
  2. Board Size: 48 x 48 inch.
  3. Board Thickness: Two "roughly equal" layers with total thickness of 3.5"
  4. Facing: Factory applied skin of fiber reinforced felt facer both sides
  5. Thermal Resistance: Aged R of 6 per inch, minimum.
  6. Board Edges: square.
  7. Water Absorption: In accordance with ASTM D2842 less than 1 percent by volume maximum.
  8. Flame/Smoke Properties: 25-50 in accordance with ASTM E84.

## 2.5 ACCESSORIES

- A. Tape: Polyester self-adhering type, mesh reinforced, 2 inch wide.
- B. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer and clips, to be mechanically fastened to surface to receive board insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- C. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances affecting adhesive bond.

3.2 INSTALLATION – BENEATH STANDING SEAM METAL ROOFING

- A. Place constant thickness first layer (2.0 inches) and constant thickness second layer (1.5 inches) on vapor retarder and structural metal roof deck.
- B. Insulation shall be friction fit, free of mechanical fasteners where roofing panels are attached to structural “Z” girts.
- C. Where roofing panels are attached to metal roof deck, mechanically fasten insulation to deck at full roof area in accordance with fastening pattern requirements for I-90 roof assemblies.
- D. Minimum Total Insulation Thickness: 3.5 inches.
- E. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- F. Apply no more insulation than can be covered with membrane in same day.

3.3 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit work to be damaged prior to covering insulation.

3.4 SCHEDULES

- A. Roof Insulation under Metal Roofing: 3 inch thick Polyisocyanurate.

END OF SECTION

## SECTION 07214

### FOAMED-IN-PLACE INSULATION

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes foamed-in-place insulation at exterior wall crevices requiring thermal seal, at junctions of dissimilar wall and roof materials and in walls and underside of roof deck at Pre-Engineered Metal Buildings to achieve thermal and air seal. Foam to be trimmed smooth as required to for proper application of intumescent paint overcoat. Work of this section also includes application of protective water based intumescent paint overcoat.
- B. Related Sections:
  - 1. Section 03130 Insulated Concrete Forms: Integral wall insulation.
  - 2. Section 07613 Manufactured Sheet Metal Roofing: Roof insulation.
  - 3. Section 13121 Pre-Engineered Buildings

##### 1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
  - 2. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
  - 3. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
  - 4. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
  - 5. ASTM D2482 - Standard Test Method for Surface Strength of Paper (Wax Pick Method).
  - 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 7. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- B. National Fire Protection Association:
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- C. Underwriters Laboratories Inc.:
  - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Conform to Kentucky Building code for flame and smoke, and thermal barrier (KBC Section 2603.4) requirements.

#### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit product description, insulation properties, preparation requirements, and overcoat properties.
- C. Manufacturer's Installation Instructions: Submit special procedures and perimeter conditions requiring special attention.

#### 1.5 QUALITY ASSURANCE

- A. Insulation Surface Burning Characteristics:
  - 1. Foam Plastic Insulation: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
  - 2. Overcoat: Tested to withstand temperatures of over 2000 for a period of over 2 hours.
- B. Apply label from agency approved by authority having jurisdiction to identify each foam plastic component.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience and certified by the insulation manufacturer.

#### 1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install insulation when ambient temperature is lower than 70 degrees F.
- C. Toxicity/Hazardous Materials:
  - 1. Outgassing/Reactivity:
    - a. Formaldehyde: Products containing urea-formaldehyde will not be permitted.
    - b. Chlorofluorocarbons (CFCs)/HCFCs: Products and equipment requiring or using CFCs or HCFCs during the manufacturing process will not be permitted.

- D. Airtightness: Meet specific standards of the Energy Star Program of 1.5 Air Changes/Hour at 50 Pa.

#### 1.9 MOCK-UP

- A. Section 01400 - Quality Requirements: Requirements for mockup.
- B. Construct mockup, 10 x 10 feet in size including application of intumescent paint coating covering a 5x5 area.
- C. Locate were directed by Architect.
- D. Mock-up may remain as part of the Work.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURER: FOAM INSULATION

- A. Icynene Inc., 6747 Campobello Rd.  
Mississauga, Ontario L5N 2L7 Canada.  
Tel 800-758-7325. Fax 905-363-0102.  
Web Site: www.icynene.com.

#### 2.2 MATERIALS

- A. Polyisocyanurate Spray Insulation: Icynene; hydrophobic, low-density, open-cell modified polyisocyanurate; conforming to the following:
  1. Thermal Resistance (R-Value/inch): ASTM C518; 3.6 hr/sq ft/degree F/BTU. In.
  2. Air Permeance (for 5.25 inches of material): ASTM E283; 0.0049 l/m<sup>2</sup>/second.
  3. Water Vapor Transmission (for 5 inches of material): ASTM E96; 10 perms.
  4. Sound Transmission Class (STC): ASTM E90; STC 37 in wood stud wall.
  5. Noise Reduction Coefficient (NRC): ASTM E90; NRC-0.7 in wood stud wall.
  6. Corrosion: No significant corrosion when in contact with steel under 85 percent relative humidity.
  7. Bacterial or Fungal Growth: No growth; no material deterioration.
  8. Flame Spread and Smoke Developed Rating: ASTM E84; <20/<400.
  9. Fuel Contribution: ASTM E84; 0.
  10. Oxygen Index: ASTM D2863; average value 23.1 percent.

#### 2.2 MANUFACTURER: THERMAL BARRIER

- A. International Fire Resistant Systems, Inc.  
580 Irwin Street No. 1  
San Rafael, CA 94901  
TEL 888-990-3388  
Web Site: www.firefree.com

### 2.3 MATERIALS

- A. FireFree 88: Water-based intumescent coating that can withstand extreme temperatures (in excess of 2000F degrees) for an extended time (over two hours).

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that substrate is free of any foreign material that will impede application.
- C. Verify that other work on and within spaces to be insulated is complete prior to application.
- D. Notify Architect of conditions that would adversely affect the application.
- E. Beginning of installation means applicator accepts existing conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written installation instructions for preparing substrates indicated to receive insulation.
- B. Mask and protect adjacent surfaces from overspray or damage.
- C. Remove foreign materials, dirt, grease, oil, paint, laitance, efflorescence, and other substances that will affect application.

### 3.3 APPLICATION FOAM INSULATION

- A. Apply insulation in accordance with manufacturer's written application instructions.
- B. Apply insulation to a reasonably uniform monolithic density without voids.
- C. Apply to minimum cured thickness of 5.5 inch +/- 1/2 inch unless otherwise specified. In no case shall thickness exceed 6".
- D. Apply insulation to fill voids around doors and windows.
- E. Apply insulation to fill voids around accessible service and equipment penetrations and where noted on drawings.
- F. Apply insulation to seal voids at truss ends to prevent wind scouring of ceiling insulation.
- G. Seal plumbing stacks, electrical wiring and other penetrations into attic to control air leakage.

- H. Where building is designed to meet the specific airtightness standards of the Energy Star Program, apply insulation as recommended by manufacturer to provide airtight construction. Apply caulking to seal joints between structural assemblies.
- I. Trim and level foam insulation to satisfy substrate requirements for application of intumescent coating.

#### 3.4 FIELD QUALITY CONTROL

- A. Inspect application for insulation thickness and density.

#### 3.5 CONSTRUCTION WASTE MANAGEMENT

- A. Plan and coordinate the insulation work to minimize the generation of offcuts and waste. Reuse insulation scraps to the maximum extent feasible.

#### 3.6 APPLICATION THERMAL BARRIER

- A. Spray Apply FireFree 88 in conformance with manufacturer's written instructions and to meet tested assembly ratings.
- B. Unless otherwise specified by the manufacturer, apply FireFree 88 at a rate of 1 gallon per 100 square feet.
- C. FireFree 88 coating shall be applied to the exposed face of all foam insulation not concealed by either wallboard or metal wall liner panel.

#### 3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit subsequent construction Work to disturb applied insulation.

END OF SECTION





## SECTION 07270

### AIR BARRIERS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes air leakage criteria for primary air seal building enclosure materials and assemblies; materials and installation methods supplementing other air seal materials and assemblies; and air seal materials to connect and seal openings, joints, and junctions between other air seal materials and assemblies.
- B. Related Sections:
  - 1. Section 07900 - Joint Sealers: Sealant materials and installation techniques.

##### 1.2 REFERENCES

- A. American Society of Civil Engineers:
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- B. American Society for Testing and Materials:
  - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 3. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - 4. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
- C. Sealant, Waterproofing and Restoration Institute:
  - 1. SWRI - Sealant Specification.

##### 1.3 DEFINITIONS

- A. Air Barrier: Continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of single material or combination of materials to achieve performance requirements.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Provide continuity of air seal materials and assemblies in conjunction with materials described in Section 03010, 04810, 07212, 07213, 07900, 08520 and 11194.

#### 1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on material characteristics, performance criteria, and limitations.
- C. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with SWRI - Sealant and Caulking Guide Specification requirements for materials and installation.

#### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Maintain temperature and humidity recommended by materials manufacturers before, during and after installation.

#### 1.8 SEQUENCING

- A. Section 01100 - Summary: Work sequence.
- B. Sequence Work to permit installation of materials in conjunction with related materials and seals.

#### 1.9 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate work with installation of masonry flashings, doors, windows, wall louvers, and roof insulation/vapor retarder.

## PART 2 PRODUCTS

### 2.1 AIR BARRIERS

- A. Manufacturers:
  - 1. Dupont Tyvek, Model CommercialWrap.
  - 2. Innovative Energy, equal product.
  - 3. Tenneco (Amocco Foam Products), equal product.
  - 4. Substitutions: Under provisions of Instructions to Bidders Article 3.3.1

### 2.2 COMPONENTS

- A. Polyurethane Sealant: ASTM C920. Use single component, chemical curing, non-sagging product recommended by mfr. of air barrier.
- B. Primer: Recommended by sealant manufacturer's.
- C. Substrate Cleaner: Non-corrosive type recommended by sealant manufacturer and compatible with adjacent materials.

### 2.3 ACCESSORIES

- A. Tape: As manufactured by air barrier for use with specified product.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Clean and prime substrate surfaces to receive sealants.

### 3.2 INSTALLATION

- A. Sheet Seal Over Solid Substrate: Secure flexible sheet seal through gypsum sheathing to metal studs using screws and washers. Seal all seams with not less than 4 inch lap in sheet over firm bearing.
- B. Air Seal For Wall/Roof Junction: Lap sheet onto roof vapor retarder (foil facing of batt insulation). Provide a continuous taped seal between roof and wall air/vapor retarders
- C. Install sheet seal between window and door frames and adjacent wall seal materials with sealant . Caulk to ensure complete seal. Position lap seal over firm bearing.
- D. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- E. Install air barrier to maintain continuity across different substrates.

- F. Coordinate installation of air barrier with installation of masonry flashings and roof flashings. Flashings, vapor retarders and air barriers shall be installed "shingle style" in all applications to ensure proper control and direction of flow of water.

### 3.3 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit adjacent work to damage work of this section.

### 3.4 SCHEDULES

- A. Provide continuous air barrier where wall construction consists of metal stud and exterior gypsum sheathing.

END OF SECTION

## SECTION 07613

### MANUFACTURED SHEET METAL ROOFING

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Architectural standing seam metal roofing.
  - 2. Metal soffit panels.
  - 3. Structural supports.
  - 4. Vapor Retarder.
  - 5. Eave protection.
  - 6. Snow guards.
  
- B. Related Sections:
  - 1. Section 04810 - Unit Masonry Assemblies: Placement of flashing reglets and accessories.
  - 2. Section 06001 - Wood Blocking and Curbing: Wood blocking.
  - 3. Section 07212 - Board Insulation: Rigid insulation under sheet metal roofing system.
  - 4. Section 07620 - Sheet Metal Flashing and Trim.
  - 5. Section 07714 - Gutters and Downspouts.
  - 6. Section 07900 - Joint Sealers.
  - 7. Section 09260 - Gypsum Board Assemblies: suspended metal framing for soffit panels.

##### 1.2 REFERENCES

- A. American Architectural Manufacturers Association:
  - 1. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 2. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
  
- B. American Iron and Steel Institute:
  - 1. AISI SG-973 - Cold-Formed Steel Design Manual.
  
- C. American Society of Civil Engineers:
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
  
- D. American Society for Testing and Materials:

1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  2. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  3. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  4. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  5. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
  6. ASTM D2178 - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
  7. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
  8. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
  9. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  10. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
- E. Federal Specification Unit:
1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- F. National Roofing Contractors Association:
1. NRCA - The NRCA Roofing and Waterproofing Manual.
- G. Sheet Metal and Air Conditioning Contractors:
1. SMACNA - Architectural Sheet Metal Manual.
- H. Underwriters Laboratories Inc.:
1. UL 580 - Tests for Uplift Resistance of Roof Assemblies.

### 1.3 DESIGN REQUIREMENTS

- A. Roof Loads: Design to resist live and dead loads with 1/360 maximum deflection.
1. Roof Live Loads: Minimum 20 psf
  2. Roof Snow Loads: 15 psf
  3. Dead Loads: Actual weight of materials incorporated into Work.
- B. Wind Loads: Design and size components to withstand positive and negative wind loads, including increased loads at building corners.
1. Design Wind Load: As calculated in accordance Kentucky Building Code, using 70 mph Basic Wind Speed, Exposure C, and Importance Factor 1.

- C. Wind Uplift Resistance: UL 580; Class 90. Tested in accordance with ASTM E 1592.
- D. Air Infiltration: Limit air leakage through roof assembly to 0.0156 cfm/sq ft of panel area, measured at pressure across assembly of 20 psf in accordance with ASTM E283.
- E. Uncontrolled Water Leakage: None, when measured in accordance with ASTM E331 with test pressure of 20 psf.
- F. Exterior Components: Accommodate the following without damage to system, components or deterioration of seals.
  - 1. Movement within system.
  - 2. Movement between system and perimeter framing components.
  - 3. Dynamic loading and release of loads.
  - 4. Deflection of structural support framing.
  - 5. Expansion and contraction from temperature range of 170 degrees F over 12 hour period.

#### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
  - 1. Indicate metal roofing and soffit panel profiles, jointing patterns, jointing details, fastening methods, flashings, terminations, sealant requirements and installation details.
  - 2. Shop drawings shall be prepared by the roofing manufacturer.
- C. Product Data:
  - 1. Submit data on metal types, finishes, and characteristics.
  - 2. Submit data on vapor retarder including thickness, sheet size and perm rating.
  - 3. Submit color charts for finish selection.
- D. Design Data:
  - 1. Submit structural design calculations for metal roofing and structural supports signed and sealed by professional engineer.
- E. Warranty Information: Submit a sample of the 20 Year No Dollar Limit Warranty.
- F. Manufacturer's Installation Instructions: Submit instructions including special procedures for roofing penetrations, flashings, and perimeter conditions requiring special attention.
- G. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.



#### 1.5 QUALITY ASSURANCE

- A. Manufacturer and Installer of work of this section shall also be responsible for all gutters, downspouts and metal trim associated with all metal roofing.
- B. Calculate structural properties of framing members in accordance with AISI SG-973.
- C. Perform Work in accordance with SMACNA Architectural Sheet Metal Manual and The NRCA Roofing and Waterproofing Manual.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum ten years documented experience in projects of similar size and complexity.
- B. Installer: Company specializing in performing work of this section with minimum ten years documented experience in projects of similar size and complexity, and certified by the manufacturer.
- C. Design sheet metal roofing and structural supports under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State of Kentucky.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials causing discoloration or staining.

#### 1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

#### 1.9 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate with Work of Section 04810 for installing recessed flashing reglets.
- C. Coordinate with Work of Section 05120 for connecting structural supports to building structural frame.

- D. Coordinate with Work of Section 07212 for insulation installed within roof assembly.

#### 1.10 WARRANTY

- A. Section 01700 - Execution Requirements: Requirements for warranties.
- B. The Roofing Contractor shall provide a two-year unconditional guarantee for all materials and workmanship.
- C. Upon project completion and Manufacturer acceptance the Manufacturer shall deliver to the Owner a twenty (20) year, NO DOLLAR LIMIT, manufacturer Roofing Warranty.
- D. The 20 year warranty shall include protection against structural failure, water penetration, and corrosion. Warranty shall also include protection against factory applied paint finishes failures such as fading, chipping, chalking and/or blistering.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURED SHEET METAL ROOFING

- A. Manufacturers:
  - 1. DMI
    - a. Roof Panel: Mechanically Seamed SL25
    - b. Soffit Panel: Flush Panel FP10
  - 2. Centria:
    - a. Roof Panel: SRS3
    - b. Soffit Panel: IW13A
  - 3. Substitutions: Section 01600 - Product Requirements
- B. Architectural Standing Seam Metal Roofing: Factory formed metal roofing panel system with concealed fasteners.
  - 1. Panel Materials: Pre-finished galvanized or galvalume steel sheet, 24 gauge (minimum) metal thickness.
  - 2. Panel Width: 16 inch minimum.
  - 3. Panel Profile: high bead; subject to Architect approval
  - 4. Seam Type: Standing seam; field formed.
  - 5. Seam Height: 2.5" minimum
  - 6. Color: As selected from manufacturer's standard colors (minimum range of 20 colors).
- C. Metal Soffit Panels: Factory formed metal soffit panel system with concealed fasteners.
  - 1. Panel Materials: Pre-finished galvanized steel sheet 24 gauges (minimum) base metal thickness.
  - 2. Panel Width: Nominal 12 inches.
  - 3. Panel Profile: Flat.

4. Panel Depth: Nominal 1 1/2 inch
5. Panel Joint: Interlocked.
6. Color: As selected from manufacturer's standard colors (minimum range of 20 colors).

## 2.2 SHEET METAL MATERIALS

- A. Pre-Finished Galvanized Steel Sheet: ASTM A755/A755M coil coated.
  1. Base Metal: ASTM A653/A653M; Structural Quality, Grade 50; G90 zinc coating.
  2. Exposed Finish: Manufacturer's standard Kynar, nominal 1.0 mil thickness.
  3. Unexposed Finish: Manufacturer's standard Kynar, nominal 1.0 mil thickness.

## 2.3 ACCESSORIES

- A. Fasteners: Stainless steel, with soft neoprene washers where exposed.
- B. Vapor Retarder: 6 mil (minimum) polyethylene vapor retarder; perm rating of .05 or less.
- C. Eave Protection: Ice and Water Shield as manufactured by W. R. Grace & Co. or approved equal.
- D. Protective Backing Paint: Zinc molybdate alkyd.
- E. Sealant: Butyl sealant as specified in Section 07900.
- F. Plastic Cement: ASTM D4586, Type I.
- G. Snow Guards: in accordance with SMACNA Figure 8-12E.

## 2.4 FABRICATION

- A. Form roof panels in one length to cover entire roof span between eave and ridge.
- B. Form sections shape as indicated on Drawings, accurate in size, square, and free from distortion or defects.
- C. Fabricate rake, edge and all other trim, flashing, and other metal components from same material as metal roof panels. Provide exposed metal surfaces with same finish as exposed face of metal roof panels.
- D. Fabricate cleats of same material as sheet, to interlock with sheet.
- E. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.

- F. Form trim pieces in longest practical lengths, not less than 16 feet.
- G. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- H. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- I. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- J. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- K. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.
- L. Fabricate snow guards in accordance with SMACNA Figure 8-12E.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Structural Framing Substrate:
  - 1. Verify primary and secondary framing members are installed and fastened, properly aligned and sloped to gutter.
  - 2. Verify damaged shop coatings are repaired with touch up paint.
- C. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- D. Verify roofing termination and base flashings are in place, sealed, and secure.
- E. Verify insulation is installed and ready for roof application.

#### 3.2 PREPARATION

- A. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

#### 3.3 INSTALLATION – VAPOR RETARDER

- A. Apply vapor retarder continuously over entire metal roof deck.
  - 1. Secure sheet to metal deck with tape.
  - 2. Weather lap edges and ends 6 inches (minimum) and adhesive seal to ensure complete continuous seal.
  - 3. Stagger end joints minimum 24 inches.

### 3.4 INSTALLATION – EAVE PROTECTION AND OTHER VERTICAL WALL INTERSECTIONS

- A. Install ice and water shield continuously within 24 inches of all gutters.
- B. Install ice and water shield at all locations where the metal roof meets a vertical wall in accordance with manufacturer's requirements; or as detailed on the drawings. Follow the most restrictive requirement if drawings conflict with manufacturer's requirements.
- C. Lay membrane perpendicular to slope.
- D. Weather lap edges 4 inches and nail in place.
- E. Stagger end joints 24 inches, minimum.

### 3.5 INSTALLATION - STANDING SEAM METAL ROOFING

- A. Conform to SMACNA and NRCA details.
- B. Install furring to support roof panel side laps and receive fasteners.
- C. Install roofing panels with long dimension perpendicular to eaves.
- D. Install clips to secure roof panels without deforming roof panels.
- E. Machine form standing seam between adjacent roofing panels. Hand form joints where machine forming is not possible.
- F. Terminate roofing panels with sheet metal trim and flashing for watertight installation. Close and conceal openings between roofing panels, panel seams, and roof substrate.
- G. Seal metal joints watertight.

### 3.6 INSTALLATION - SOFFIT PANELS

- A. Install perimeter trim, level, aligned and oriented as indicated on the reflected ceiling plan.
- B. Install perforated soffit panels to form flat, flush surface.
- C. Fit soffit panels in single length between perimeter trim. Secure panels to soffit framing.
- D. Adjust panels for uniform joints.

### 3.7 INSTALLATION - FLASHING

- A. Install reglets in accordance with Section 04810.
- B. Conform to SMACNA and NRCA details.
- C. Insert flashings into reglets to form tight fit. Secure in place with lead wedges at maximum 6 inches on center. Seal flashings into reglets with sealant.
- D. Place eave edge and gable edge metal flashings tight to fascia. Weather lap joints 2 inches and seal with plastic cement. Secure flange to substrate.
- E. Form valleys with sheet metal not exceeding 10 feet in length. Lap joints 6 inches in direction of drainage. Extend valley sheet minimum 6 inches under roofing sheets.
- F. Secure flashings in place using concealed fasteners.
- G. Secure flashing exposed edges with continuous cleats.
- H. Apply plastic cement compound between metal flashings and felt flashings.
- I. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- J. Seal metal joints watertight.

### 3.8 INSTALLATION - SNOW GUARDS

- A. Install snow guards in accordance with SMACNA standards.
- B. Install snow guards in continuous line, 12 inches up slope of exterior wall centered of each roof panel.

### 3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit traffic over unprotected roof surface.

END OF SECTION



SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes flashings and counterflashings and fabricated sheet metal items.
- B. Related Sections:
  - 1. Section 04810 - Unit Masonry Assemblies: Through-wall flashings in masonry.
  - 2. Section 06001 - Carpentry: Wood blocking
  - 3. Section 07714 - Gutters and Downspouts.
  - 4. Section 07900 - Joint Sealers.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International:
  - 1. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - 2. ASTM A625/A625M - Standard Specification for Tin Mill Products, Black Plate, Single Reduced.
  - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 4. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
  - 5. ASTM B32 - Standard Specification for Solder Metal.
  - 6. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction.
  - 7. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.



8. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
  9. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.
  10. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
  11. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
  12. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- C. Copper Development Association Inc.:
1. CDA - Copper in Architecture - Handbook.
- D. Federal Specification Unit:
1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- E. Sheet Metal and Air Conditioning Contractors:
1. SMACNA - Architectural Sheet Metal Manual.

### 1.3 DESIGN REQUIREMENTS

- A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual."

### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

### 1.5 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in sheet metal work with minimum three years documented experience.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials causing discoloration or staining.

## 1.7 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate with Work of Section 04810 for installing recessed flashing reglets.

## 1.8 WARRANTY

- A. The installer of metal flashings and trim shall provide a two-year unconditional guarantee for watertightness on all materials and workmanship.

## PART 2 PRODUCTS

### 2.1 SHEET METAL FLASHING AND TRIM

- A. Pre-Finished Galvanized Steel Sheet: ASTM A924/A924M, Grade A, or ASTM A653/A653M, G90 zinc coating; 24 gage core steel, shop pre-coated with PVDF (polyvinylidene fluoride) coating; color as selected from manufacturer's standard color.

### 2.2 ACCESSORIES

- A. Fasteners: Stainless steel, with soft neoprene washers.
- B. Underlayment: ASTM D226, organic roofing felt, Type II, No. 30.
- C. Slip Sheet: Rosin sized building paper.
- D. Primer: Zinc molybdate.
- E. Protective Backing Paint: Zinc molybdate alkyd.
- F. Sealant: Type E butyl.
- G. Plastic Cement: ASTM D4586, Type I.
- H. Reglets: Recessed type, galvanized steel.
- I. Solder: ASTM B32; type suitable for application and material being soldered.

### 2.3 FABRICATION

- A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet metal, interlocking with sheet.
- C. Form pieces in longest possible lengths.

- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.
- I. Seal metal joints.

#### 2.4 FACTORY FINISHING

- A. PVDF (polyvinylidene fluoride) coating: Multiple coat, thermally cured, fluoropolymer system.
- B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.

#### 3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets to lines and levels indicated on Drawings. Seal top of reglets with sealant.
- C. Paint concealed metal surfaces with protective backing paint to minimum dry film thickness of 15 mil.

#### 3.3 INSTALLATION

- A. Coordinate installation of concealed reglets in masonry assemblies with work of Section 04810.

- B. Insert flashings into reglets to form tight fit. Secure in place with lead wedges. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Seal metal joints watertight.
- F. Install fabricated sheet metal splash pans beneath downspouts that discharge onto a roof surface.

#### 3.4 SCHEDULE

- A. The following Schedule is a list of principle items only. Refer to Drawings Sheets for items not specifically scheduled.
  - 1. Counter Flashing: 24 gage prefinished galvanized steel
  - 2. Expansion Joint Covers: 24 gage prefinished galvanized steel
  - 3. Sheet Metal Splash Pans for downspouts that discharge onto a roof area: 24 gage prefinished steel fabricated in conformance with SMACNA Figure 1-36.

END OF SECTION

SECTION 07714  
GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes prefinished galvanized steel gutters and downspouts.
- B. Related Sections:
  - 1. Section 02630 – Storm Drainage: cast iron downspout boots and underground storm piping system.
  - 2. Section 04065 – Masonry Mortar & Grout.
  - 3. Section 07620 - Sheet Metal Flashing and Trim.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International:
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - 3. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 4. ASTM B32 - Standard Specification for Solder Metal.
  - 5. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 6. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
- C. Copper Development Association Inc.:
  - 1. CDA - Copper in Architecture - Handbook.
- D. Federal Specification Unit:

1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

- E. Sheet Metal and Air Conditioning Contractors:
  1. SMACNA - Architectural Sheet Metal Manual

### 1.3 DESIGN REQUIREMENTS

- A. Conform to SMACNA Manual for sizing components for rainfall intensity determined by storm occurrence of 1 in 10 years.

### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- C. Product Data: Submit data on manufactured components, materials, and finishes.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA Manual.
- B. Gutter and Downspout installer shall also be responsible for work of Section 07613 Manufactured Sheet Metal Roofing.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope to drain.
- C. Prevent contact with materials during storage capable of causing discoloration, staining, or damage.

### 1.7 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with downspout discharge pipe inlet.

### 1.8 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.

- B. The Roofing Contractor shall furnish to the Owner a written two-year unconditional guarantee for gutter and downspout materials workmanship and watertightness.
- C. Furnish five year manufacturer warranty for downspout finishes.

## PART 2 PRODUCTS

### 2.1 GUTTERS AND DOWNSPOUTS

- A. Product Description:
  - 1. Gutters: Prefinished steel sheet metal; dimensions and configuration as shown on drawings.
  - 2. Downspouts: Prefinished Steel Sheet metal; SMACNA 3 inches x 4 inches or 4 inches x 4 inches rectangular profile. Refer to drawings for locations.

### 2.2 COMPONENTS

- A. Pre-Finished Galvanized Steel Sheet: ASTM A924/A924M, Grade A, or ASTM A653/A653M, G90 zinc coating; 22 gage core steel, shop pre-coated with mfr's standard Kynar finish coating; color as selected from manufacturer's standard.

### 2.3 ACCESSORIES

- A. Anchors and Supports: Profiled to suit gutters and downspouts.
  - 1. Anchoring Devices: In accordance with SMACNA recommendations and Plate Number 17 Figure B
  - 2. Gutter Supports: Spacers (1/8 inch thick) and Brackets (3/16 inch thick) at 36 inches OC, staggered.
  - 3. Downspout Supports: Straps at 36 inches OC
- B. Fasteners: Same material and finish as gutters and downspouts, with soft neoprene washers.
- C. Primer: Zinc molybdate type.
- D. Protective Backing Paint: Zinc molybdate alkyd.
- E. Solder: ASTM B32; 50/50 type.

### 2.4 FABRICATION

- A. Form gutters and downspouts of profiles and sizes specified.
- B. Fabricate with required connection pieces.

- C. Form sections to shape indicated on Drawings, square, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

## 2.5 FACTORY FINISHING

- A. Kynar Finish: Manufacturer's standard
- B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces are ready to receive gutters and downspouts.

### 3.2 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

### 3.3 INSTALLATION

- A. Sheet Metal: Join lengths with formed seams soldered watertight. Flash and solder gutters to downspouts and accessories.
- B. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
- C. Connect downspouts to cast iron downspout boots and seal with mortar.

### 3.4 SCHEDULE

- A. Refer to drawings for gutter and downspout details and requirements.

END OF SECTION



## SECTION 07840

### FIRESTOPPING

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes firestopping materials and accessories; firestopping tops of fire rated walls; and smoke sealing at joints between floor slabs and exterior walls.
- B. Related Sections:
  - 1. Section 04065 - Masonry Mortar and Grout: Mortar used for firestopping.
  - 2. Section 07214 – Foamed Insulation: Water Base Intumescent thermal barrier paint coating.
  - 3. Section 09260 - Gypsum Board Assemblies: Gypsum board fireproofing.
  - 4. Division 15 - Mechanical: Mechanical work requiring firestopping.
  - 5. Division 16 - Electrical: Electrical work requiring firestopping.

##### 1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
  - 4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
- B. Intertek Testing Services (Warnock Hersey Listed):
  - 1. WH - Certification Listings.
- C. National Fire Protection Association:
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- D. Underwriters Laboratories Inc.:
  - 1. UL 263 - Fire Tests of Building Construction and Materials.
  - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
  - 3. UL 1479 - Fire Tests of Through-Penetration Firestops.
  - 4. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
  - 5. UL - Fire Resistance Directory.

##### 1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Conform to Kentucky Building Code for fire resistance ratings and surface burning characteristics.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of materials used.

#### 1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on product characteristics, performance and limitation criteria.
- C. Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Manufacturer's Installation Instructions: Submit preparation and installation instructions.

#### 1.6 QUALITY ASSURANCE

- A. Through Penetration Firestopping of Fire Rated Assemblies: ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
  - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
  - 2. Floor Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
    - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- B. Through Penetration Firestopping of Non-Fire Rated Floor Assemblies: Materials to resist free passage of flame and products of combustion.
  - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
  - 2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- C. Fire Resistant Joints in Fire Rated Floor, and Wall Assemblies: ASTM E1966 or UL 2079 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
- D. Fire Resistant Joints Between Floor Slabs: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- E. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

## 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of materials.
- D. Provide ventilation in areas to receive solvent cured materials.

## PART 2 PRODUCTS

### 2.1 FIRESTOPPING

- A. Manufacturers:
  - 1. A/D Fire Protection Systems, Inc.
  - 2. Dow Corning Corp.
  - 3. Fire Trak Corp.
  - 4. Hilti Corp.
  - 5. 3M fire Protection Products
  - 6. Nelson Firestop Products
  - 7. Pecora Corporation
  - 8. Premier Refractories & Chemicals Inc.
  - 9. United States Gypsum Co.
  - 10. Substitutions: Section 01600 - Product Requirements.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
  - 1. Silicone Firestopping Elastomeric Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
  - 2. Foam Firestopping Compounds: Single component foam compound.
  - 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
  - 4. Fiber Stuffing and Sealant Firestopping: Composite of mineral fiber stuffing insulation with silicone elastomer for smoke stopping.
  - 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.

6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
7. Firestop Pillows: Formed mineral fiber pillows.
8. Mortar as specified in Section 04065 where permitted by applicable code.

C. Color: As selected from manufacturer's full range of colors.

## 2.2 ACCESSORIES

A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.

- B. Dam Material: Permanent:
1. Mineral fiberboard.
  2. Mineral fiber matting.
  3. Sheet metal.
  4. Plywood or particle board.
  5. Alumina silicate fire board.

C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify openings are ready to receive firestopping.

### 3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Install backing/damming materials to arrest liquid material leakage.

### 3.3 APPLICATION

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.

- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.
- D. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.
- E. Dam material to remain.

#### 3.4 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Clean adjacent surfaces of firestopping materials.

#### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Protect adjacent surfaces from damage by material installation.

#### 3.6 SCHEDULES

END OF SECTION



SECTION 07900

JOINT SEALERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cleaning and preparation of surfaces to receive sealants and joint backing, sealants, precompressed foam sealers, and accessories in all locations where two different materials meet, or where there is a gap in a common material that creates a potential for water or air infiltration, or creates a visual concern.
- B. Related Sections:
  - 1. Section 02764 – Pavement Joint Sealants: Sealants associated with asphalt paving.
  - 2. Section 02751 – Cement Concrete Pavement: Sealants associated with concrete curbs and paving.
  - 3. Section 07840 - Firestopping: Firestopping sealants.
  - 4. Section 08800 - Glazing: Glazing sealants and accessories.
  - 5. Section 09260 - Gypsum Board Assemblies: Acoustic sealant.
  - 6. Section 09300 - Tile: Sealant used as tile grout.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM C834 - Standard Specification for Latex Sealants.
  - 2. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
  - 3. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
  - 5. ASTM D1056 - Standard Specification for Flexible Cellular Materials- Sponge or Expanded Rubber.
  - 6. ASTM D1667 - Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
  - 7. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.

- D. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight seal, watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

#### 1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

#### 1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Products Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

#### 1.6 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with sections referencing this section.

### PART 2 PRODUCTS

#### 2.1 JOINT SEALERS

- A. Exterior Sealant, except paving joints, shall be Sonolastic NP-II by Sonneborn, Dymetric by Tremco, Dynatrol 11 by Pecora, or approved equal.
- B. Interior sealant shall be Pecora AC-20 Acrylic, Sonolac by Sonneborn or approved equal.
- C. Color of sealants shall be selected from manufacturers standards by Architect.

#### 2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.



- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

#### 3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.
- D. Protect elements surrounding Work of this section from damage or disfiguration.

#### 3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- C. Install bond breaker where joint backing is not used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Tool joints concave.
- G. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

#### 3.4 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Protect sealants until cured.

3.6 SCHEDULE

- A. Caulk and seal all joints where different materials join. The exterior is to be water and weather tight.
- B. Caulk around all door and window frames.
- C. Caulk all gaps in exterior and interior construction, which are not sealed by prime painting.
- D. Seal all expansion and control joints.

END OF SECTION

SECTION 08114  
STANDARD STEEL DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes non-rated, fire rated, and thermally insulated, steel doors.
- B. Related Sections:
  - 1. Section 08115 - Standard Steel Frames.
  - 2. Section 08710 - Door Hardware.
  - 3. Section 08800 - Glazing: Glass for doors.
  - 4. Section 09900 - Paints and Coatings: Field painting of doors.

1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. ASTM International:
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM C1363 - Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
  - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 4. ASTM E413 - Standard Classification for Rating Sound Insulation.
- C. Hollow Metal Manufacturers Association:
  - 1. HMMA 810 - Hollow Metal Doors.
- D. National Fire Protection Association:
  - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
  - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
  - 3. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- E. Steel Door Institute:
  - 1. SDI 108 - Recommended Selection and Usage Guide for Standard Steel Doors.
- F. Underwriters Laboratories Inc.:
  - 1. UL 10B - Fire Tests of Door Assemblies.
  - 2. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
  - 3. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

4. UL 1784 - Air Leakage Tests of Door Assemblies.

G. Uniform Building Code:

1. UBC Standard 7-2 - Fire Tests of Door Assemblies.

### 1.3 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing, and finishes.

C. Product Data: Submit door configurations, location of cut-outs for hardware reinforcement.

D. Manufacturer's Installation Instructions: Submit special installation instructions.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

### 1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ANSI A250.8.

B. Fire Rated Door Construction: Conform to NFPA 252.

C. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.

D. Smoke and Draft Control Doors: Tested in accordance with UL 1784.

1. Air Leakage: Maximum 3.0 cfm/sf of door opening with 0.10 inch water gage pressure differential.

E. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.

1. Indicate temperature rise rating for stair doors.

2. Attach smoke label to smoke and draft control doors.

F. Surface Burning Characteristics:

1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with NFPA 255.

### 1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Break seal on site to permit ventilation.

## 1.7 COORDINATION

- A. Section 01300 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work with door opening construction, door frame, and door hardware installation.
- C. Coordinate installation to accommodate door hardware electric wire connections.

## PART 2 PRODUCTS

### 2.1 STANDARD STEEL DOORS

- A. Manufacturers:
  - 1. Steelcraft
  - 2. Ceco Door Products
  - 3. Republic Builders Products
  - 4. Curries Manufacturing
  - 5. Hollow Metal Metal Products
  - 6. Substitutions: Section 01600 - Product Requirements
- B. Product Description:
  - 1. Exterior Doors (Insulated): ANSI A250.8, SDI 108, 1-3/4 inch thick.
    - a. Level 3 - Extra heavy Duty, Model 2, seamless design.
  - 2. Interior Doors (Non-Rated): ANSI A250.8, SDI 108, 1-3/4 inch thick.
    - a. Level 2 - Heavy Duty, Model 1, full flush design.
  - 3. Interior Doors (Fire Rated): ANSI A250.8, SDI 108, 1-3/4 inch thick.
    - a. Level 2 - Heavy Duty, Model 1, full flush design.

### 2.2 COMPONENTS

- A. Face: Steel sheet in accordance with ANSI A250 and SDI 108.
- B. End Closure: Channel, 0.04 inches thick, flush.
- C. Core: polystyrene foam (exterior doors) steel channel grid (interior doors).
- D. Thermal Insulated Door: Total insulation R-Value of 7, measured in accordance with ASTM C236.

## 2.3 ACCESSORIES

- A. Removable Stops: Rolled steel, channel shape, butted corners; prepared for countersink style screws.
- B. Louvers:
  - 1. Material and Finish: Roll formed steel; prime painted.
  - 2. Louver Blade: Inverted V, sight proof
  - 3. Louver Free Area: Maximum available
  - 4. Frame: Manufacturer's standard with surface fasteners.
- C. Astragals for Double Doors: refer to Section 08710 Door Hardware.
- D. Primer: ANSI A250.10 rust inhibitive type.

## 2.4 FABRICATION

- A. Fabricate doors with hardware reinforcement welded in place.
- B. Attach astragal to inactive leaf of pairs of fire rated doors.
- C. Attach fire rating label to each fire rated door. Indicate temperature rise rating for stair doors.
- D. Configure exterior doors with edge profile to receive recessed weatherstripping.

## 2.5 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653/A653M A60.
- B. Primer: Baked.
- C. Finish: Site Applied under work of Section 09900.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify opening sizes and tolerances are acceptable.

### 3.2 INSTALLATION

- A. Install doors in accordance with ANSI A250.8.
- B. Install door louvers, plumb and level.

- C. Coordinate installation of glass and glazing specified in Section 08800.
- D. Coordinate installation of doors with installation of frames specified in Section 08115 and hardware specified in Section 08710.
- E. Touch-up damaged shop finishes.

### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

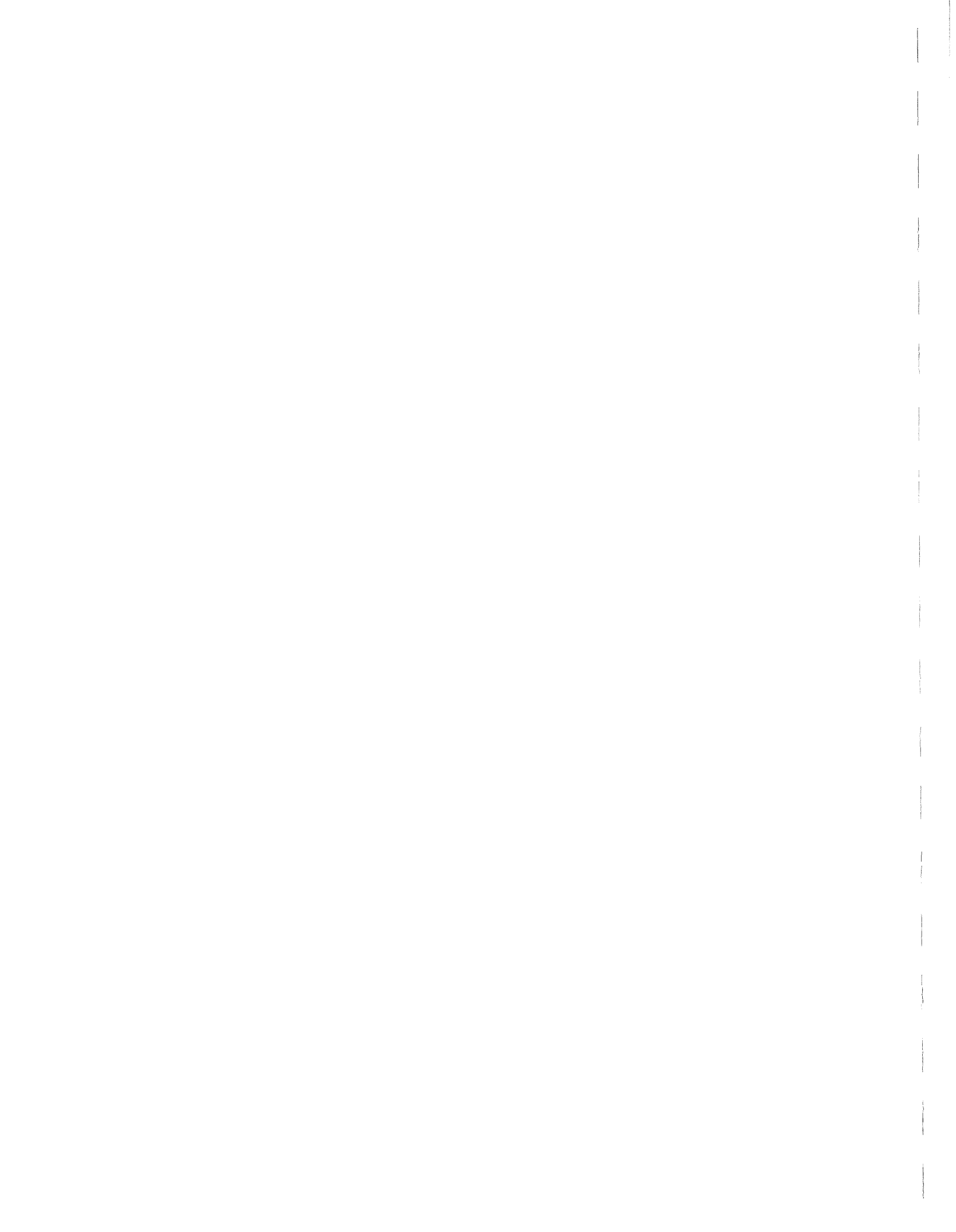
### 3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Requirements for adjusting.
- B. Adjust door for smooth and balanced door movement.

### 3.5 SCHEDULE

- A. Refer to Door and Frame Schedule in the Contract Drawings.

END OF SECTION





SECTION 08115  
STANDARD STEEL FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire rated and non-rated steel frames.
  - 1. Provide frames for interior glazed lights.
- B. Related Sections:
  - 1. Section 03131 – Insulated Concrete Forms Accessories – Integrated Assemblies: Steel frames used for concrete forms and door frames.
  - 2. Section 04810 - Unit Masonry Assemblies: Masonry grout fill of metal frames and placement of anchors into masonry wall construction.
  - 3. Section 08114 - Standard Steel Doors.
  - 4. Section 08710 - Door Hardware: Hardware, silencers, and weatherstripping.
  - 5. Section 08800 - Glazing.

1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. ASTM International:
  - 1. ASTM A591/A591M - Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
  - 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. National Fire Protection Association:
  - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
  - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- D. Underwriters Laboratories Inc.:
  - 1. UL 10B - Fire Tests of Door Assemblies.
  - 2. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
  - 3. UL 1784 - Air Leakage Tests of Door Assemblies.
- E. Uniform Building Code:
  - 1. UBC Standard 7-2 - Fire Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings: Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.
- C. Product Data: Submit frame configuration and finishes.
- D. Manufacturer's Installation Instructions: Submit special installation instructions.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

#### 1.4 QUALITY ASSURANCE

- A. Conform to requirements of ANSI A250.8.
- B. Fire Rated Frame Construction: Conform to NFPA 252.
- C. Installed Fire Rated Frame Assembly: Conform to NFPA 80 for fire rated class same as fire door.
- D. Smoke and Draft Control Door Frames: Tested in accordance with UL 1784.
  - 1. Air Leakage: Maximum 3.0 cfm/sf of door opening with 0.10 inch water gage pressure differential.
- E. Attach label from agency approved by authority having jurisdiction to identify each fire rated door frame.
  - 1. Attach smoke label to smoke and draft control door frames.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Accept frames on site in manufacturer's packaging. Inspect for damage.
- C. Break seal on-site to permit ventilation.

#### 1.7 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with frame opening construction, door, and hardware installation.

- C. Sequence installation to accommodate required door hardware electric wire connections.

## PART 2 PRODUCTS

### 2.1 STANDARD STEEL FRAMES

- A. Manufacturers:
  - 1. Steelcraft
  - 2. Ceko Door Products
  - 3. Republic Builders Products
  - 4. Curries Manufacturing
  - 5. Hollow Metal Metal Products
  - 6. Substitutions: Section 01600 - Product Requirements
- B. Product Description: Standard shop fabricated steel frames, fire rated and non-rated types.
  - 1. Exterior Frames:
    - a. Level 2, nominal 16 gage/0.053 inch thick material, base metal thickness, galvanized finish.
  - 2. Interior Frames:
    - a. Level 2, nominal 16 gage/0.053 inch thick material, base metal thickness, shop prime finish.

### 2.2 ACCESSORIES

- A. Removable Stops: Rolled steel, channel shape, butted corners; prepared for countersink style screws.
- B. Bituminous Coating: Non-asbestos fibered asphalt emulsion.
- C. Primer: ANSI A250.10 rust inhibitive type.
- D. Silencers: Resilient rubber fitted into drilled hole.
- E. Weatherstripping: Specified in Section 08710.

### 2.3 FABRICATION

- A. Fabricate frames as welded unit.
- B. Mullions for Double Doors: Fixed or Removable type, of same profiles as jambs; refer to drawings.
- C. Transom Bars for Glazed Lights: Fixed type, of same profiles as jamb and head.
- D. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes.

- E. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- F. Prepare frames for silencers. Provide three single silencers for single doors and mullions of double doors on strike side. Provide two single silencers on frame head at double doors without mullions.
- G. Configure exterior frames with special profile to receive recessed weatherstripping.
- H. Attach fire rated label to each fire rated frame.
- I. Fabricate frames to suit masonry wall coursing with 4 inch head member unless otherwise detailed.

## 2.4 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A653/A653M A60.
- B. Primer: Baked.
- C. Coat inside of frame profile with bituminous coating to minimum thickness of 1/16 inch.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify opening sizes and tolerances are acceptable.

### 3.2 INSTALLATION

- A. Install frames in accordance with ANSI A250.8.
- B. Coordinate with masonry, gypsum board, and concrete wall construction for anchor placement.
- C. Coordinate installation of glass and glazing specified in Section 08800.
- D. Coordinate installation of frames with installation of hardware specified in Section 08710 and doors in Section 08212.
- E. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

3.4 SCHEDULE

- A. Refer to Door and Frame Schedule in Contract Drawings.

END OF SECTION



SECTION 08212  
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes factory finished flush wood doors and flush glazed configuration; fire rated and non-rated.
- B. Related Sections:
  - 1. Section 08115 - Standard Steel Frames.
  - 2. Section 08710 - Door Hardware.
  - 3. Section 08800 - Glazing.

1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A135.4 - Basic Hardboard.
- B. ASTM International:
  - 1. ASTM E413 - Standard Classification for Rating Sound Insulation.
- C. Architectural Woodwork Institute:
  - 1. AWI - Quality Standards Illustrated.
- D. Hardwood Plywood and Veneer Association:
  - 1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.
- E. Intertek Testing Services (Warnock Hersey Listed):
  - 1. WH - Certification Listings.
- F. National Electrical Manufacturers Association:
  - 1. NEMA LD 3 - High Pressure Decorative Laminates.
- G. National Fire Protection Association:
  - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
  - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- H. Underwriters Laboratories Inc.:
  - 1. UL - Building Materials Directory.
  - 2. UL 10B - Fire Tests of Door Assemblies.
  - 3. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
  - 4. UL 1784 - Air Leakage Tests of Door Assemblies.
- I. Uniform Building Code:
  - 1. UBC Standard 7-2 - Fire Tests of Door Assemblies.

### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.
- C. Product Data: Submit information on door core materials and construction, and on veneer species, type and characteristics.
- D. Samples:
  - 1. Submit two samples of door veneer, 8 x 8 inch in size illustrating wood grain, color, and sheen.
- E. Manufacturer's Installation Instructions: Submit special installation instructions.

### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with AWI Quality Standard Section 1300, Custom Grade.
- B. Finish doors in accordance with AWI Quality Standard Section 1500.
- C. Fire Rated Door Construction: Conform to NFPA 252.
- D. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.
- E. Smoke and Draft Control Doors: Tested in accordance with UL 1784.
  - 1. Air Leakage: Maximum 3.0 cfm/sf of door opening with 0.10-inch water gage pressure differential.
- F. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
  - 1. Indicate temperature rise rating for stair doors.
  - 2. Attach smoke label to smoke and draft control doors.

### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.



- B. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer when stored more than one week.
  - 1. Break seal on site to permit ventilation.

#### 1.7 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with door opening construction, door frame and door hardware installation.

#### 1.8 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.
- C. Furnish manufacturer's "Life of Installation" warranty for interior doors.

### PART 2 PRODUCTS

#### 2.1 FLUSH WOOD DOORS

- A. Manufacturers:
  - 1. Algoma Hardwoods Inc.
  - 2. Eggers Industries
  - 3. Marshfield Door systems
  - 4. Substitutions: Section 01600 - Product Requirements
- B. Product Description: Solid core flush wood doors; wood veneer facing material; non-rated and fire-rated types; flush and glazed design; without louvers; shop finished wood doors.
  - 1. Flush Interior Doors: 1-3/4 inches thick; solid core, five ply construction, as indicated on Drawings.

#### 2.2 COMPONENTS

- A. Solid Core, Non-Rated: AWI Section 1300, Type PC - Particleboard.
- B. Solid Core, Fire-Rated; AWI Section 1300, Type FD 1; Category A, intumescent protection integral with door construction.
- C. Interior Veneer Facing: AWI Custom quality wood, RIFT cut with matched grain, for transparent finish. Pair match multiple door leaves in single opening.
  - 1. Wood: Rift Cut Oak

- D. Facing Adhesive: Type II - water resistant.

### 2.3 ACCESSORIES

- A. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink style screws.

### 2.4 FABRICATION

- A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.
- B. Astragals for Double Doors: as specified in Section 08710 Door Hardware.
- C. Furnish lock blocks at lock edge and top of door for closer for hardware reinforcement.
- D. Vertical Exposed Edge of Stiles: Of same species as veneer facing for transparent finish.
- E. Fit door edge trim to edge of stiles after applying veneer facing.
- F. Bond edge banding to cores.
- G. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Furnish solid blocking for through bolted hardware.
- H. Factory fit doors for frame opening dimensions identified on shop drawings.
- I. Provide edge clearances in accordance with AWI 1300.

### 2.5 SHOP FINISHING

- A. Factory finish doors in accordance with AWI Quality Standard Section 1500 to the following finish designations; color as selected:
  - 1. Transparent Finish TR-4: Conversion varnish, Custom quality, satin sheen.
- B. Seal door top edge with clear sealer to match door facing.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify opening sizes and tolerances are acceptable.

- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### 3.2 INSTALLATION

- A. Install non-rated doors in accordance with AWI Quality Standards requirements.
- B. Install fire-rated doors in accordance with AWI Quality Standards, NFPA 80, and to requirements for fire rating label by UL.
- C. Trim non-rated door width by cutting equally on both jamb edges.
- D. Trim door height by cutting bottom edges to maximum of 3/4 inch.
- E. Machine cut doors for hardware installation.
- F. Coordinate installation of doors with installation of frames specified in Section 08115 and hardware specified in Section 08710.
- G. Install door louvers plumb and level.
- H. Coordinate installation of glass and glazing specified in Section 08800.

### 3.3 INSTALLATION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Conform to AWI requirements for fit and clearance tolerances.
- C. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over imaginary 36 x 84 inches surface area.
- D. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over imaginary 36 x 84 inches surface area.
- E. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over imaginary 36 x 84 inches surface area.
- F. Glazing stops shall fit in openings tight, flush to face of door and free of warpage, misalignment, voids or any other defect.

### 3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust door for smooth and balanced door movement.
- C. Adjust closer for full closure.

3.5 SCHEDULE

- A. Refer to Door and Frame Schedule in Contract Drawings.

END OF SECTION

SECTION 08310  
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes non-rated access doors and panels with frames.
  - 1. Provide for access to controls, valves, traps, dampers, cleanouts, and similar items requiring operation behind inaccessible finished surfaces.
  - 2. Coordinate exact locations with various trades to assure proper placement of access doors and panels.
- B. Related Sections:
  - 1. Section 09900 - Paints and Coatings: Field paint finish.
  - 2. Section 15820 - Duct Accessories: Access doors in ductwork.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Intertek Testing Services (Warnock Hersey Listed):
  - 1. WH - Certification Listings.
- C. National Fire Protection Association:
  - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
- D. Underwriters Laboratories Inc.:
  - 1. UL - Building Materials Directory.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate exact position of access door units.
- C. Product Data: Submit literature indicating sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining Work.
- D. Manufacturer's Installation Instructions: Submit installation requirements and rough-in dimensions.

1.4 COORDINATION

- A. Coordinate Work under provisions of Section 01311 - Project Coordination.

- B. Coordinate Work with work requiring controls, valves, traps, dampers, cleanouts, and similar items requiring operation being located behind finished surfaces.

## PART 2 PRODUCTS

### 2.1 ACCESS DOORS AND PANELS

- A. Manufacturers:
  - 1. Karp Associates, Inc. Model DSC-214M
  - 2. J. L. Industries
  - 3. Nystrom Products Co.
  - 4. Milcor LTD, Partnership.
  - 5. Substitutions: Section 01600 - Product Requirements.
- B. Flush Framed Access Doors (Type 1): Frames and nominal .75 inch wide exposed flanges of 16 gage steel and door panels of 16 gage steel.

### 2.2 FABRICATION

- A. Fabricate units of continuous welded construction; weld, fill, and grind joints to assure flush and square unit.
- B. Wall Access Door and Panel Hardware:
  - 1. Hinge: Standard continuous or concealed spring pin type, 175 degree steel hinges.
  - 2. Lock: Self-latching lock. Screw driver slot for quarter turn cam lock.
- C. Size Variations: Obtain acceptance of manufacturer's standard size units which vary slightly from sizes shown or scheduled.

### 2.3 SHOP FINISHING

- A. Base Metal Protection: Prime coat units with manufacturer's standard primer
- B. Finish: Manufacturer's standard.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify rough openings for access doors and panels are correctly sized and located.

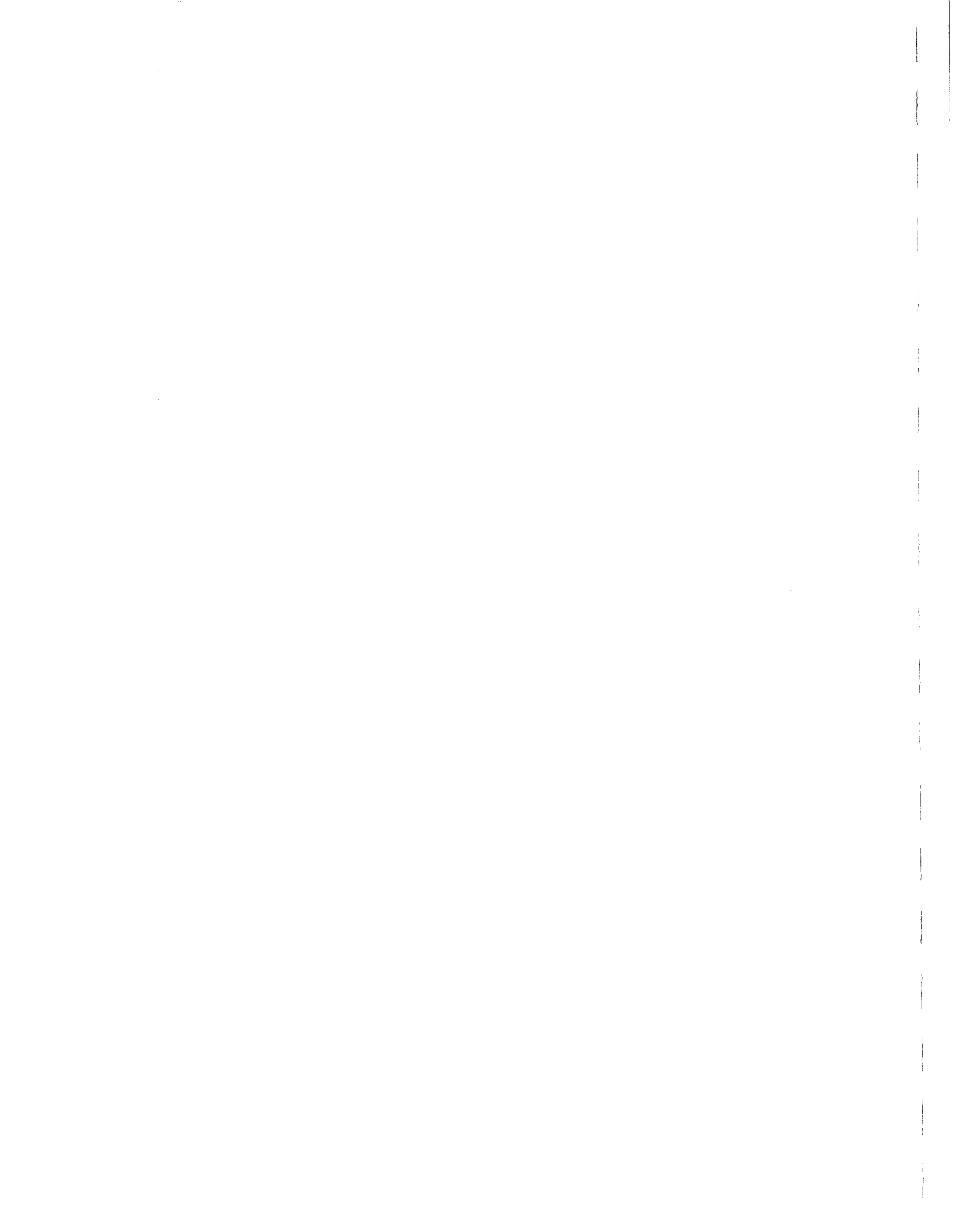
### 3.2 INSTALLATION

- A. Secure frames rigidly in place, plumb and level in opening, with plane of door and panel face aligned with adjacent finished surfaces.
  - 1. Set concealed frame type units flush with adjacent finished surfaces.
- B. Position unit to provide convenient access to concealed work requiring access.
- C. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

### 3.3 SCHEDULES

- A. The following is a list of principal items only. Refer to Drawing details for item not specifically schedule.
  - 1. Underside of Drive-Thru: Universal Access Door for use in metal wall panel soffit system, 24 inches x 24 inches with screwdriver slot lock. Coordinate location of access doors with Banking Equipment installer.
  - 2. Quantify and location of access doors required to provide access to controls, valves, traps, dampers, cleanouts, electrical junction boxes and similar items requiring operation and/or access behind inaccessible finished surfaces.

END OF SECTION





SECTION 08333  
OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes overhead coiling door and shutter, operating hardware, manual and electric operation.
  - 1. Provide wiring from electric circuit disconnect to door operator to control station.
- B. Related Sections:
  - 1. Section 13121 – Pre-Engineered Buildings: Structural framing support of overhead door.
  - 2. Section 16130 - Raceway and Boxes: Conduit from electric circuit to door operator and from door operator to control station.
  - 3. Section 16150 - Wiring Connections: Power to disconnect.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - 3. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Intertek Testing Services (Warnock Hersey Listed):
  - 1. WH - Certification Listings.
- C. National Electrical Manufacturers Association:
  - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
  - 2. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
  - 3. NEMA MG 1 - Motors and Generators.
- D. National Fire Protection Association:
  - 1. NFPA 80 - Standard for Fire Doors, Fire Windows.
  - 2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

3. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

E. Underwriters Laboratories Inc.:

1. UL - Building Materials Directory.
2. UL 10B - Fire Tests of Door Assemblies.
3. UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.
4. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

### 1.3 SYSTEM DESCRIPTION

- A. Electric Operation: Electric motor operated unit with manual override in case of power failure.

### 1.4 DESIGN REQUIREMENTS

- A. Operation: Design door assembly ,including operator, to operate for not less than 20,000 cycles and 10 cycles per day.

### 1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- C. Product Data: Submit general construction, component connections and details, wiring diagram and electrical equipment.
- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, and adjustment and alignment procedures.

### 1.6 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

### 1.7 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by UL or another testing firm acceptable to authority having jurisdiction.
- B. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.

## 1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.

## PART 2 PRODUCTS

### 2.1 OVERHEAD COILING DOORS

- A. Manufacturers:
  - 1. Overhead Door Model 625 Stormtite Insulated Service Door
  - 2. Cookson Co. – equal product
  - 3. Cornell Iron Works, Inc. – equal product
  - 4. Metro Door – equal product
  - 5. Raynor Garage Door– equal product
  - 6. Substitutions: Section 01600 - Product Requirements.
- B. Product Description:
  - 1. Electric Operation: Electric motor operated unit with manual chain hoist override in case of power failure.

### 2.2 COMPONENTS

- A. Curtain: Conforming to the following:
  - 1. Slats: Interlocking, 24 gage painted all sides of foamed-in-place polyurethane insulation.
    - a. Type: roll formed curved profile
  - 2. Nominal Slat Size: 2.5 inches wide x required length.
  - 3. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
  - 4. Curtain Bottom: Fitted with angles, channels, or hollow extrusion to provide reinforcement and positive contact with floor in closed position.
- B. Guides: Steel shapes attached to continuous wall angle.
- C. Roller Shaft Counterbalance: Helical torsion spring type designed for standard 20,000 cycle life design. Counterbalance shall be housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to .03 inch per foot of span. Counterbalance shall be adjustable by means of adjusting tension wheel.
- D. Hood Enclosure: Round shape, prefinished 24 gage steel with intermediate supports as required
- E. Hardware:

1. Electric Doors: Manufacturer's standard cylinder locking system to secure door; interlock with motor to prevent motor from operating when lock is activated.
- F. Electric Operator:
  1. Description: UL 325, top of hood mounted, open drip-proof motor.
  2. Motor Enclosure: NEMA MG1 enclosure.
  3. Motor Rating: 1/2 hp; continuous duty.
  4. Motor Voltage: 115 single phase, 60 Hz.
  5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  6. Controller Enclosure: NEMA 250
  7. Door Speed: 12 inches per second
  8. Brake: Adjustable friction clutch type, activated by motor controller.
  9. Manual Override: Chain hoist designed for concealed above ceiling attachment.
- G. Control Station: Key Switch with (Open-Stop-Close) momentary control for each operator; 24-volt circuit; surface mounted.
- H. Safety Photo Eye: Designed to stop operation of door upon sensing of object and eliminate all hanging cords.
- I. Wall Mount Condition: Face of wall.

## 2.3 SHOP FINISHING

- A. Curtain Slats: Mfr's standard paint finish, color selected from standard options.
- B. Steel Guides: Galvanized and prime coated steel.
- C. Hood Enclosure: Prime paint.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify opening sizes, tolerances and conditions are acceptable.

### 3.2 INSTALLATION

- A. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- B. Securely and rigidly brace components suspended from structure.

- C. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- D. Coordinate installation of electrical service with Division 16. Complete wiring from disconnect to unit components.
- E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.
- F. Install perimeter trim and closures.

### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Maximum Variation From Plumb: 1/16 inch.
- D. Maximum Variation From Level: 1/16 inch.
- E. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

### 3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust door hardware and operating assemblies for smooth and noiseless operation.

### 3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Clean door and components.
- C. Remove labels and visible markings.

### 3.6 SCHEDULE

- A. Refer to Door Schedule in Contract Drawings

END OF SECTION



SECTION 08410  
METAL-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes aluminum-framed storefronts including aluminum and glass doors.
- B. Related Sections:
  - 1. Section 04810 – Unit Masonry System: Preparation of masonry opening to receive storefront framing.
  - 2. Section 07900 - Joint Sealers: System perimeter sealant and back-up materials.
  - 3. Section 08520 - Aluminum Windows: Operable sash within glazing system.
  - 4. Section 08710 - Door Hardware: Mortised hardware reinforcement requirements affecting framing members; hardware items other than specified in this section.
  - 5. Section 08800 - Glazing.

1.2 REFERENCES

- A. Aluminum Association:
  - 1. AA DAF-45 - Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association:
  - 1. AAMA 501 - Methods of Test for Exterior Walls.
  - 2. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
  - 3. AAMA 503 - Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.
  - 4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
  - 6. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 7. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 8. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
  - 9. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.

10. AAMA MCWM-1 - Metal Curtain Wall Manual.
  11. AAMA SFM-1 - Aluminum Store Front and Entrance Manual.
- C. American Society of Civil Engineers:
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
  2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  4. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  7. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  8. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
  9. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
  10. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
  11. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- E. National Fenestration Rating Council Incorporated:
1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.
- F. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- G. SSPC: The Society for Protective Coatings:
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
  2. SSPC Paint 25 - Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.
- H. Underwriters Laboratories Inc.:



1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

### 1.3 SYSTEM DESCRIPTION

- A. Aluminum-framed storefront system includes tubular aluminum sections with supplementary internal support framing if necessary, aluminum and glass entrances, shop fabricated, factory finished, related flashings, anchorage and attachment devices.
- B. System Assembly: Shop unitized assembly.

### 1.4 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
  1. As calculated in accordance with Kentucky Building Code, as measured in accordance with ASTM E330.
- B. Deflection: Limit mullion deflection to flexure limit of glass; with full recovery of glazing materials.
- C. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- D. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E283.
- E. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and inner sheet of infill panel and heel bead of glazing compound.
- F. Water Leakage: None, when measured in accordance with ASTM E331 and E547 with test pressure difference of 20 percent of design pressure, with minimum differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.
- G. Expansion / Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period without causing detrimental effect to system components and anchorage.
- H. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.

### 1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details. Show details demonstrating use and requirement of subsills for all storefronts exposed to exterior weather conditions.
- C. Product Data: Submit component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details.
- D. Samples: Submit two samples 12 inches in length illustrating finished aluminum surface.
- E. Design Data: Indicate framing member structural and physical characteristics, calculations, and dimensional limitations.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA SFM-1 and AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

#### 1.7 QUALIFICATIONS

- A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience, and with service facilities within 100 miles of Project.
- B. Design structural support framing components under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Kentucky

#### 1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Handle Products of this section in accordance with AAMA MCWM-1 - Curtain Wall Manual #10.
- C. Protect finished aluminum surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

#### 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.

- B. Do not install sealants nor glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

#### 1.10 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Correct defective work within a two-year period after Substantial Completion.

### PART 2 PRODUCTS

#### 2.1 ALUMINUM-FRAMED STOREFRONTS

- A. Manufacturers:
  - 1. EFCO Corp.
    - a. Model S-403: exterior applications (double glazed)
    - b. Model S401: interior applications (single glazed)
  - 2. Vistawall Architectural Products
    - a. Model Vistawall Series 3000 Thermal Multiplane.
    - b. Model Vista Series 2000
  - 3. Kawneer Co., Inc. – equal products
  - 4. Substitutions: Section 01600 - Not permitted.
- B. Product Description:
  - 1. Aluminum Frame: Thermally broken and Non-thermally broken; flush applied glazing stops; drainage holes; internal weep drainage system. Frames for interior glazing need not to be thermally broken.
  - 2. Mullions: Profile of extruded aluminum with internal reinforcement of aluminum or shaped steel structural section if required to meet performance criteria.
  - 3. Doors: Aluminum framed glass doors; 2 inches thick, nominal 5 inch wide top rail and vertical stiles, nominal 8 inch wide bottom rail; nominal 8 inch crossrail, square glazing stops with structural thermal barrier.

#### 2.2 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Steel Sections: ASTM A36/A36M; shaped to suit mullion sections, galvanized to G90.
- C. Glass: Specified in Section 08800.
- D. Glazing Materials: As specified on Drawings and in Section 08800.
- E. Hardware: As specified in Section 08710.

- F. Flashings and Subsills: Minimum 0.080 inch thick aluminum to match mullion sections where exposed.
- G. Sealant and Backing Materials:
  - 1. Sealant Used Within System (Not Used for Glazing): Manufacturer's standard materials to achieve weather, moisture, and air infiltration requirements.
  - 2. Perimeter Sealant: Specified in Section 07900.
- H. Fasteners: Stainless steel.

### 2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Prepare components with internal reinforcement for door hardware.
- F. Reinforce framing members for imposed loads.

### 2.4 SHOP FINISHING

- A. Champagne Bronze Anodized Aluminum Surfaces (applicable to all frames): AAMA 611, AA-M12C22A41 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class I 0.7 mils clear anodized coating.
- B. Painted Aluminum Surfaces (applicable to doors): AA-M12C12R1x non-specular as fabricated mechanical finish, chemically cleaned, and prepared for applied coating; with organic coating.
  - 1. High Performance Organic Coating: Complying with AAMA 605 and equal to Kynar 70% - 500 Base. Doors and Frames: 2 coat custom color with an additional clear protective top coat.
  - 2. Color: Custom, as selected by the Architect.
- C. Concealed Steel Items: Galvanized in accordance with ASTM A123/A123M to thickness Grade 85, 2.0 oz/sq ft.
- D. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- E. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.

- F. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
- G. Extent of Finish:
  - 1. Apply factory coating to surfaces exposed at completed assemblies.
  - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
  - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.

#### 3.2 INSTALLATION

- A. Install wall system in accordance with AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. **Install sill flashings / subsills on all assemblies exposed to exterior weather. Turn up ends and edges; seal to adjacent Work to form water tight dam.**
- G. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- H. Install integral flashings and integral joint sealers.
- I. Set thresholds in bed of mastic and secure.

- J. Install hardware using templates provided. Refer to Section 08710 for installation requirements.
- K. Coordinate installation of glass with Section 08800; separate glass from metal surfaces.
- L. Coordinate installation of perimeter sealants with Section 07900.

### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### 3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust operating hardware for smooth operation.

### 3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Protect finished Work from damage.

### 3.7 SCHEDULES

- A. Refer to Door Schedule in the Contract Drawings.

END OF SECTION

SECTION 08450  
ALL-GLASS ENTRANCES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Structural glass doors and sidelights.
  - 2. Door hardware.
  
- B. Related Sections:
  - 1. Section 03300 - Cast-In-Place Concrete: Block outs for recessed floor closers.
  - 2. Section 07900 - Joint Sealers: System perimeter sealant and back-up materials.
  - 3. Section 08710 - Door Hardware: Lock cylinders.
  - 4. Section 08800 - Glazing.
  - 5. Section 09620 - Gypsum Board Assemblies: Adjacent construction for recessed frames and closers.

1.2 REFERENCES

- A. Aluminum Association:
  - 1. AA DAF-45 - Designation System for Aluminum Finishes.
  
- B. American Architectural Manufacturers Association:
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
  
- C. American National Standards Institute:
  - 1. ANSI A156.18 - Materials and Finishes.
  - 2. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.
  
- D. American Society of Civil Engineers:
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
  
- E. ASTM International:
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

3. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
4. ASTM B36/B36M - Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar.
5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
6. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
7. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.

F. Federal Specification Unit:

1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

1.3 SYSTEM DESCRIPTION

- A. All-glass entrance system includes glass doors and sidelights, rails, frames, patches and hardware and anchors and attachments.

1.4 DESIGN REQUIREMENTS

- A. Wind Loads: Design and size components to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall, including building corners.
1. Design Wind Load: As calculated in accordance with Kentucky Building Code and ASCE 7 with [ ] mph basic wind speed, exposure [ ], as measured in accordance with ASTM E330.
- B. Deflection: Limit deflection to 1/175; with full recovery of glazing materials.

1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate entrance elevations framed opening requirements, tolerances; anchorage and fasteners; glass; door hardware requirements and installation details.
- C. Product Data: Submit data for system components including glass; door hardware, rails, frames, and finishes.
- D. Samples:
1. Submit two corner of doors, 12 x 12 inches in size illustrating patch fitting, glass, and finishes.
  2. Submit two glazing channel sections, 12 inches long illustrating finishes.
- E. Design Data: Submit design calculations for components resisting wind loads.



1.6 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Submit for maintaining metal finishes. Include care and cleaning instructions, list of recommended cleaning and polishing materials.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.
- C. Design exterior glass entrances under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Kentucky

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept all-glass entrances on site in manufacturer's protective packaging. Inspect for damage.
- C. Protect finished metal surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install sealants nor glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.11 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.12 COORDINATION

- A. Section 01300 - Administrative Requirements: Requirements for coordination.

- B. Coordinate work with adjacent floor, wall, and ceiling construction to accommodate frame anchorage, recessed glazing channels, and concealed overhead closers.
- C. Coordinate work with concrete floors for block outs to accommodate concealed floor closers.

### 1.13 WARRANTY

- A. Section 01700 - Execution Requirements: Requirements for warranties.
- B. Furnish five year manufacturer's warranty for door closers.

## PART 2 PRODUCTS

### 2.1 ALL-GLASS ENTRANCES

- A. Manufacturers:
  - 1. ACI Glass Products
  - 2. Blumcraft of Pittsburgh
  - 3. Virginia Glass Products Corp.
  - 4. Substitutions: Section 01600 - Product Requirements.
- B. Product Description:
  - 1. Door and Light Styles: Patch fittings top and bottom.
  - 2. Door Operation: Swing.
  - 3. Rails, Frames, and Patches: Extruded aluminum stainless steel clad.
  - 4. Rail Shape: Tapered.
  - 5. Rail Height: 4 inches.
  - 6. Rail Thickness: 1-3/4 inches.
  - 7. Stops and Locks: Patch fitting type.

### 2.2 COMPONENTS

- A. Steel Sections: ASTM A36/A36M; shapes to suit frame sections.
- B. Aluminum Extrusions: Aluminum Extrusions: ASTM B221, alloy 6063, temper T5.
- C. Stainless Steel Cladding: ASTM A167; Type 302
- D. Fasteners: Stainless steel.
- E. Glass: ASTM C1048, Kind FT fully tempered with horizontal tempering, Condition A uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; conforming to ANSI Z97.1; 1/2 inch thick with exposed edges polished.
- F. Glazing Channels: 1 x 1-1/2 inch top channel; 1 x 2 inch bottom channel.
- G. Door Hardware: As specified in section 08710.

## 2.3 ACCESSORIES

- A. Backing Paint: Protective Backing Paint: Zinc molybdate alkyd. FS TT-C-494, Bituminous.
- B. Perimeter Sealants: As specified in Section 07900.
- C. Glazing Materials: As specified in Section 08800.

## 2.4 FABRICATION

- A. Fabricate doors with top and bottom patch fittings.
- B. Fabricate sidelights with continuous top and bottom glazing channels.
- C. Fabricate doors and sidelights allowing for minimum clearances and shim spacing around perimeter of assembly.
- D. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof.
- E. Break form cladding to match patch fitting profiles. Fabricate cladding to align flush with adjacent cladding with hairline joints.
- F. Prepare components to receive anchor devices and hardware. Fabricate anchorage items.
- G. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- H. Prepare components with drillings for door hardware.

## 2.5 SHOP FINISHING

- A. Stainless Steel Finishes:
  - 1. Satin Polished Finish: Number 4, satin directional polish parallel with long dimension of finished face.
- B. Concealed Steel Items: Galvanized to ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication. Primed with iron oxide paint.
- C. Aluminum Finishes:
  - 1. Finish coatings to conform to [AAMA 611] [AAMA 2603] [AAMA 2604] [AAMA 2605].
  - 2. Finish Designations: Conform to AA DAF-45.
  - 3. Anodized Finish: AAMA [A41] [A42] [A43] [A44] anodized, prepared with [mechanical M[\_\_\_\_\_]] [chemical C[\_\_\_\_\_]] pre-treatment, anodized to [clear] [\_\_\_\_\_] color.  

\*\*\*\*\* [OR] \*\*\*\*\*
  - 4. Anodized Finish: [[Exterior] [Hardcoat] [Two step] anodized to [clear] [\_\_\_\_\_] color, to [0.7] [\_\_\_\_\_] mils thickness].

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify wall openings are ready to receive work of this section.
- C. Verify block outs for floor closers are sized and located properly.

### 3.2 PREPARATION

- A. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

### 3.3 INSTALLATION

- A. Use anchorage devices to securely attach glazing channels assembly to structure.
- B. Align assembly plumb and to indicated position, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- C. Install hardware and hang doors.
- D. Glaze sidelight glass joints in accordance with Section 08800.
- E. Install perimeter sealant, backing materials in accordance with Section 07900.

### 3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 0.06 inches in 3 ft non-cumulative or 1/16 inches in 10 ft, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### 3.5 ADJUSTING

- A. Section 01700 - Execution Requirements: Requirements for starting and adjusting.
- B. Adjust operating hardware for smooth, balanced operation.

### 3.6 CLEANING

- A. Section 01700 - Execution Requirements: Requirements for cleaning.
- B. Remove protective material from prefinished surfaces.

- C. Wash down exposed surfaces using solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

### 3.7 PROTECTION OF FINISHED WORK

- A. Section 01700 - Execution Requirements: Requirements for protecting finished Work.
- B. Protect finish work and glazing from damage.

### 3.8 SCHEDULES

END OF SECTION



SECTION 08520  
ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes extruded aluminum windows with fixed and operating sash, factory glazed and operating hardware.
- B. Related Sections:
  - 1. Section 05500 - Metal Fabrications: Steel lintels.
  - 2. Section 06001 – Carpentry: Wood blocking and perimeter shims.
  - 3. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.
  - 4. Section 08410 - Metal-Framed Storefronts: Operable sash within storefront system.
  - 5. Section 08800 - Glazing.

1.2 REFERENCES

- A. Aluminum Association:
  - 1. AA DAF-45 - Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association:
  - 1. AAMA 101 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
  - 2. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 3. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
  - 4. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 5. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 6. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
  - 7. AAMA MCWM-1 - Metal Curtain Wall manual.
- C. American National Standards Institute:
  - 1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.
- D. American Society of Civil Engineers:
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- E. ASTM International:

1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  4. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
  5. ASTM D3656 - Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
  6. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  7. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
  8. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
  9. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
  10. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
  11. ASTM F588 - Standard Test Methods for Resistance of Window Assemblies to Forced Entry Excluding Glazing.
- F. Glass Association of North America:
1. GANA - Glazing Manual.
- G. National Fenestration Rating Council Incorporated:
1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.
- H. SSPC: The Society for Protective Coatings:
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
  2. SSPC Paint 25 - Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.

### 1.3 SYSTEM DESCRIPTION

- A. Windows: Tubular aluminum sections, factory fabricated, factory finished, factory glazed vision glass, related flashings, anchorage and attachment devices.
- B. Configuration: Conform with AAMA 101 Designations for windows required for Project; P-projected sash. Sash shall be project out type. Sash shall close "flush" with surrounding frame of window.



- C. Glazing: Interior.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Primary Performance Requirements: Aluminum windows to meet performance criteria for AAMA 101 Designation HC40 Heavy Commercial or better.
- B. Deflection: Limit member deflection to the more restrictive of the following:
  - 1. flexure limit of glass or
  - 2. 1/175 of longer dimensionwith full recovery of glazing materials.
- C. Assembly: To accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.
- D. Thermal Transmittance of Assembly: Maximum U Value of 0.45 Btu/sq ft per hour per deg F when measured in accordance with AAMA 1503.
- E. Air Infiltration: Limit air infiltration through assembly to 0.1 cfm/min/sq ft of wall area, measured at reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E283.
- F. Water Leakage: None, when measured in accordance with ASTM E331 at 12 psf static air pressure difference.
- G. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, and migrating moisture occurring within system, to exterior by weep drainage network.
- H. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

#### 1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related Work; and installation requirements.
- C. Product Data: Submit component dimensions, anchorage and fasteners, glass, internal drainage, and typical details.
- D. Samples: Submit two 12 x 12 inches in size illustrating window frame section mullion section, and factory finished aluminum surfaces. Submit two samples of operating hardware.
- E. Manufacturer's Certificates: Certify Product performance ratings by independent third party such as AAMA, CAWM, or NFRC as meeting or exceeding specified requirements.

## 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
  - 1. Aluminum Windows: Fabricate window assemblies in accordance with AAMA 101 for types of windows required.
  - 2. Insulated Glass: Fabricate insulated glass units in accordance with GANA (formerly FGMA) Glazing Manual.
  - 3. Safety Glass: Conform to ANSI Z97.1 and applicable codes.

## 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing commercial aluminum windows with minimum three years documented experience, and with service facilities within 100 miles of Project.
- B. Installer: Company specializing in installation of commercial aluminum windows with minimum five years documented experience.

## 1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Handle Work of this section in accordance with AAMA MCWM-1 - Curtain Wall Manual #10.
- C. Protect factory finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install glazing materials when ambient temperature is less than 40 degrees F.
- C. Maintain this minimum temperature during and after installation of glazing materials.

## 1.10 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Correct defective work within a five-year period after Date of Substantial Completion.
- C. Furnish ten-year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.
- D. Warranty: Include coverage for degradation of color finish.

## PART 2 PRODUCTS

### 2.1 ALUMINUM WINDOWS

- A. Manufacturers:
  - 1. EFCO Corp. Model 510 Thermal (VERIFY GC USING STALA FRAMES. IF STALA FRAME NOT USED, THEN WINDOW SYSTEM MUST BE MODEL 810-I)
  - 2. Modu-line. Equal product
  - 3. Wausau – Equal product
  - 4. Substitutions: Section 01600 - Product Requirements
- B. Product Description: Aluminum windows thermally broken with interior portion of frame insulated from exterior portion with 3/8-inch separation and flush-applied glass stops of snap-on type.

### 2.2 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper of not less than .125 wall thickness.
- B. Sheet Aluminum: ASTM B209; 5005 alloy, H15 or H34 temper.
- C. Steel Sections: Profiled to suit mullion sections.
- D. Insulating Glass: Sealed double pane units conforming with requirements in Section 08800 - Glazing.
  - 1. Outer Pane: Clear float glass – Low E.
  - 2. Inner Pane: Clear float glass – Low E.
  - 3. Pane Thickness: Minimum 1/4 inch thick.
  - 4. Minimum Total Unit Thickness: 1 inch.
  - 5. Glazing Materials: Manufacturer's standard conforming with requirements specified in Section 08800 - Glazing.
- E. Hardware:
  - 1. Sash lock: Access Control CAM type, white bronze alloy with US25D Brushed finish.
  - 2. Operating Hardware: 4-Bar stainless steel arms with limit stop. Anderberg or equal.
- F. Sills: Extruded aluminum; sloped for positive wash, fit under sash leg; one piece, full width of opening.
- G. Subframes, Receptors, Extenders, Trim and Panning: Manufacturer's standard extruded material with matching finish.
- H. Operable Sash Weather Stripping: 3/8 inch high density neoprene; permanently resilient, profiled to effect weather seal.

### 2.3 ACCESSORIES

- A. Fasteners and Anchors: Stainless steel.
- B. Bituminous Paint: Fibered asphaltic type.
- C. Swing Inhibitors: set for maximum outswing of 12".

### 2.4 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to ensure concealment from view.
- E. Prepare components with internal reinforcement for operating hardware.
- F. Furnish internal reinforcement in mullions with galvanized steel members to maintain rigidity.
- G. Permit internal drainage weep holes and channels to migrate moisture to exterior. Furnish internal drainage of glazing spaces to exterior through weep holes.
- H. Weatherstrip operable units.
- I. Factory glaze window units. Install glass in accordance with Section 08800, to glazing method required to achieve performance criteria.

### 2.5 SHOP FINISHING

- A. Finish Coatings: Conform to AAMA 2605 and AAMA 611.
- B. Interior and Exterior Surfaces of Fixed Frame Sections: Champagne Anodized Aluminum Surfaces: AA-M12C22A41 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class I 0.7 mils (0.018 mm) clear anodized coating.
- C. Interior and Exterior Surfaces of Operable Sashes: Painted Aluminum Surfaces-AA-M12C12R1x non-specular as fabricated mechanical finish, chemically cleaned, and prepared for applied coating; with organic coating.
  - 1. High Performance Organic Coating: Complying with AAMA 605 and equal to Kynar 70% - 500 Base. Two (2) coat custom color with an additional clear protective top coat.

- 2. Color: Custom, as selected by the Architect (different from frame color)
- D. Locks, Operators, and Exposed Hardware: Enameled to match window finish.
- E. Apply coat of bituminous paint on concealed aluminum surfaces in contact with cementitious or dissimilar materials.
- F. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
- G. Concealed Steel Items: Galvanized in accordance with ASTM A123/A123M to thickness Grade 85, 2.0 oz/sq ft.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this section.

#### 3.2 INSTALLATION

- A. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- B. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Install sill and sill end angles.
- D. Install thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- E. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.
- F. Install operating hardware.

#### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Remove protective material from factory finished aluminum surfaces.
- C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

3.6 SCHEDULES

- A. Refer to Contract Drawings.

END OF SECTION

SECTION 08710  
DOOR HARDWARE

PART 1 - GENERAL

- 1.1 Refer to "General and Special Conditions", and "Instructions to Bidders", Division 1 of Specifications. Requirements of these Sections and the project drawings shall govern work in this section.
- 1.2 Work Included:
- A. Furnish all items of Finish Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.
  - B. Related work:
    - 1. Division 1 – General Requirements
    - 2. Division 6 – Rough Carpentry
    - 3. Division 6– Finish Carpentry: Installation of Finish Hardware
    - 4. Division 8 – Steel Doors and Frames
    - 5. Division 8 – Wood Doors
    - 6. Division 8 – Special Doors
    - 7. Division 8 – All Glass Entrances and Storefronts
    - 8. Division 8 – Aluminum Framed Entrances and Storefronts
    - 9. Division 16 – Smoke Detection Systems
    - 10. Division 16 – Security Access Systems
  - C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:
    - 1. Cabinet Hardware.
    - 2. Signs, except as noted.
    - 3. Folding partitions, except cylinders where detailed.
    - 4. Sliding aluminum doors
    - 5. Chain link and wire mesh doors and gates
    - 6. Access doors and panels
    - 7. Overhead and Coiling doors
- 1.3 Quality Assurance
- A. Requirements of Regulatory Agencies:
    - 1. Furnish finish hardware to comply with the requirements of laws, codes, ordinances, and regulations of the governmental authorities having jurisdiction where such requirements exceed the requirements of the Specifications.
    - 2. Furnish finish hardware to comply with the requirements of the regulations for public building accommodations for physically handicapped persons of the

governmental authority having jurisdiction and to comply with Americans with Disabilities Act.

3. Provide hardware for fire-rated openings in compliance with NFPA 80 and state and local building code requirements. Provide only hardware that has been tested and listed by UL for types and sizes of doors required and complies with requirements of door and door frame labels.

B. Hardware Supplier:

1. Shall be an established firm dealing in contract builders' hardware. He must have adequate inventory, qualified personnel on staff and be located within 100 miles of the project. The distributor must be a factory-authorized dealer for all materials required. The supplier shall be or have in employment an Architectural Hardware Consultant (AHC).

C. Electrified Door Hardware Supplier:

1. Shall be an experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.
2. Shall prepare data for electrified door hardware, including shop drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this project.
3. Shall have experience in providing consulting services for electrified door hardware installations.

D. Pre-installation Meeting:

1. Before hardware installation, General Contractor/Construction Manager will request a hardware installation meeting be conducted on the installation of hardware; specifically that of locksets, closers, exit devices, overhead stops and coordinators. Manufacturer's representatives of the above products, in conjunction with the hardware supplier for the project, shall conduct the meeting. Meeting to be held at job site and attended by installers of hardware for aluminum, hollow metal and wood doors. Meeting to address proper coordination and installation of hardware, per finish hardware schedule for this specific project, by using installation manuals, hardware schedule, templates, physical product samples and installation videos.
2. When any electrical or pneumatic hardware is specified this meeting shall also include the following trades/installers: Electrical, Security, Alarm systems and Architect.
3. Convene one week or more prior to commencing work of this Section.
4. The Hardware Supplier shall include the cost of this meeting in his proposal.

E. Manufacturer:

1. Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.



2. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.

1.4 Submittals:

A. Hardware Schedule

1. Submit number of Hardware Schedules as directed in Division 1.
2. Follow guidelines established in Door & Hardware Institute Handbook (DHI) Sequence and Format for the Hardware Schedule unless noted otherwise.
3. Schedule will include the following:
  - a. Door Index including opening numbers and the assigned Finish Hardware set.
  - b. Preface sheet listing category only and manufacturer's names of items being furnished as follows:

CATEGORY	SPECIFIED	SCHEDULED
Hinges	Manufacturer A	Manufacturer B
Lock sets	Manufacturer X	Manufacturer X
Kick Plates	Open	Manufacturer Z

- c. Hardware Locations: Refer to Article 3.1 B.2 Locations.
- d. Opening Description: Single or pair, number, room locations, hand, active leaf, degree of swing, size, door material, frame material, and UL listing.
- e. Hardware Description: Quantity, category, product number, fasteners, and finish.
- f. Headings that refer to the specified Hardware Set Numbers.
- g. Scheduling Sequence shown in Hardware Sets.
- h. Product data of each hardware item, and shop drawings where required, for special conditions and specialty hardware.
- i. Electrified Hardware system operation description.
- j. "Vertical" scheduling format only. "Horizontal" schedules will be returned "Not Approved."
- k. Typed Copy.
- l. Double-Spacing.
- m. 8-1/2 x 11 inch sheets
- n. U.S. Standard Finish symbols or BHMA Finish symbols.

B. Product Data:

1. Submit, in booklet form Manufacturers Catalog cut sheets of scheduled hardware.
2. Submit product data with hardware schedule.

C. Samples:

1. Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample, if required, of each type of exposed hardware unit, finished as required and tagged with full description for coordination with schedule.

2. Samples will be returned to the supplier. Units, which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

D. Key Schedule:

1. Submit detailed schedule indicating clearly how the Owner's final keying instructions have been followed.
2. Submit as a separate schedule.

E. Electrified Hardware Drawings:

1. Submit elevation drawings showing relationship of all electrical and pneumatic hardware components to door and frame. Indicate number and gage of wires required.
  - a. Include wiring drawing showing point to point wire hook up for all components.
  - b. Include system operations descriptions for each type of opening; describe each possible condition.

- F. Submit to General Contractor/Construction Manager, the factory order acknowledgement numbers for the various hardware items to be used on the project. The factory order acknowledgement numbers shall help to facilitate and expedite any service that may be required on a particular hardware item. General Contractor/Construction Manager shall keep these order acknowledgement numbers on file in the construction trailer.

1.5 Product Delivery, Storage, and Handling:

- A. Label each item of hardware with the appropriate door number and Hardware Schedule heading number, and deliver to the installer so designated by the contractor.

1.6 Warranties:

- A. Refer to Division 1 for warranty requirements.
- B. During the warranty period, replace defective work, including labor, materials and other costs incidental to the work. Replace work found to be defective as defined in the General Conditions.

PART 2 - PRODUCT

- 2.1 Furnish each category with the products of only one manufacturer unless specified otherwise; this requirement is mandatory whether various manufacturers are listed or not.

2.2 Provide the products of manufacturer designated or if more than one manufacturer is listed, the comparable product of one of the other manufacturers listed. Where only one manufacturer or product is listed, it is understood that this is the owner's Building Standard and "no substitution" is allowed.

A. Hinges:

1. Furnish hinges of class and size as listed in sets.
2. Numbers used are Ives (IVE).
3. Products of a BHMA member are acceptable.

B. Continuous Gear Hinge:

1. 6063-T6 aluminum alloy, anodized finish (cap on entire hinge painted if specified). Manufacture to template, uncut hinges non-handed, pinless assembly, three interlocking extrusions, full height of door and frame, lubricated polyacetal thrust bearing, fasteners 410 stainless steel plated and hardened. All hinge profiles to be manufactured to template bearing locations, with standard duty bearing configurations at 5-1/8" spacing with a minimum of 16 bearings: and heavy duty at 2-9/16" spacing with a minimum of 32 bearings. Anodizing of material shall be done after fabrication of components so that all bearing slots are anodized.
2. Length: 1" less than door opening height. Fastener 12-24 x 1/2" #3 Phillips keen form stainless steel self-tapping at aluminum and hollow metal doors, 12- 1/2" #3 Philips, flathead full thread at wood doors.
3. Furnish fire rated hinges "FR" at labeled openings.
4. Numbers used are Ives.
  - a. For Wood and Hollow Metal frames;
    - 1) Ives 224HD
    - 2) Equal products by Select Products Limited will also be accepted.
  - b. For Aluminum and FRP frames;
    - 1) Ives 112HD
    - 2) Equal products by Select Products Limited will also be accepted.

C. Flush Bolts:

1. Automatic - wood doors:
  - a. Ives FB40 Series
  - b. Equal product of any B.H.M.A. member.
2. Constant Latching: metal doors:
  - a. Ives FB50 Series
  - b. Equal product of any B.H.M.A. member.
3. Constant Latching: wood doors:
  - a. Ives FB60 Series
  - b. Equal product of any B.H.M.A. member.
4. Manual – wood and metal doors:
  - a. Ives FB457 Series
  - b. Equal product of any B.H.M.A. member.
5. Dust Proof Strikes - furnish with all flush bolts, except at openings having thresholds:
  - a. Ives DP2
  - b. Equal product of any B.H.M.A. member.

- D. Deadlock:
1. Adams-Rite MS1850S Series with Armor faceplate to suit door edge. Backset shall be 1 1/2" unless door stile width requires narrower backset.
- E. Padlock:
1. Case hardened steel shackle, 1" shackle clearance height. Capable of being keyed into building key system.
- F. Locksets and Latchsets – Heavy Duty Cylindrical Type:
1. Function numbers listed are IR-Schlage.
  2. Provide 2-3/4 inch backset.
  3. Provide strikes with extended lips where required to protect trim from being marred by latch bolt. Provide strike lips that do not project more than 1/8" beyond doorframe trim at single doors and have 7/8" lip to center at pairs of 1-3/4" doors.
  4. Locksets and Latchsets:
    - a. Falcon T Series
  5. Lockset Trim:
    - a. Falcon Dane
- G. Roller Latches:
- a. IR-Ives RL30
  - b. Equal Product of Any B.H.M.A. manufacturer.
- H. Exit Devices
1. All exit devices shall meet ANSI A156.3, 1994, Grade 1 test standards.
  2. Devices shall be push through type with stainless steel touch pad design.
  3. Center Case: Shall be interchangeable with all functions.
  4. Mechanism End Cap: Shall be a stamped or forged metal. Plastic end caps will not be acceptable.
  5. Trim: Shall be heavy-duty type.
  6. The following manufacturers will be acceptable providing they meet the above criteria for exit devices:
    - a. Monarch 18-R Series
    - b. VonDuprin 98 Series
    - c. Precision Apex 2000 Series
  7. Trim:
    - a. As specified in sets.
    - b. Levers to match lockset design where specified.
- I. Push and Pull Hardware:
1. Push Plates: Ives 8200 Series 6 x 16 x .050 inches. If stile widths will not accept 6 inches, provide stile width less two inches.
  2. Push Bars: Monarch 180DT
  3. Push-Pull Units: One inch round rod. Push: Straight push bar, Pull: 90 degree offset, 12 inch centers. Attach top post of pull back to back with latch stile end of push bar, bottom post of pull and hinge stile end of push bar with end caps.
  4. Pull, Offset: One inch round rod, 90 degree offset, 12 inch centers.

5. Pull Plates: Ives 8303-8 4 x 16 x .050 inches. 8" center.
6. Vandal Resistant Pulls: IR-Ives VR900 Series. Stainless steel construction 0.120 inches thick.
7. Manufacturer: Provide push and pull hardware from any member of B.H.M.A.

J. Coordinator – Frame Stop Mounted:

1. Door coordinator shall prevent the active door from closing before inactive door. Stop mounted channel 1-5/8" x 5/8" steel tubing x length to suit door opening. Coordinator shall be UL listed. Furnish filler bars to fill gap between end of coordinator and inactive door frame. Furnish mounting brackets for all stop mounted hardware such as exit device strikes, door closer PA shoes, etc. Coordinators shall be prepared (cutout) at the factory for surface applied or concealed vertical rod panic devices if required.
2. Furnish with carry bar CB1 when required for proper operation.
  - a. Ives COR x length to suit.
  - b. Equal products of any BHMA manufacturer

K. Closers

1. Refer to door and frame details and furnish accessories such as drop plates, panel adapters, spacers and supports as required to correctly install door closers. State degree of door swing in the hardware schedule.
2. Acceptable manufacturers and types:
  - a. LCN 4011/4111 & 1461 Series
  - b. Sargent 281 Series

L. Overhead Holders and Stops:

1. Type, function and fasteners must be same as Glynn-Johnson specified. Size per manufacturer's selector chart. Plastic end caps, hold open mechanisms and shock blocks are not allowed. End caps must be finished same as balance of unit.
2. Manufacture products using base material of Brass/Bronze for US3, US4, & US10B finished products and 300 Stainless Steel for US32 & US32D finished products.
3. Type, function, and fasteners must be the same as Glynn-Johnson specified. Size per manufacturer's selector chart.
  - a. Glynn-Johnson
  - b. Architectural Builders Hardware

M. Kick Plates:

1. Furnish .050 inches thick 10" high x door width less 1-1/2" at single doors and less 1" at pairs. Where glass or louvers prevent this height, supply with height equal to height of bottom rail less 2".
2. Any BHMA manufacturing product meeting above is acceptable.

N. Bumpers:

1. Wrought, forged, or cast, approximately 2-1/2 inch diameter, convex or concave rubber center, concealed fasteners.
  - a. Ives WS402CCV
  - b. BHMA L02101.
  
- O. Wall Holders:
  1. Products specified by series only; furnish strike length to exceed projection of all other hardware.
  2. Wall holder must allow doors that swing up to 118 degrees to be held open.
    - a. Ives WS40
    - b. Equal products of any BHMA manufacturer
  
- P. Thresholds:
  1. 1/2" high - 5" wide. Cope at jambs.
  2. Furnish full wall opening width when frames are recessed.
  3. Cope in front of mullions if thresholds project beyond door faces.
  4. Furnish with non-ferrous Stainless Steel Screws and Lead Anchors.
    - a. National Guard as listed in sets
    - b. Equal of Zero or Reese
  
- Q. Door Sweeps:
  1. Surface Sweeps:
    - a. National Guard as listed in sets
    - b. Equal by Zero or Reese
  
- R. Weather-stripping:
  1. Apply to head and jamb stops.
  2. Solid Bar stock all sides
    - a. National Guard as listed in sets
    - b. Equal by Zero or Reese
  
- S. Meeting Stile Weather-stripping:
  1. 2 Pc. Nylon brush type to seal gap between pairs of doors.
    - a. National Guard as listed in sets
    - b. Equal by Zero or Reese
  
- T. Smoke and Draft Control Seals:
  1. Gaskets must comply with UBC7.2 (1997) Part 2, UL1784 (1995), and NFPA 105 (1999) for use on all 'S' labeled wood and hollow-metal Positive Pressure door assemblies.
  2. Perimeter Seals:
    - a. National Guard 2525
    - b. Zero
    - c. Reese

3. Meeting Stile Astragal Seals:
  - a. National Guard 2525
  - b. Zero
  - c. Reese
  
4. Smoke Seals for doors with overlapping astragals:
  - a. National Guard 2525
  - b. Zero
  - c. Reese
  
- U. Lock Protector:
  1. Lock protector shall eliminate gap between door and frame. No exposed fasteners on face of unit.
    - a. IR-Ives LG10
  
- V. Automatic Door Bottoms:
  1. Surface: Provide UL approved at all fire doors.
    - a. National Guard as listed in sets.
    - b. Equal by Zero by Reese
  
- W. Key Control:
  1. Key Cabinet
    - a. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3 way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150 percent of the number of locks required for the project.
    - b. Provide complete cross-index system set up by hardware supplier or Lockset manufacturers representative or Lockset Manufacturers authorized Service Center. Place keys on markers and hooks in the cabinet as determined by the final key schedule. Provide hinged panel type cabinet for wall mounting. Provide one each wall mounted key cabinet.
    - c. Telkee WC Series with key loan record system.
    - d. Supplier shall include the cost of this service in their proposal.
  
- X. Miscellaneous:
  1. Furnish items not categorized in the above descriptions but specified by manufacturer's names in Hardware Sets.
  
- Y. Fasteners:
  1. Furnish fasteners of the proper type, size, quantity and finish. Use machine screws and expansion shields for attaching hardware to concrete or masonry, and wall grip inserts at hollow wall construction. Furnish machine screws for attachment to reinforced hollow metal doors and frames and reinforced aluminum

doors and frames. Furnish full thread wood screws for attachment to solid wood doors and frames. "TEK" type screws are not acceptable.

2. **Sex bolts will not be permitted on reinforced metal doors or wood doors where blocking is specified.**

2.3 Finishes:

- A. Generally, Dull Chrome, US26D / BHMA 626. Provide finish for each item as indicated in sets.

2.4 Templates and Hardware Location:

- A. Furnish hardware made to template. Supply required templates and hardware locations to the door and frame manufacturers.
- B. Furnish metal template to frame/door supplier for continuous hinge.
- C. Refer to Article 3.1 B.2, Locations, and coordinate with templates.

2.5 Cylinders and Keying:

- A. All cylinders for this project will be supplied by one supplier regardless of door type and location.
- B. The Finish Hardware supplier will meet with Architect and/or Owner to finalize keying requirements and obtain keying instructions in writing including the delivery of final keys and cores.
  1. Supplier shall include the cost of this service in his proposal.
- C. Provide disposable or keyed construction cores for use during construction period as specified in sets. Permanent cores will be furnished to the Owner's Representative prior to occupancy. The Owner or Owner's Security Agent in conjunction with the supplying distributor shall remove construction cores and install final cores.
  1. Supplier shall include the cost of this service in his proposal.
- D. Permanent cylinders shall be keyed by a Certified Keying Center or IR-Schlage Factory, combined in sets or subsets, master keyed or great grand master keyed, as directed by Owner. Permanent keys and cylinders shall be marked with the applicable blind code for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Patented". Keys and cylinder identification stamping to be approved by Architect and Owner.
- E. Equip locks and cylinders with restricted, small format interchangeable core cylinders. Provide a minimum of seven pins with nickel silver bottom pins. Cylinders must allow for multiplex master keying, combined to Owner's instructions.
- F. Deliver all permanent keys, key blanks and other security keys as determined in keying meeting.



- G. Key Material: Provide manufacturer's standard embossed keys of nickel silver to ensure durability. Furnish keys in the following quantities:
- a. 25 each Temporary construction keys.
  - b. 2 each Control Keys.
  - c. 2 each Grand Master Keys.
  - d. 4 each Master keys per master group.
  - e. 2 each Keys per cylinder.
- H. Available manufacturers: Subject to compliance with requirements, manufacturers offering the products which may be incorporated in the work include:
- 1. Falcon Lock Company

### PART 3 - EXECUTION

#### 3.1 Installation

##### A. General:

- 1. Install hardware according to manufacturers installations and template dimensions. Attach all items of finish hardware to doors, frames, walls, etc. with fasteners furnished and required by the manufacture of the item.
- 2. Provide blocking/reinforcement for all wall mounted Hardware.
- 3. Reinforced hollow metal doors and frames and reinforced aluminum door and frames will be drilled and tapped for machine screws.
- 4. Solid wood doors and frames: full thread wood screws. Drill pilot holes before inserting screws.
- 5. Continuous gear hinges attached to hollow metal doors and frames and aluminum doors and frames: 12-24 x 1/2" #3 Phillips Keenform self-tapping. Use #13 or 3/16 drill for pilot.
- 6. Continuous Gear Hinges require continuous mortar guards of foam or cardboard 1/2" thick x frame height, applied with construction adhesive.
- 7. Install weather-strip gasket prior to parallel arm closer bracket, rim exit device or any stop mounted hardware. Gasket to provide a continuous seal around perimeter of door opening. Allow for gasket when installing finish hardware. Door closers will require special templating. Exit devices will require adjustment in backset.

##### B. Locations:

- 1. Dimensions are from finish floor to center line of items.
- 2. Include this list in Hardware Schedule.

<u>CATEGORY</u>	<u>DIMENSION</u>
Hinges	Door Manufacturer's Standard
Flush Bolt Levers	72" and 12"
Levers	Door Manufacturer's Standard
Exit Device Touchbar	Per Template
Deadlock MS Cylinder	43" unless conflicting with push-pull.
Roller Latch	At Head
Push-Pull Units	42" to centerline of Pull
Offset Pulls	Suitable for Exit Devices
Push Plates	50" Centerline of Plate
Pull Plates	50" Centerline of Pull
Wall Bumpers	Centerline of Lever-handle
Wall Holders	Top Leading Edge of Door
Astragals	Push-side of inactive leaf

C. Final Adjustment:

1. Provide the services of a representative to inspect material furnished and its installation and adjustment, to make final hardware adjustment, and to instruct the Owner's personnel in adjustment, care and maintenance of hardware.
2. Locksets, closers and exit devices shall be inspected by the factory representative and adjusted after installation and after the HVAC system is in operation, to insure correct installation and proper adjustment in operation. The manufacturer's representative shall prepare a written report stating compliance, and also recording locations and kinds of noncompliance. The original report shall be forwarded to the Architect with copies to the Contractor, hardware installer and building owner.

D. Technical and Warranty Information:

1. At the completion of the project, the technical and warranty information coalesced and kept on file by the General Contractor/Construction Manager shall be given to the Owner or Owner's Agent. In addition to both the technical and warranty information, all factory order acknowledgement numbers supplied to the General Contractor/Construction Manager during the construction period shall be given to the Owner or Owner's Agent. The warranty information and factory order acknowledgement numbers shall serve to both expedite and properly execute any warranty work that may be required on the various hardware items supplied on the project.
2. Submit to General Contractor/Construction Manager, two copies each of parts and service manuals and two each of any special installation or adjustment tools. Include for locksets, exit devices, door closers and any electrical products.

3.2 Hardware Sets:

**Hardware Group No. 01**

**For use on door(s):**

01E                      205

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
2	EA IC CORE ONLY, KEYED	C607	626	FAL
2	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
2	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
1	BALANCE OF HARDWARE BY DOOR SUPPLIER			B/O

**Hardware Group No. 02**

**For use on door(s):**

02E

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
2	EA CONTINUOUS HINGE	112HD 85"	628	IVE
2	EA PANIC DEVICE	LD-18-C-EO	630	MON
2	EA SURFACE CLOSER	4021	689	LCN
2	EA MOUNTING PLATE	4020-18G	689	LCN
2	EA OVERHEAD STOP	104S	630	GLY
1	SET MEETING STILE SEAL	FURNISHED UNDER SECTION 08400		B/O
1	SET SEAL	FURNISHED UNDER SECTION 08400		B/O
2	EA DOOR SWEEP	C627A 36"	AL	NGP
1	EA THRESHOLD	425 SIA 72"	NS	NGP

**Hardware Group No. 03**

**For use on door(s):**

03E

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
2	EA CONTINUOUS HINGE	112HD 85"	628	IVE
2	EA PANIC DEVICE	18-C-EO	630	MON
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
2	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
2	EA OFFSET DOOR PULL	8190-2-O	630	IVE
2	EA SURFACE CLOSER	4021	689	LCN
2	EA MOUNTING PLATE	4020-18G	689	LCN
2	EA OVERHEAD STOP	104S	630	GLY
1	SET MEETING STILE SEAL	FURNISHED UNDER SECTION 08400		B/O
1	SET SEAL	FURNISHED UNDER SECTION 08400		B/O
2	EA DOOR SWEEP	C627A 36"	AL	NGP
1	EA THRESHOLD	425 SIA 72"	NS	NGP
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA KEYSWITCH	653-0404-L2	630	SCE
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 04**

**For use on door(s):**

04E

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA CONTINUOUS HINGE	224HD 83"	628	IVE
1	EA APARTMENT LOCK	M531B DN	626	FAL
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA SURFACE CLOSER	4111 SHCUSH ST-1586	689	LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	SET SEALS	700SA 1/36" 2/84"	AL	NGP
1	EA DRIP CAP	16A 40"	AL	NGP
1	EA DOOR SWEEP	C627A 36"	AL	NGP
1	EA THRESHOLD	425 SIA 36"	NS	NGP
1	EA LOCK GUARD	LG10	630	IVE

**Hardware Group No. 05**

**For use on door(s):**

05E

24E

31E

34E

35E

42E

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA CONTINUOUS HINGE	224HD 83"	628	IVE
1	EA PANIC DEVICE	18-R-NL-LESS PULL	630	MON
2	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA RIM CYLINDER	C953	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
2	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
1	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
1	EA DOOR PULL	VR910NL	630	IVE
1	EA SURFACE CLOSER	4111 SCUSH ST-1586	689	LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	SET SEALS	700SA 1/36" 2/84"	AL	NGP
1	EA DRIP CAP	16A 40"	AL	NGP
1	EA DOOR SWEEP	C627A 36"	AL	NGP
1	EA THRESHOLD	425 SIA 36"	NS	NGP
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA KEYSWITCH	653-0404-L2	630	SCE
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 06**

**For use on door(s):**

07E                      08E                      09E                      10E

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA CONTINUOUS HINGE	112HD 85"	628	IVE
1	EA DEADLOCK	MS1850S 1-1/2"BS	628	ADA
1	EA MORTISE THUMBTURN	4066	628	ADA
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-001-00	626	FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
1	EA PULL/PUSHBAR	9190-30-2-NO	630	IVE
1	EA SURFACE CLOSER	4021	689	LCN
1	EA MOUNTING PLATE	4020-18G	689	LCN
1	EA OVERHEAD STOP	104S	630	GLY
1	SET SEAL	FURNISHED UNDER SECTION 08400		B/O
1	EA DOOR SWEEP	C627A 36"	AL	NGP
1	EA THRESHOLD	425 SIA 36"	NS	NGP

**Hardware Group No. 07**

For use on door(s):

11E                      16E

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
2	EA CONTINUOUS HINGE	112HD 85"	628	IVE
1	EA PANIC DEVICE	18-C-EO	630	MON
1	EA PANIC DEVICE	18-C-TL-NL	630	MON
2	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA RIM CYLINDER	C953	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
2	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
2	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
2	EA OFFSET DOOR PULL	8190-2-O	630	IVE
2	EA SURFACE CLOSER	4021	689	LCN
2	EA MOUNTING PLATE	4020-18G	689	LCN
2	EA OVERHEAD STOP	104S	630	GLY
1	SET MEETING STILE SEAL	FURNISHED UNDER SECTION 08400		B/O
1	SET SEAL	FURNISHED UNDER SECTION 08400		B/O
2	EA DOOR SWEEP	C627A 36"	AL	NGP
1	EA THRESHOLD	425 SIA 72"	NS	NGP
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA KEYSWITCH	653-0404-L2	630	SCE
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 08**

**For use on door(s):**

12E                      17E                      22E

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
2	EA CONTINUOUS HINGE	224HD 83"	628	IVE
1	EA MANUAL FLUSH BOLT	FB457-12" (BOTTOM)	626	IVE
1	EA MANUAL FLUSH BOLT	FB457-12" (TOP)	626	IVE
1	EA DUST PROOF STRIKE	DP1	626	IVE
1	EA STOREROOM LOCK	M581B DN LESS OUTSIDE TRIM	626	FAL
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA DOOR PULL	VR900	630	IVE
2	EA SURFACE CLOSER	4111 SHCUSH ST-1586	689	LCN
2	EA KICK PLATE	8400 10" X 35"	630	IVE
1	SET SEALS	700SA 1/72" 2/84"	AL	NGP
1	SET DRIP CAP	16A 76"	AL	NGP
2	EA DOOR SWEEP	C627A 36"	AL	NGP
1	EA THRESHOLD	425 SIA 72"	NS	NGP

**Hardware Group No. 09**

**For use on door(s):**

06E

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA CONTINUOUS HINGE	224HD 83"	628	IVE
1	EA PANIC DEVICE	LD-18-R-NL-LESS PULL	630	MON
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA RIM CYLINDER	C953	626	FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
1	EA DOOR PULL	VR910NL	630	IVE
1	EA SURFACE CLOSER	4111 SCUSH ST-1586	689	LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	SET SEALS	700SA 1/36" 2/84"	AL	NGP
1	EA DRIP CAP	16A 40"	AL	NGP
1	EA DOOR SWEEP	C627A 36"	AL	NGP
1	EA THRESHOLD	425 SIA 36"	NS	NGP

**Hardware Group No. 10**

**For use on door(s):**

13E                      18E

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
1	EA CONTINUOUS HINGE	112HD 85"	628 IVE
1	EA PANIC DEVICE	18-R-NL-LESS PULL	630 MON
2	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA RIM CYLINDER	C953	626 FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626 FAL
2	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626 FAL
1	EA OFFSET DOOR PULL	8190-2-O	630 IVE
1	EA SURFACE CLOSER	4021	689 LCN
1	EA MOUNTING PLATE	4020-18G	689 LCN
1	EA OVERHEAD STOP	104S	630 GLY
1	SET SEAL	FURNISHED UNDER SECTION 08400	B/O
1	EA DOOR SWEEP	C627A 36"	AL NGP
1	EA THRESHOLD	425 SIA 36"	NS NGP
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR	B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR	B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR	B/O
1	EA KEYSWITCH	653-0404-L2	630 SCE
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630 B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT B/O

**Hardware Group No. 11**

For use on door(s):

14E 15E

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	FinishMfr
1	EA CONTINUOUS HINGE	112HD 85"	628 IVE
1	EA DEADLOCK	MS1850S 1-1/2"BS	628 ADA
1	EA MORTISE THUMBTURN	4066	628 ADA
1	EA PULL/PUSHBAR	9190-30-2-NO	630 IVE
1	EA SURFACE CLOSER	4021	689 LCN
1	EA MOUNTING PLATE	4020-18G	689 LCN
1	EA OVERHEAD STOP	104S	630 GLY
1	SET SEAL	FURNISHED UNDER SECTION 08400	B/O
1	EA DOOR SWEEP	C627A 36"	AL NGP
1	EA THRESHOLD	425 SIA 36"	NS NGP

**Hardware Group No. 12**

For use on door(s):

100

Provide each PR door(s) with the following:

Quantity	Description	Model Number	FinishMfr
2		ALL HARDWARE BY DOOR MANUFACTURER	B/O

**Hardware Group No. 13**

For use on door(s):

103                      106                      123                      123A                      129                      152

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA SURFACE CLOSER	1461 FC ST-1974	689 LCN
1	EA MOUNTING PLATE	1460-18	689 LCN
1	EA OVERHEAD STOP	104S	630 GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 14**

For use on door(s):

104                      171                      171A                      326

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA SURFACE CLOSER	1461 EDA FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 15**

For use on door(s):

105                      110                      215

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652 IVE
1	EA CLASSROOM LOCK	T561B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA SURFACE CLOSER	1461 FC ST-1974	689 LCN
1	EA MOUNTING PLATE	1460-18	689 LCN
1	EA OVERHEAD STOP	904S	630 GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	SET SEALS	2525B 17'	BRN NGP



**Hardware Group No. 16**

**For use on door(s):**

107                      109                      136                      173                      322                      331  
346

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA ENTRY/OFFICE LOCK	T511B7D D	626	FAL
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA OVERHEAD STOP	104S	630	GLY
3	EA SILENCER	SR64	GRY	IVE

**Hardware Group No. 17**

**For use on door(s):**

108                      163                      164                      176

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
1	EA PASSAGE SET	T101S D	626	FAL
1	EA SURFACE CLOSER	1461 FC ST-1974	689	LCN
1	EA MOUNTING PLATE	1460-18	689	LCN
1	EA OVERHEAD STOP	104S	630	GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
3	EA SILENCER	SR64	GRY	IVE
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 18**

**For use on door(s):**

111                      176B

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
1	EA PASSAGE SET	T101S D	626	FAL
1	EA SURFACE CLOSER	1461 EDA FC	689	LCN

1	EA	KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	EA	WALL STOP	WS402CCV	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA	POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA	WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA	PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA	SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 19**

For use on door(s):

112	146	213	325	329
-----	-----	-----	-----	-----

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA STOREROOM LOCK	T581B7D D	626	FAL
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA SURFACE CLOSER	1461 FC ST-1974	689	LCN
1	EA MOUNTING PLATE	1460-18	689	LCN
1	EA OVERHEAD STOP	104S	630	GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	SET SEALS	2525B 17'	BRN	NGP

**Hardware Group No. 20**

For use on door(s):

113	114	115	116	117	118
120	124	131	132	133	167
177	182	184	185	187	200
209	212	219	220	222	223
302	304	310	324	342	

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA ENTRY/OFFICE LOCK	T511B7D D	626	FAL
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA WALL STOP	WS402CCV	626	IVE
3	EA SILENCER	SR64	GRY	IVE

**Hardware Group No. 21**

For use on door(s):

119	188	188A
-----	-----	------

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA PASSAGE SET	T101S D	626	FAL

1	EA	OVERHEAD STOP	104S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 22**

For use on door(s):

125	165	166	173A	174A	178
178A	183	210	309		

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA PASSAGE SET	T101S D	626	FAL
1	EA WALL STOP	WS402CCV	626	IVE
3	EA SILENCER	SR64	GRY	IVE

**Hardware Group No. 23**

For use on door(s):

126

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
1	EA PASSAGE SET	T101S D	626	FAL
1	EA SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689	LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	EA WALL STOP	WS402CCV	626	IVE
3	EA SILENCER	SR64	GRY	IVE
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 24**

For use on door(s):

127                      128

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA PRIVACY SET	T301S D	626	FAL
1	EA SURFACE CLOSER	1461 EDA FC	689	LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	EA WALL STOP	WS402CCV	626	IVE
3	EA SILENCER	SR64	GRY	IVE

**Hardware Group No. 25**

**For use on door(s):**

130

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA STOREROOM LOCK	T581B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 26**

**For use on door(s):**

137

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA CLASSROOM LOCK	T561B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA SURFACE CLOSER	1461 EDA FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
1	SET SEALS	2525B 17'	BRN NGP

**Hardware Group No. 27**

**For use on door(s):**

138

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
2	EA CONTINUOUS HINGE	112HD 83"	628 IVE
2	EA PANIC DEVICE	18-C-L-816L-DANE	630 MON
2	EA IC CORE ONLY, KEYED	C607	626 FAL
2	EA RIM CYLINDER	C953	626 FAL
2	EA SURFACE CLOSER	4021	689 LCN
2	EA MOUNTING PLATE	4020-18G	689 LCN
2	EA OVERHEAD STOP	104S	630 GLY

**Hardware Group No. 28**

**For use on door(s):**

141

155

303

305

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA STOREROOM LOCK	T581B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
1	SET SEALS	2525B 17'	BRN NGP

**Hardware Group No. 29**

**For use on door(s):**

142

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA STOREROOM LOCK	T581B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 30**

**For use on door(s):**

143

154

186

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 31**

**For use on door(s):**

144

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
6	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA AUTO FLUSH BOLT	FB41T	630 IVE
1	EA ROLLER LATCH	RL30 (TOP MOUNT)	626 IVE
1	EA PASSAGE SET	T101S D	626 FAL

2	EA	WALL STOP & HOLDER WS40		626	IVE
2	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 32**

**For use on door(s):**

145

**Provide each SGL door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	T581B7D D	626	FAL
1	EA	IC CORE ONLY, KEYED	C607	626	FAL
1	EA	SURFACE CLOSER	1461 SCUSH FC	689	LCN
1	EA	KICK PLATE	8400 10" X 34-1/2"	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 33**

**For use on door(s):**

147

147A

**Provide each PR door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
6	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
2	EA	PANIC DEVICE	18-C-WDC-L-BE-DANE-LBR	630	MON
2	EA	SURFACE CLOSER	1461 SCUSH FC	689	LCN
2	EA	KICK PLATE	8400 10" X 35"	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 34**

**For use on door(s):**

148

**Provide each PR door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	SET	CONST LATCHING BOLT	FB61P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	PASSAGE SET	T101S D	626	FAL
1	EA	COORDINATOR	COR52 X FL20	628	IVE
2	EA	MOUNTING BRACKET	MB2	689	IVE
1	EA	SMOKE ASTRAGAL	2525B 7'	BRN	NGP
1	EA	OVERLAPPING ASTRAGAL	FURNISHED BY THE DOOR SUPPLIER		B/O
2	EA	SURFACE CLOSER	1461 SCUSH FC	689	LCN
2	EA	KICK PLATE	8400 10" X 35"	630	IVE
1	SET	SEALS	2525B 20'	BRN	NGP

**Hardware Group No. 35**

**For use on door(s):**

149

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
6	EA HINGE	5BB1HW 4.5 X 4.5	652	IVE
2	EA PANIC DEVICE	18-C-WDC-L-NL-DANE-LBR	630	MON
2	EA IC CORE ONLY, KEYED	C607	626	FAL
2	EA RIM CYLINDER	C953	626	FAL
2	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
2	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
2	EA SURFACE CLOSER	1461 SCUSH FC	689	LCN
2	EA KICK PLATE	8400 10" X 35"	630	IVE
2	EA SILENCER	SR64	GRY	IVE
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 36**

**For use on door(s):**

150

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA KING COBRA LOCK	KC5196-06-SFS	626	SCE
1	EA SURFACE CLOSER	1461 EDA FC	689	LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	EA WALL STOP	WS402CCV	626	IVE
3	EA SILENCER	SR64	GRY	IVE

**Hardware Group No. 37**

**For use on door(s):**

151

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA CLASSROOM LOCK	T561B7D D	626	FAL
1	EA IC CORE ONLY, KEYED	C607	626	FAL

1	EA	SURFACE CLOSER	1461 FC ST-1974	689	LCN
1	EA	MOUNTING PLATE	1460-18	689	LCN
1	EA	OVERHEAD STOP	104S	630	GLY
1	EA	KICK PLATE	8400 10" X 34-1/2"	630	IVE
1		SET SEALS	2525B 17'		BRN NGP

**Hardware Group No. 38**

For use on door(s):

157

Provide each SGL door(s) with the following:

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	T581B7D D	626	FAL
1	EA	IC CORE ONLY, KEYED	C607	626	FAL
1	EA	SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	EA	WALL STOP	WS402CCV	626	IVE
1		SET SEALS	2525B 17'	BRN	NGP
1		SET SEALS	700SA 1/36" 2/84"	AL	NGP
1	EA	DOOR BOTTOM	423N 36"	AL	NGP
1	EA	THRESHOLD	411 36"	AL	NGP

PROVIDE INTUMESCENT SEALS IF THEY'RE NOT AN INTEGRAL PART OF THE DOOR.

**Hardware Group No. 39**

For use on door(s):

158

207

Provide each PR door(s) with the following:

Quantity		Description	Model Number	Finish	Mfr
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1		SET CONST LATCHING BOLT	FB61P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	T581B7D D	626	FAL
1	EA	IC CORE ONLY, KEYED	C607	626	FAL
1	EA	COORDINATOR	COR52 X FL20	628	IVE
1	EA	SMOKE ASTRAGAL	2525B 7'	BRN	NGP
1	EA	OVERLAPPING ASTRAGAL	FURNISHED BY THE DOOR SUPPLIER		B/O
2	EA	SURFACE CLOSER	1461 FC ST-1974	689	LCN
2	EA	MOUNTING PLATE	1460-18	689	LCN
2	EA	OVERHEAD STOP	104S	630	GLY
2	EA	KICK PLATE	8400 10" X 35"	630	IVE
1		SET SEALS	2525B 20'	BRN	NGP



**Hardware Group No. 40**

**For use on door(s):**

159

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PANIC DEVICE	18-R-L-NL-DANE	630 MON
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA RIM CYLINDER	C953	626 FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626 FAL
1	EA SURFACE CLOSER	1461 EDA FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 41**

**For use on door(s):**

161                      161A                      170                      181

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652 IVE
1	EA CLASSROOM LOCK	T561B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA SURFACE CLOSER	1461 EDA FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 42**

**For use on door(s):**

162                      301                      328

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA SURFACE CLOSER	1461 EDA FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 43**

**For use on door(s):**

168                      169                      318

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA SURFACE CLOSER	1461 SCUSH FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	SET SEALS	2525B 17'	BRN NGP

**Hardware Group No. 44**

**For use on door(s):**

174                      201

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1HW 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 45**

**For use on door(s):**

175

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
2	EA CONTINUOUS HINGE	112HD 83"	628 IVE
2	EA DUMMY TOUCH BAR	180DT	630 MON
2	EA OFFSET DOOR PULL	8190-2-O	630 IVE
2	EA SURFACE CLOSER	4021	689 LCN
2	EA MOUNTING PLATE	4020-18G	689 LCN
2	EA OVERHEAD STOP	104S	630 GLY
1	SET MEETING STILE SEAL	FURNISHED UNDER SECTION 08400	B/O
1	SET SEAL	FURNISHED UNDER SECTION 08400	B/O

**Hardware Group No. 46**

**For use on door(s):**

176A                      224

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA STOREROOM LOCK	T581B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA SURFACE CLOSER	1461 EDA FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 47**

**For use on door(s):**

179

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PRIVACY SET	T301S D	626 FAL
1	EA SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 48**

**For use on door(s):**

201A                      201B                      223A                      225

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA OVERHEAD STOP	414S	630 GLY
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 49**

**For use on door(s):**

202

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
6	EA HINGE	5BB1HW 4.5 X 4.5	652 IVE

2	EA	SGL DUMMY TRIM	T12 D	626	FAL
2	EA	PUSH PLATE	8200 4" X 16"	630	IVE
2	EA	SURFACE CLOSER	1461 SCUSH FC	689	LCN
2	EA	KICK PLATE	8400 10" X 35"	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 50**

**For use on door(s):**

203                      203A

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA CLASSROOM LOCK	T561B7D D	626	FAL
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA SURFACE CLOSER	1461 FC ST-1974	689	LCN
1	EA MOUNTING PLATE	1460-18	689	LCN
1	EA OVERHEAD STOP	104S	630	GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	SET SEALS	2525B 17'	BRN	NGP

**Hardware Group No. 51**

**For use on door(s):**

204

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA PASSAGE SET	T101S D	626	FAL
1	EA SURFACE CLOSER	1461 FC ST-1974	689	LCN
1	EA MOUNTING PLATE	1460-18	689	LCN
1	EA OVERHEAD STOP	104S	630	GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
3	EA SILENCER	SR64	GRY	IVE

**Hardware Group No. 52**

**For use on door(s):**

204A

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA PASSAGE SET	T101S D	626	FAL
1	EA SURFACE CLOSER	1461 SCUSH FC	689	LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
3	EA SILENCER	SR64	GRY	IVE

**Hardware Group No. 53**

**For use on door(s):**

211

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA SURFACE CLOSER	1461 EDA FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP & HOLDER	WS40	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 54**

**For use on door(s):**

214

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA KING COBRA LOCK	KC5196-06-SFS	626 SCE
1	EA SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 55**

**For use on door(s):**

217

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA WALL STOP	WS402CCV	626 IVE
1	SET SEALS	700SA 1/36" 2/84"	AL NGP
1	EA DOOR BOTTOM	423N 36"	AL NGP
1	EA THRESHOLD	411 36"	AL NGP

**Hardware Group No. 56**

**For use on door(s):**

332

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
2	EA CONTINUOUS HINGE	224HD 83"	628	IVE
2	EA PANIC DEVICE	18-C-L-NL-DANE	630	MON
2	EA IC CORE ONLY, KEYED	C607	626	FAL
2	EA RIM CYLINDER	C953	626	FAL
2	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
2	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
2	EA SURFACE CLOSER	1461 EDA FC	689	LCN
2	EA KICK PLATE	8400 10" X 35"	630	IVE
2	EA WALL STOP	WS402CCV	626	IVE
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 57**

**For use on door(s):**

19E                      20E                      21E                      23E                      41E                      43E

**Provide each RU door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
1		BALANCE OF HARDWARE BY DOOR SUPPLIER		B/O

VERIFY CYLINDER TYPE & QUANTITY.

**Hardware Group No. 58**

**For use on door(s):**

25E                      26E                      29E                      30E

**Provide each RU door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL

1 BALANCE OF HARDWARE BY DOOR SUPPLIER B/O

VERIFY CYLINDER TYPE & QUANTITY.

**Hardware Group No. 59**

**For use on door(s):**

27E 28E 36E

**Provide each RU door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
1	BALANCE OF HARDWARE BY DOOR SUPPLIER			B/O

VERIFY CYLINDER TYPE & QUANTITY.

**Hardware Group No. 60**

**For use on door(s):**

37E 38E 39E 40E

**Provide each RU door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
1	BALANCE OF HARDWARE BY DOOR SUPPLIER			B/O

VERIFY CYLINDER TYPE & QUANTITY.

**Hardware Group No. 61**

**For use on door(s):**

33E

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA CONTINUOUS HINGE	224HD 83"	628	IVE
1	EA PASSAGE SET	T101S D	626	FAL
1	EA SURFACE CLOSER	4011 ST-1544	689	LCN
1	EA MOUNTING PLATE	4020-18	689	LCN
1	EA OVERHEAD STOP	104S	630	GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	SET SEALS	700SA 1/36" 2/84"	AL	NGP
1	EA DOOR BOTTOM	35VA 36"	AL	NGP
1	EA THRESHOLD	425 SIA 36"	NS	NGP

**Hardware Group No. 62**

**For use on door(s):**

308A                      32E

**Provide each RU door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA MORTISE CYLINDER	C987 A12667-003-00	626	FAL
1	EA CONSTRUCTION CORE	CONSTRUCTION CORE	626	FAL
1		BALANCE OF HARDWARE BY DOOR SUPPLIER		B/O

VERIFY CYLINDER TYPE & QUANTITY.

**Hardware Group No. 63**

**For use on door(s):**

308

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA ELECTROMAG LOCK	FURNISHED BY THE SECURITY CONTRACTOR	628	B/O
1	EA PASSAGE SET	T101S D	626	FAL
1	EA SURFACE CLOSER	1461 FC ST-1974	689	LCN
1	EA MOUNTING PLATE	1460-18	689	LCN
1	EA OVERHEAD STOP	104S	630	GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630	IVE
3	EA SILENCER	SR64	GRY	IVE
1	EA CARD READER	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA POWER SUPPLY	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA WIRING DIAGRAM	FURNISHED BY THE SECURITY CONTRACTOR		B/O
1	EA PUSHBUTTON	FURNISHED BY THE SECURITY CONTRACTOR	630	B/O
1	EA SCANNER	FURNISHED BY THE SECURITY CONTRACTOR	WHT	B/O

**Hardware Group No. 64**

**For use on door(s):**

312

**Provide each PR door(s) with the following:**

Quantity	Description	Model Number	Finish	Mfr
6	EA HINGE	5BB1 4.5 X 4.5	652	IVE
1	SET CONST LATCHING BOLT	FB51P	630	IVE
1	EA DUST PROOF STRIKE	DP2	626	IVE
1	EA IC CORE ONLY, KEYED	C607	626	FAL
1	EA KING COBRA LOCK	KC5196-06-SFS	626	SCE
1	EA COORDINATOR	COR52 X FL20	628	IVE
2	EA MOUNTING BRACKET	MB2	689	IVE
1	EA OVERLAPPING ASTRAGAL	FURNISHED BY THE DOOR SUPPLIER		B/O
2	EA SURFACE CLOSER	1461 EDA FC	689	LCN



2	EA	KICK PLATE	8400 10" X 35"	630	IVE
2	EA	WALL STOP	WS402CCV	626	IVE
2	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 65**

**For use on door(s):**

313

**Provide each PR door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
6	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	T581B7D D	626	FAL
1	EA	IC CORE ONLY, KEYED	C607	626	FAL
1	EA	COORDINATOR	COR52 X FL20	628	IVE
2	EA	MOUNTING BRACKET	MB2	689	IVE
1	EA	OVERLAPPING ASTRAGAL	FURNISHED BY THE DOOR SUPPLIER		B/O
2	EA	SURFACE CLOSER	1461 EDA FC	689	LCN
2	EA	KICK PLATE	8400 10" X 35"	630	IVE
2	EA	WALL STOP	WS402CCV	626	IVE
2	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 66**

**For use on door(s):**

320

327

**Provide each SGL door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	T561B7D D	626	FAL
1	EA	IC CORE ONLY, KEYED	C607	626	FAL
1	EA	SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	EA	WALL STOP	WS402CCV	626	IVE
1	SET	SEALS	2525B 17'	BRN	NGP

**Hardware Group No. 67**

**For use on door(s):**

321

**Provide each SGL door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	T101S D	626	FAL
1	EA	SURFACE CLOSER	1461 EDA FC	689	LCN
1	EA	KICK PLATE	8400 10" X 34-1/2"	630	IVE

1	EA	WALL STOP	WS402CCV	626	IVE
1		SET SEALS	2525B 17'	BRN	NGP

**Hardware Group No. 68**

**For use on door(s):**

323

**Provide each SGL door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	T561B7D D	626	FAL
1	EA	IC CORE ONLY, KEYED	C607	626	FAL
1	EA	SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689	LCN
1	EA	KICK PLATE	8400 10" X 34-1/2"	630	IVE
1	EA	WALL STOP	WS402CCV	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 69**

**For use on door(s):**

330

**Provide each SGL door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRY/OFFICE LOCK	T511B7D D	626	FAL
1	EA	IC CORE ONLY, KEYED	C607	626	FAL
1	EA	SURFACE CLOSER	1461 FC ST-1974	689	LCN
1	EA	MOUNTING PLATE	1460-18	689	LCN
1	EA	OVERHEAD STOP	104S	630	GLY
1	EA	KICK PLATE	8400 10" X 34-1/2"	630	IVE
1		SET SEALS	5050B 17'	BRN	NGP
1	EA	DOOR BOTTOM	35VA 36"	AL	NGP
1	EA	THRESHOLD	513 36"	AL	NGP

**Hardware Group No. 70**

**For use on door(s):**

333

**Provide each SGL door(s) with the following:**

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY SET	T301S D	626	FAL
1	EA	OVERHEAD STOP	104S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

**Hardware Group No. 71**

**For use on door(s):**

334

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PRIVACY SET	T301S D	626 FAL
1	EA WALL STOP	WS402CCV	626 IVE
3	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 72**

**For use on door(s):**

336

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA SURFACE CLOSER	1461 FC (MOUNT ON PULL-SIDE)	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	EA WALL STOP	WS402CCV	626 IVE
1	SET SEALS	2525B 17'	BRN NGP

**Hardware Group No. 73**

**For use on door(s):**

337

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA WALL STOP	WS402CCV	626 IVE
1	SET SEALS	2525B 17'	BRN NGP

**Hardware Group No. 74**

**For use on door(s):**

338

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA STOREROOM LOCK	T581B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA WALL STOP	WS402CCV	626 IVE
1	SET SEALS	2525B 17'	BRN NGP

THE LOCKSET SHALL BE INSTALLED SO THAT THE KEYED SIDE OF THE OPENING IS IN WASH ROOM 338.

**Hardware Group No. 75**

**For use on door(s):**

339

**Provide each SGL door(s) with the following:**

Quantity	Description	Model Number	FinishMfr
1	EA CONTINUOUS HINGE	224HD 83"	628 IVE
1	EA PASSAGE SET	T101S D	626 FAL
1	EA WALL STOP	WS402CCV	626 IVE
1	SET SEALS	2525B 17'	BRN NGP

**Hardware Group No. 76**

For use on door(s):

340

Provide each PR door(s) with the following:

Quantity	Description	Model Number	FinishMfr
6	EA HINGE	5BB1HW 4.5 X 4.5	652 IVE
2	EA PUSH PLATE	8200 4" X 16"	630 IVE
2	EA PULL PLATE	8303-8 4" X 16"	630 IVE
2	EA SURFACE CLOSER	1461 SCUSH FC	689 LCN
2	EA KICK PLATE	8400 10" X 35"	630 IVE
2	EA SILENCER	SR64	GRY IVE

**Hardware Group No. 77**

For use on door(s):

343

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA CLASSROOM LOCK	T561B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA SURFACE CLOSER	1461 SCUSH FC	689 LCN
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	SET SEALS	2525B 17'	BRN NGP

**Hardware Group No. 78**

For use on door(s):

341

345

Provide each SGL door(s) with the following:

Quantity	Description	Model Number	FinishMfr
3	EA HINGE	5BB1 4.5 X 4.5	652 IVE
1	EA CLASSROOM LOCK	T561B7D D	626 FAL
1	EA IC CORE ONLY, KEYED	C607	626 FAL
1	EA SURFACE CLOSER	1461 FC ST-1974	689 LCN
1	EA MOUNTING PLATE	1460-18	689 LCN
1	EA OVERHEAD STOP	104S	630 GLY
1	EA KICK PLATE	8400 10" X 34-1/2"	630 IVE
1	SET SEALS	5050B 17'	BRN NGP
1	EA DOOR BOTTOM	35VA 36"	AL NGP
1	EA THRESHOLD	513 36"	AL NGP

**END OF SECTION**

## SECTION 08800

### GLAZING

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes glass glazing for metal frames, doors, and aluminum storefront.
- B. Related Sections:
  - 1. Section 07900 - Joint Sealers: Sealant and back-up material other than glazing sealants.
  - 2. Section 08114 - Standard Steel Doors: Glazed doors.
  - 3. Section 08212 - Flush Wood Doors: Glazed doors.
  - 4. Section 08410 - Metal-Framed Storefronts.
  - 5. Section 10800 - Toilet Accessories: Metal framed mirrors.

##### 1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.
- B. American Society of Civil Engineers:
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International:
  - 1. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
  - 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 3. ASTM C1036 - Standard Specification for Flat Glass.
  - 4. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
  - 5. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
  - 6. ASTM C1193 - Standard Guide for Use of Joint Sealants.
  - 7. ASTM D4802 - Standard Specification for Poly (Methyl Methacrylate) Acrylic Plastic Sheet.
  - 8. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  - 9. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 10. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
  - 11. ASTM E546 - Standard Test Method for Frost Point of Sealed Insulating Glass Units.

12. ASTM E576 - Standard Test Method for Frost Point of Sealed Insulating Glass Units in the Vertical Position.
  13. ASTM E773 - Standard Test Methods for Seal Durability of Sealed Insulating Glass Units.
  14. ASTM E774 - Standard Specification for Sealed Insulating Glass Units.
  15. ASTM E1425 - Standard Practice for Determining the Acoustical Performance of Exterior Windows and Doors.
- D. Glass Association of North America:
1. GANA - FGMA Sealant Manual.
  2. GANA - Glazing Manual.
  3. GANA - Laminated Glass Design Guide.
- E. National Fire Protection Association:
1. NFPA 80 - Standard for Fire Doors, Fire Windows.
  2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
  3. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.
- F. Underwriters Laboratories Inc.:
1. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
  2. UL - Building Materials Directory.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
1. In conjunction with materials described in Sections 04810 and 07900.
  2. To utilize inner pane of multiple pane sealed units for continuity of air barrier and vapor retarder seal.
  3. To maintain continuous air barrier and vapor retarder throughout glazed assembly from glass pane to heel bead of glazing sealant.
- B. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as calculated in accordance with Kentucky Building Code and as measured in accordance with ASTM E330.
- C. Limit glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data:
1. Glass: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

- 2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors where exposed.
  - C. Certificates: Certify products meet or exceed specified requirements.
- 1.5 QUALITY ASSURANCE
- A. Perform Work in accordance with GANA Glazing Manual, and GANA Sealant Manual, for glazing installation methods.
- 1.6 QUALIFICATIONS
- A. Installer: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.
- 1.7 ENVIRONMENTAL REQUIREMENTS
- A. Section 01600 - Product Requirements.
  - B. Do not install glazing when ambient temperature is less than 50 degrees F.
  - C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.
- 1.8 WARRANTY
- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
  - B. Furnish ten-year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
  - C. Furnish ten-year warranty to include coverage for delamination of laminated glass and replacement of same.

## PART 2 PRODUCTS

### 2.1 GLAZING

- A. Manufacturers:
  - 1. PPG Industries
  - 2. Libbey-Owens-Ford, Inc.
  - 3. Viracon
  - 4. Substitutions: Section 01600 - Product Requirements

### 2.2 COMPONENTS

- A. Flat Glass (Type FG): Minimum 1/4 inch unless otherwise indicated.

1. Clear Heat Strengthened Glass (Type FG-CH): ASTM C1048, Kind HS, heat strengthened, Condition A uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select.
- B. Safety Glass (Type SG): Conform to ANSI Z97.1, minimum total thickness 1/4 inch unless otherwise indicated.
  1. Clear Tempered Glass (Type SG-CT): ASTM C1048, Kind FT Fully tempered, Condition A, uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; [with horizontal tempering].
  2. Clear Laminated Glass (Type SG-CL): ASTM C1172, Kind LHS, clear heat strengthened glass (Type FG-CH)]; with plastic interlayer.
    - a. Plastic Interlayer: Manufacturer's standard, minimum 0.030 inch thick.
- C. Fire Resistive Glass (Type FRG): Glazing materials to by types approved for use with specified materials in fire rated applications as indicated on Drawings. Minimum 1/4 inch thick unless otherwise indicated.
  1. Wired Clear Glass (Type FRG-CW): ASTM C1036, Type II wired flat, Class 1 polished both sides, Quality q8 glazing; Mesh m2 square of woven stainless steel wire, manufacturer's standard grid size.
- D. Insulated Glass Units (Type IG): Total unit thickness 1 inch.
  1. Double Pane Insulated Glass Units: ASTM E774 Class A and E773; with silicone sealant edge seal; purge interpane space with dry hermetic air.
    - a. Outer Pane: Glass Type: 1/4 inch clear Flat Glass
    - b. Inner and Middle Pane: 1/4 inch clear Flat Glass
  2. Insulated Glass Unit Edge Seal Construction: Aluminum, mitered and spigoted corners.

***THIS GLAZING TO BE LOW E TYPE – SPEC. TO BE DETERMINED***
- E. One-Way Reflective Mirror Glass (Type FG-M): ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q1 mirror select; size noted on Drawings.

## 2.3 ACCESSORIES

- A. Elastomeric Glazing Sealants: Materials compatible with adjacent materials including glass, laminated glass core, insulating glass seals, and glazing channels.
  1. Polysulfide Glazing Sealant: ASTM C920, Type M, Grade NS, Class and Use suitable for glazing application indicated; two component; chemical curing, non-sagging type; cured Shore A hardness of 15 to 25.
- B. Pre-Formed Glazing Tape: Size to suit application.
  1. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal.



- C. Setting Blocks: ASTM C864, Neoprene, 80 to 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- D. Spacer Shims: ASTM C864, Neoprene, 50 to 60 Shore A durometer hardness, minimum 3 inch long x one half the height of glazing stop x thickness to suit application.
- E. Glazing Clips: Manufacturer's standard type.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify openings for glazing are correctly sized and within acceptable tolerance.
- C. Verify surfaces of glazing channels or recesses are clean, free of obstructions impeding moisture movement, weeps are clear, and ready to receive glazing.

#### 3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

#### 3.3 INSTALLATION

- A. Perform installation in accordance with GANA Glazing Manual.
  - 1. Glazing Sealants: Comply with ASTM C1193.
  - 2. Fire Rated Openings: Comply with NFPA 80
- B. Exterior Wet/Dry Method (Preformed Tape and Sealant) Installation:
  - 1. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with compatible butyl sealant.
  - 2. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapor seal.
  - 3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

4. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
  5. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line.
  6. Fill gap between glazing and stop with elastomeric glazing sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
  7. Apply cap bead of elastomeric glazing sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- C. Exterior Wet Method (Sealant and Sealant) Installation:
1. Place setting blocks at 1/4 points and install glazing pane or unit.
  2. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inches intervals, 1/4 inch below sight line.
  3. Fill gaps between glazing and stops with elastomeric glazing sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
  4. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.
- D. Interior Dry Method (Tape and Tape) Installation:
1. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
  2. Place setting blocks at [1/4] [1/3] points with edge block no more than 6 inches from corners.
  3. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
  4. Place glazing tape on free perimeter of glazing in same manner described above.
  5. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
  6. **Knife trim protruding tape.** Tape shall be cut flush, level and true with metal stop. Uneven, rough edged tape surfaces will not be accepted.
  7. Glazing installation shall be performed by experienced, skilled persons. The space between the stops and glass shall completely seal with good adhesion to both surfaces. Glass demonstrating any movement shall be reset.
- 3.4 CLEANING
- A. Section 01700 - Execution Requirements: Final cleaning.
  - B. Remove glazing materials from finish surfaces.
  - C. Remove labels after Work is complete.
  - D. Clean glass and adjacent surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. After installation, mark pane with an 'X' by using removable plastic tape or paste.

3.6 SCHEDULE

END OF SECTION



## SECTION 08830

### MIRRORS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes glass mirrors for frameless installation, and mirrors for installation into sections referencing this section for products and installation.
- B. Related Sections:
  - 1. Section 07900 - Joint Sealers: Sealant and back-up material.]
  - 2. Section 08800 - Glazing: Glass and glazing.
  - 3. Section 10800 - Toilet Accessories: Metal framed mirrors.

##### 1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.
- B. ASTM International:
  - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 2. ASTM C1036 - Standard Specification for Flat Glass.
  - 3. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
  - 4. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.
  - 5. ASTM C1193 - Standard Guide for Use of Joint Sealants.
- C. Glass Association of North America:
  - 1. GANA - FGMA Sealant Manual.
  - 2. GANA - Glazing Manual.

##### 1.3 PERFORMANCE REQUIREMENTS

- A. Limit mirrored glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less based on loading requirements specified in Section 08800.

##### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data:
  - 1. Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

2. Glazing Materials: Submit chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

#### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual [and GANA Sealant Manual] for mirror installation methods.
- B. Maintain one copy of each document on site.

#### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install glazing when ambient temperature is less than 50 degrees F.
- C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing sealants.

#### 1.7 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish ten year warranty to include coverage for reflective coating on mirrors and replacement of same.

#### 1.8 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Supply two of each mirror size.

### PART 2 PRODUCTS

#### 2.1 MIRRORS

- A. Mirror Manufacturers:
  1. Arch Aluminum & Glass LC
  2. Sunshine Mirrors
  3. Viracon
  4. Substitutions: Section 01600 - Product Requirements

#### 2.2 COMPONENTS

- A. Mirror Glass: ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q1 mirror select; type with copper and silver coating, and organic overcoating.
  1. Edges: Polished.
  2. Thickness: Minimum 1/4 inch unless otherwise indicated.
  3. Size: sizes noted on Drawings.

## 2.3 ACCESSORIES

- A. Elastomeric Glazing Sealant: Materials compatible with mirrors and adjacent materials.
  - 1. Silicone Sealant: ASTM C920, Type S, Grade NS, Class and Use as recommended by manufacturer for mirror installation; single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining, cured Shore A hardness of 15 to 25.
- B. Setting Blocks: Silicone, 80 to 90 Shore A durometer hardness.
- C. Spacer Shims: Silicone, 50 to 60 Shore A durometer hardness, self adhesive on one face.
- D. Glazing Clips: Manufacturer's standard type.
- E. Mirror Attachment Accessories: Stainless steel clips
- F. Mirror Adhesive: Chemically compatible with mirror coating and wall substrate.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify openings for mirrored glazing are correctly sized and within tolerance.
- C. Verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive mirrors.

### 3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

### 3.3 INSTALLATION

- A. Perform installation in accordance with GANA Glazing Manual.
  - 1. Glazing Sealants: Comply with ASTM C1193.
  - 2. Set mirrors plumb and level, free of optical distortion.
  - 3. Set mirrors with edge clearance free of surrounding construction including counter tops and backsplashes.
- B. Sealant Installation: Comply with GANA Sealant Manual.

1. Install mirrors resting on setting blocks. Install applied stop and center mirror by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
  2. Locate and secure mirror using glazers' clips.
  3. Fill gaps between mirror and stops with glazing sealant until flush with sight line. Tool surface to straight line.
- C. Frameless Mechanical Installation:
1. Set mirrors with clips. Anchor rigidly to wall construction.
  2. Place plumb and level without visible distort.
- D. Frameless Adhesive Installation:
1. Set mirrors with adhesive.
  2. Place plumb and level without visible distortion.
- 3.4 CLEANING
- A. Section 01700 - Execution Requirements: Final cleaning.
  - B. Remove wet glazing materials from finish surfaces.
  - C. Remove labels after Work is complete.
  - D. Clean mirrors and adjacent surfaces.

3.5 SCHEDULE

END OF SECTION



SECTION 09260  
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes metal stud wall framing; metal channel ceiling framing; gypsum board and joint treatment; acoustic insulation; and smooth finish.
- B. Related Sections:
  - 1. Section 06001 – Carpentry: wood blocking for support of wall mounted products.
  - 2. Section 10800 – Toilet Accessories: Product requirements for frames for recessed washroom accessories for placement by this section.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM C36 - Standard Specification for Gypsum Wallboard.
  - 2. ASTM C79/C79M - Standard Specification for Gypsum Sheathing Board.
  - 3. ASTM C442 - Standard Specification for Gypsum Backing Board and Coreboard.
  - 4. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - 5. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board.
  - 6. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
  - 7. ASTM C630/C630M - Standard Specification for Water-Resistant Gypsum Backing Board.
  - 8. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
  - 9. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - 10. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
  - 11. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
  - 12. ASTM C931/C931M - Standard Specification for Exterior Gypsum Soffit Board.
  - 13. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases.
  - 14. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing.
  - 15. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

16. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  17. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Gypsum Association:
1. GA 214 - Recommended Levels of Gypsum Board Finish.
  2. GA 216 - Application and Finishing of Gypsum Board.
  3. GA 600 - Fire Resistance Design Manual Sound Control.
- C. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings.
- D. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- E. Underwriters Laboratories Inc.:
1. UL - Fire Resistance Directory.
  2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
- 1.3 SUBMITTALS
- A. Section 01330 - Submittal Procedures: Submittal procedures.
  - B. Product Data: Submit data on metal framing, gypsum board, joint tape; and acoustic accessories.
- 1.4 QUALITY ASSURANCE
- A. Perform Work in accordance with ASTM C840.
- 1.5 QUALIFICATIONS
- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
  - B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.
- 1.6 ENVIRONMENTAL REQUIREMENTS
- A. Section 01600 - Product Requirements.
  - B. Maintain not less than 90 footcandles of light in all areas during finishing of gypsum wallboard.

## PART 2 PRODUCTS

### 2.1 GYPSUM BOARD ASSEMBLIES

#### A. Manufacturers:

1. National Gypsum Co.
2. United States Gypsum Co.
3. Substitutions: Section 01600 - Product Requirements

### 2.2 COMPONENTS

#### A. Framing Materials:

1. Studs and Tracks: ASTM C645; GA-216; galvanized sheet steel, minimum 20 gage inch thick, C shape. Provide limited amount of 16 gage studs and tracks at locations where two aluminum ladders provide access to mechanical platforms and metal wall panels are installed on framed wall system that is not supported by a concrete back-up wall.
2. Furring, Framing, and Accessories: Of same material as studs and tracks. Dimension and configuration to fit purpose as indicated on the Drawings.
3. Fasteners: size and type recommended by manufacturer and suited to specific application.
4. Anchorage to Substrate: Tie wire, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
5. Adhesive: ASTM C557.

#### B. Gypsum Board Materials:

1. Standard Gypsum Board: ASTM C36; 5/8 inch thick, maximum available length in place; ends square cut, tapered edges.
2. Fire Rated Gypsum Board: ASTM C36; fire resistive type, UL or WH rated; 5/8 inch thick, maximum available length in place; ends square cut, tapered edges.
3. Moisture Resistant Gypsum Board: ASTM C630/C630M; 5/8 inch thick, maximum available length in place; ends square cut, tapered edges.
4. Paperless Interior Wallboard: ASTM C630, ASTM C1396, ASTM C1177, ASTM C1629, ASTM C1658, 5/8" thick x maximum sheet available moisture resistant, with fiberglass mats in lieu of paper facers. Georgia-Pacific DensArmor Plus Abuse Guard or approved equal.
5. Abuse Resistant Gypsum Board. ASTM C 36/C 1396, 5/8 inch thick x maximum sheet size available with additives to enhance fire resistance where appropriate. Product shall also contain additives designed to enhance surface indentation resistance and impact resistance of the core and shall be surfaced with abrasion-resistant paper on the front and long edges with heavy liner paper bonded to the back side. Hi-Abuse Brand (Fire-Shield) as manufactured by National Gypsum Company or equal.
6. Exterior Gypsum Wall Sheathing: 1/2 inch thick, 4 ft. x 10 ft sheet size, fire resistant, water-resistant, gypsum sheathing with glass mats both sides and long edges. Georgia Pacific Dens Glass Gold.

## 2.3 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced, 3 1/2 inch thick.
- B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- C. Corner Beads: Metal.
- D. Edge Trim: GA-216; Type L bead. All edges shall receive gypsum compound and rubbed out for smooth appearance. Use of exposed plastic trim is not allowed at any location, or under any condition.
- E. Joint Materials: ASTM C475; GA-216; reinforcing tape, joint compound, adhesive, and water.
- F. Fasteners: ASTM C1002, Type S12.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

### 3.2 INSTALLATION

- A. Metal Stud Installation:
  - 1. Install studs in accordance with ASTM C754, GA-216 and GA-600.
  - 2. Metal Stud Spacing: 16 inches on center.
  - 3. Extend stud framing to height specified on drawings, or 4" above finished ceiling and braced to structure above at 48" OC if not specified.
  - 4. Refer to Drawings for indication of partitions extending stud framing through ceiling to structure above. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.
  - 5. Door Opening Framing: Install double studs at door frame jambs. Install stud tracks on each side of opening, at frame head height, and between studs and adjacent studs.
  - 6. Blocking: Bolt or screw steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, wood frame opening, toilet accessories, hardware, and at all locations where wall mounted fixtures, equipment, or accessories are specified. Coordinate with other trades as necessary.
- B. Wall Furring Installation:

1. Erect wall furring for direct attachment to masonry walls.
  2. Erect interior furring channels vertically; space maximum 16 inches oc, not more than 4 inches from floor, ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
  3. Install thermal insulation in conjunction with Section 07212 Board Insulation between Z-furring channels directly attached to concrete masonry walls.
  4. Erect metal stud framing tight to existing walls, attached by adjustable furring brackets.
- C. Ceiling Framing Installation:
1. Install in accordance with ASTM C754 & GA-216.
  2. Coordinate location of hangers with other work.
  3. Install ceiling framing independent of walls, columns, and above ceiling work.
  4. Reinforce openings in ceiling suspension system, which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
  5. Laterally brace entire suspension system.
- D. Acoustic Accessories Installation:
1. Place acoustic insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
  2. Install acoustic sealant at gypsum board perimeter at:
    - a. Metal Framing: One bead.
    - b. Face Layer.
    - c. Seal penetrations of partitions by conduit, pipe, duct work, rough-in boxes, and all other items.
- E. Gypsum Board Installation:
1. Install gypsum board in accordance with GA-216 and GA-600.
  2. Erect single layer board in most economical direction with ends and edges occurring over firm bearing.
  3. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
  4. Use screws when fastening gypsum board to metal furring or framing.
  5. Double Layer Applications: Secure second layer to first with fasteners.
  6. Place second layer perpendicular to first layer. Offset joints of second layer from joints of first layer.
  7. Erect exterior gypsum soffit board perpendicular to supports, with staggered end joints over supports.
  8. Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.
  9. Place control joints consistent with lines of building spaces in accordance with manufacturer's recommendations. Consult Architect at any area in question.
  10. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials, or where wallboard reveal is detailed.

- F. Joint Treatment:
  - 1. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 2. Feather coats on to adjoining surfaces so that camber is maximum 1/32 inch.

### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation of Finished Gypsum Board Surface from Flat Surface: 1/8 inch in 10 feet.

### 3.4 SCHEDULES

- A. Finishes in accordance with GA-214 Level:
  - 1. Level 1: Above finished ceilings concealed from view.
  - 2. Level 5: Walls exposed to view.
  - 3. Level 4: Ceilings exposed to view.
- B. Provide abuse resistant wallboard for vertical wall surfaces where specified on the drawings.
- C. Provide standard gypsum wallboard for all soffits and ceilings except where water resistant wallboard is specified.
- D. Provide acoustic insulation full wall height where specified on the drawings
- E. Provide paperless wallboard sheathing in any/all locations where gypsum board is specified to be installed in non-air-conditioned space.
- F. Refer to the Contract Drawings for type, quantity and location of Gypsum Board Assembly requirements.

END OF SECTION

## SECTION 09300

### TILE

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes ceramic tile for floor and wall applications using thin-set application method; stainless steel cove trim between floor and wall tile and thresholds at door openings.
- B. Related Sections:
  - 1. Section 03300 - Concrete: Troweling of floor slab for tile application.
  - 2. Section 07900 - Joint Sealers.
  - 3. Section 09260 – Gypsum Board Assemblies: Mounting substrate and tile backer board.

##### 1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A108.1 - Installation of Ceramic Tile, A collection.
  - 2. ANSI A108.10 - Specifications for Installation of Grout in Tilework.
  - 3. ANSI A108.1A - Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar.
  - 4. ANSI A108.1B - Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
  - 5. ANSI A108.1C - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar -or- Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
  - 6. ANSI A108.4 - Specifications for Ceramic Tile Installed with Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.
  - 7. ANSI A108.5 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
  - 8. ANSI A108.6 - Specifications for Ceramic Tile Installed with Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy.
  - 9. ANSI A108.7 - Specifications for Electrically Conductive Ceramic Tile Installed with Conductive Dry-Set Portland Cement Mortar.
  - 10. ANSI A108.8 - Specifications for Ceramic Tile Installed with Chemical-Resistant Furan Mortar and Grout.
  - 11. ANSI A108.9 - Specifications for Ceramic Tile Installed with Modified Epoxy Emulsion Mortar/Grout.
  - 12. ANSI A118.1 - Standard Specification for Dry-Set Portland Cement Mortar.
  - 13. ANSI A118.3 - Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.

14. ANSI A118.4 - Latex-Portland Cement Mortar.
15. ANSI A118.5 - Chemical-Resistant Furan Mortar and Grout.
16. ANSI A118.6 - Ceramic Tile Grouts.
17. ANSI A118.8 - Modified Epoxy Emulsion Mortar/Grout.
18. ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
19. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.
20. ANSI A137.1 - Ceramic Tile.

- B. ASTM International:
1. ASTM C847 - Standard Specification for Metal Lath.

- C. Tile Council of America:
1. TCA - Handbook for Ceramic Tile Installation.

### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit instructions and data for grouts, adhesives, stainless steel cove and waterproofing membrane.
- C. Samples: Provide color samples of tile, marbles thresholds, stainless steel cove and grout for selection.

### 1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with TCA Handbook and ANSI A108 Series/A118 Series.

### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum five years documented experience.

### 1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.



## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Protect adhesives and grouts from freezing or overheating.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install adhesives and grouts in unventilated environment.
- C. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.
- D. Maintain not less than 90 footcandles of light in all areas during installation of tile.

## 1.10 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Supply 4 sq ft of each size, color, and surface finish of tile specified.

## PART 2 PRODUCTS

### 2.1 TILE

- A. Ceramic Tile Manufacturers:
  - 1. Dal-Tile products are specified to establish product requirements.
    - a. Floors
      - 1) Porcelto – 12x12 & 8x8 (Group 1) – Applicable to Warehouse except at showers
      - 2) Veranda – size and pattern to be determined – Applicable to Office Building
      - 3) Keystones – 2x2, all color groups, including all available trim pieces. Applicable to Warehouse shower areas.
    - b. Wall Base
      - 1) Porcelto – 6h x 8l (Group 1) – Applicable to Warehouse except at showers
      - 2) Veranda – size and pattern to be determined – Applicable to Office Building utilizing Schluter stainless steel cove base
      - 3) Keystones – 2x2, all color groups, including all available trim pieces. Applicable to Warehouse shower areas.

- c. Wall
  - 1) 6x6 Semi-Gloss (60% price group 1 or 2, 35% price group 2 or 3, 15% price group 4) – Applicable to Warehouse except at showers.
  - 2) Veranda – size and pattern to be determined – Applicable to Office Building utilizing Schluter stainless steel cove base
  - 3) Keystones – 2x2, all color groups, including all available trim pieces. Applicable to Warehouse shower areas.

- B. Other acceptable manufacturers offering equivalent ceramic tile products:
  - 1. American Olean
  - 2. Metropolitan Ceramic
  - 3. Substitutions: Section 01600 - Product Requirements
  - 4. Substitutions: Section 01600 - Product Requirements

## 2.2 COMPONENTS (Type One System – Porcelato & Semi Gloss Products)

- A. Ceramic Floor Tile: ANSI A137.1, conforming to the following:
  - 1. Moisture Absorption: 0 to 0.5 percent.
  - 2. Size: 12 x 12 inch and 8 x 8 inch.
  - 3. Thickness: 5/16 inch
  - 4. Shape: Square.
  - 5. Edge: Cushioned.
  - 6. Surface Finish: textured
  - 7. Coefficient of Friction
    - a. Dry: 0.60 – 0.90
    - b. Wet: 0.50 to 0.75
  - 8. Material: Impervious porcelain
  - 9. Color: As selected.
- B. Ceramic Wall Tile: ANSI A137.1, conforming to the following:
  - 1. Moisture Absorption: 0 to 0.5 percent.
  - 2. Size: 6 x 6 inch.
  - 3. Thickness: 5/16 inch
  - 4. Shape: Square.
  - 5. Edge: Cushioned.
  - 6. Surface Finish: Bright Glaze
  - 7. Color: As selected.
  - 8. Pattern: see drawings.
- C. Base: Same as floor tile. Match floor tile for moisture absorption, surface finish, and color:
  - 1. Length: Tile length, 8 inches (for ceramic) and 6 inches for quarry.
  - 2. Height: 6 inches.
  - 3. Top Edge: Bull nosed.
  - 4. Bottom Edge: Coved.
  - 5. Internal Corner: Coved.
  - 6. External Corner: Bullnosed.

### 2.3 COMPONENTS (Type Two System – Veranda Products)

- A. Ceramic Floor, Wall & Base Tile: ANSI A137.1, conforming to the following:
  - 1. Moisture Absorption: 0 to 0.5 percent.
  - 2. Size: combination of 5 shapes available – pattern to be determined
  - 3. Thickness: 3/8 inch
  - 4. Shape: rectilinear.
  - 5. Edge: rectified and modular allowing use of smaller grout joints
  - 6. Surface Finish: smooth
  - 7. Coefficient of Friction
    - a. Dry: >0.60
    - b. Wet: >0.8
  - 8. Material: Impervious porcelain
  - 9. Color & Pattern: to be determined

### 2.4 COMPONENTS (Type Three System –Keystone Products)

- A. Ceramic Floor, Wall and Base Tile: ANSI A137.1, conforming to the following:
  - 1. Moisture Absorption: 0 to 0.5 percent.
  - 2. Size: 2x2 and all available trim pieces
  - 3. Thickness: 1/4 inch
  - 4. Shape: Square.
  - 5. Edge: Cushioned.
  - 6. Surface Finish: smooth
  - 7. Coefficient of Friction
    - a. Dry: > 0.60
    - b. Wet: > 0.70
  - 8. Material: Impervious porcelain
  - 9. Color & Pattern: to be determined

### 2.5 ACCESSORIES

- A. Adhesive Materials:
  - 1. Epoxy Adhesive: ANSI A118.3, thin-set bond type recommended by tile manufacturer.
- B. Grout Materials:
  - 1. Epoxy Grout: ANSI A118.8, modified epoxy emulsion grout, color as selected; use for all floor applications.
- C. Waterproofing Membrane at shower floors and walls: Liquid rubber and reinforcing fabric that form a seamless membrane. Laticrete 9235 or approved equal.
- D. Thresholds: black slate, honed finish, 3 x 1/4 inch size by full width of wall or frame opening, beveled both sides, radiused edges from bevel to vertical face.
- E. Formed Cove Wall Base (Applicable to all floor and wall transitions at all locations in the Office Building):

1. Manufacturer's standard profile with integrated, roll-formed stainless steel with trapezoid-perforated anchoring legs, connected at a 90-degree angle by a stainless steel cove shaped section with 23/32 inch radius and 1/2 inch wide thermoplastic rubber movement zone, which together form the visible surface. Product shall be Schluter Dilex-HKS model HKS U10/O11 or approved equal.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces are ready to receive work.

#### 3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler.
- D. Prepare substrate surfaces for adhesive installation.

#### 3.3 INSTALLATION

- A. Install tile, thresholds, and grout in accordance with applicable requirements of ANSI A108.1 through A108.10, and TCA Handbook recommendations.
- B. Lay tile to pattern specified at the end of the schedule for floors. Request tile pattern from Architect for wall tile. Do not interrupt tile pattern through openings.
- C. Place thresholds at exposed tile edges.
- D. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor, base and wall joints.
- E. Place tile with joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
  1. Floor tile: 3/16 inch
  2. Wall Tile: 1/16 inch.
  3. Quarry Tile: 3/8 inch.
- F. Wall base to be "flush-set"; top of cove base to align exactly with top of floor tile.  
**DO NOT "TOPSET" OR "THIN-LIP" WALL BASE.**

- G. Form internal angles coved and external angles bullnosed.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Allow tile to set for a minimum of 48 hours prior to grouting.
- J. Grout tile joints.
- K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
- L. Install stainless steel cove wall base trim in accordance with mfr's written instructions.
- M. Installation - Floors - Thin-Set Methods:
  - 1. Over interior concrete substrates, install in accordance with TCA Handbook Method install in accordance with TCA Handbook Method F131-01 with epoxy mortar bond coat and grout.
    - a. Where waterproofing membrane is indicated, install in accordance with TCA Handbook Method F122, with epoxy mortar bond coat and grout.
- N. Installation - Wall Tile:
  - 1. Over gypsum wallboard on wood or metal studs install in accordance with TCA Handbook thin-set Method using epoxy mortar bond coat and grout.
  - 2. Over interior concrete and masonry install in accordance with TCA Handbook thin-set Method using epoxy mortar bond coat and grout.

### 3.4 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Clean tile and grout surfaces.

### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit traffic over finished floor surface for 4 days after installation.

### 3.6 SCHEDULES

END OF SECTION



SECTION 09440  
PLASTIC MATRIX TERRAZZO

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes resinous matrix terrazzo floor and base; and divider strps.
- B. Related Sections:
  - 1. Section 03300 - Cast-in-Place Concrete: Concrete subfloor with broom finish.
  - 2. Section 07900 - Joint Sealers: Joint between terrazzo base and wall surface.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM C150 - Standard Specification for Portland Cement.
- B. National Terrazzo and Mosaic Association:
  - 1. NTMA - Terrazzo Specifications Guide.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate divider strip and control joint layout, flooring material transitions, color patterns, and details of adjacent components.
- C. Product Data: Submit data for divider strips, control joint strips, and sealer.
- D. Samples: Submit two samples 6 x 6 in size illustrating color, chip size and variation, chip gradation, matrix color for each color specified and typical divider strip.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit procedures for stain removal, stripping, and sealing.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NTMA recommendations contained in "Terrazzo Information Guide".

## 1.6 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Store resin materials in dry, secure area.
- C. Maintain minimum temperature of 55 degrees F.
- D. Keep products away from fire or open flame.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install terrazzo when temperature is below 50 degrees F or above 90 degrees F.
- C. Maintain temperature within specified range 24 hours before, during, and 72 hours after installation of flooring.
- D. Provide ambient lighting level of 80 ft candles measured at floor surface.

## 1.9 COORDINATION

- A. Section [01310 - Project Management and Coordination] [01311 - Project Coordination] [01312 - Mechanical and Electrical Coordination]: Requirements for coordination.
- B. Coordinate placement of terrazzo divider strips with location of mechanical and electrical access covers, floor mat frames, and other items built in to terrazzo.

## PART 2 PRODUCTS

### 2.1 RESINOUS MATRIX TERRAZZO

- A. Manufacturers:
  - 1. Crossfield Products Co.
  - 2. Fritz Industries Inc.
  - 3. Harris Specialty Chemicals, Inc.
  - 4. Master Builders
  - 5. Substitutions: Section 01600 - Product Requirements



## 2.2 COMPONENTS

- A. Floors: Epoxy matrix, 1/4 inch thick.
  - 1. Matrix Color: As selected.
  - 2. Aggregate Color: As selected.
  - 3. Aggregate Size: No. As Selected
- B. Borders: Same type and thickness as floors.
  - 1. Matrix Color: As selected.
  - 2. Aggregate Color: As selected.
  - 3. Aggregate Size: No. As Selected
- C. Base: Same type and thickness as floors.
  - 1. Matrix Color: As selected.
  - 2. Aggregate Color: As selected.
  - 3. Aggregate Size: No. As Selected
- D. Materials:
  - 1. Epoxy Matrix: Two component resin and epoxy hardener with mineral filler and color pigment, non-volatile, thermo-setting.
  - 2. Aggregate: Crushed marble, granite, and/or glass, size as selected of standard gradation and uniform coloration.

## 2.3 ACCESSORIES

- A. Divider Strips: 1/8 inch thick zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features; manufactured by Schluter or approved equal.
- B. Control Joint Strips: 1/8 inch nominal width zinc exposed top strips, zinc coated steel concealed bottom strips, 1/8 inch wide neoprene filler strip between vertical strips, with anchoring features; manufactured by Schluter or approved equal.
- C. Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.
- D. Base Cap, Base Divider Strip, and Separator Strip: Match divider strips.
- E. Cleaner: Liquid type, pH of 7; as recommended by installer
- F. Sealer: Colorless, non-yellowing, penetrating liquid type to completely seal matrix surface; not detrimental to terrazzo components; as recommended by installer.

## 2.4 MIXES

- A. Topping: Three parts aggregate chip; one part aggregate dust; one part matrix binder and hardener.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces are ready to receive work.
- C. Do not begin terrazzo work until concrete substrate has cured 28 days, minimum, and has dried to maximum moisture content of 12 percent.

### 3.2 PREPARATION

- A. Clean substrate of foreign matter.
- B. Apply slurry coat to substrate.

### 3.3 INSTALLATION

- A. Saw cut substrate to install divider and control joint strips.
- B. Install divider and control joint strips straight and level to locations indicated.
- C. Install base and border divider and control joint strips to match floor pattern.
- D. Install terminating cap strip at top of base; attach securely to wall substrate.
- E. Form border with divider strips.
- F. Place terrazzo mix over prepared substrate to thickness indicated.
- G. Flush Vertical Base: Bond topping to wall.
- H. Close area to allow undisturbed curing.
- I. Finishing:
  - 1. Finish terrazzo to NTMA requirements.
  - 2. Produce terrazzo finish surface to match approved sample.
  - 3. Grind terrazzo surfaces with power disc machine; sequence with coarse to fine grit abrasive, using wet or dry method.
  - 4. Apply patch mix to match mortar over ground surface to fill honeycomb exposed during grinding.
  - 5. Remove patch coat by grinding, using fine grit abrasive.
  - 6. Hand grind base and cove similarly.

### 3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat Surface: 1/8 inch in 10 feet.

- C. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch.

### 3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Scrub and clean terrazzo surfaces with cleaner. Let dry.
- C. Immediately after terrazzo has dried, apply sealer.
- D. Seal and polish surfaces.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit traffic over finished terrazzo surfaces.

END OF SECTION

SECTION 09510  
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes suspended metal grid ceiling system and perimeter trim and acoustic tile.
- B. Related Sections:
  - 1. Section 07900 - Joint Sealers.
  - 2. Section 09260 – Gypsum Board Assemblies: soffits and bulkheads
  - 3. Division 15 – Mechanical: Sprinkler heads, diffusers and grille devices installed in ceiling system.
  - 4. Division 16 – Electrical: Lighting Fixtures, Sound system devices, Security system devices and Fire alarm components in ceiling system.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  - 2. ASTM C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
  - 3. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 5. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 6. ASTM E580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
  - 7. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.
- B. Ceilings and Interior Systems Construction Association:
  - 1. CISCA - Acoustical Ceilings: Use and Practice.
- C. Intertek Testing Services (Warnock Hersey Listed):
  - 1. WH - Certification Listings.
- D. National Fire Protection Association:
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

- E. Underwriters Laboratories Inc.:
  1. UL - Fire Resistance Directory.
  2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Installed System: Conform to Kentucky Building Code for installation performance requirements for the suspended metal grid system.
- B. Suspension System: Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1: 360.

### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Submit attachment details and spacing showing calculations on compliance with Kentucky Building Code requirements for seismic design performance classification "B".
- C. Product Data: Submit data on metal grid system components, and acoustic units.
- D. Samples: Submit two samples illustrating material and finish of acoustic units.
- E. Samples: Submit two samples each, of suspension system main runner, cross runner, and perimeter molding.
- F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

### 1.5 QUALITY ASSURANCE

- A. Conform to CISCA requirements.

### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.
- C. Provide seismic design of suspended ceiling under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Kentucky

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.
- C. Maintain not less than 80 footcandles of light in all areas during installation of ceiling tile.

## 1.8 SEQUENCING

- A. Section 0110 - Summary: Work sequence.
- B. Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install acoustic units after interior wet work is dry.

## 1.9 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish one unopened carton of extra tile of each type specified to the Owner upon completion of the work.

## PART 2 PRODUCTS

### 2.1 SUSPENDED ACOUSTICAL CEILINGS

- A. Manufacturers:
  - 1. USG Interiors.
    - a. Type 1: DX suspension system with Summit ClimaPlus (Item No. 990)
    - b. Type 2: DXLA suspension system with Clean Room ClimaPlus Class 10M – 100M (Item No. 56060)
  - 2. Armstrong World Industries: equal products.
  - 3. Substitutions: Section 01600 - Product Requirements

### 2.2 COMPONENTS

- A. Acoustic Tile Type 1: ASTM E1264, conforming to the following:
  - 1. Size: 24 x 24 inches.
  - 2. Thickness: 3/4 inches.
  - 3. Composition: Mineral
  - 4. Light Reflectance: 82 percent.
  - 5. NRC Range: .70

6. CAC (min: 38
  7. Edge: Shadow-Line Bevel (SLB)
  8. Surface Color: White.
  9. Surface Finish: Non-directional fine texture
- B. Acoustic Panels Type 2: ASTM E1264, conforming to the following:
1. Size: 24 x 24 inches.
  2. Thickness: 5/8 inches.
  3. Composition: Mineral.
  4. Light Reflectance: 79 percent.
  5. Edge: Square.
  6. Surface Color: White.
  7. Surface Finish: embossed vinyl laminated surface.
- C. Grid (Type 1):
1. Non-fire Rated Grid: ASTM C635, exposed T; components die cut and interlocking.
  2. Grid Materials: Commercial quality cold rolled steel with hot dipped galvanized coating.
  3. Exposed Grid Surface Width: 15/16 inch.
  4. Grid Finish: White color
  5. Accessories: Stabilizer bars, clips, splices, and perimeter moldings as required for suspended grid system.
  6. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- D. Grid (Type 2):
1. Non-Fire Rated Grid: ASTM C635, two directional exposed T; components die cut and interlocking.
  2. Grid Materials: Commercial quality cold rolled steel with galvanized coating and aluminum cap
  3. Exposed Grid Surface Width: 15/16 inch.
  4. Grid Finish: White color
  5. Accessories: Stabilizer bars, clips, splices, and perimeter moldings as required for suspended grid system.
  6. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

### 2.3 ACCESSORIES

- A. Touch-up Paint: Type and color to match acoustic and grid units.
- B. Manufacturer's standard specialty prefinished aluminum trim and accessories designed for use with free-form island ceilings. Height of trim to be 6" (minimum). Product to be Compasso as manufactured by USG or approved equal.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify layout of hangers will not interfere with other work.

### 3.2 INSTALLATION

- A. Lay-In Grid Suspension System:
  - 1. Install suspension system in accordance with ASTM C636 and as supplemented in this section.
  - 2. Install system in accordance with ASTM E580.
  - 3. Install system capable of supporting imposed loads to deflection of 1/360 maximum.
  - 4. Locate system on room axis according to reflected plan. Do not allow "layering" of multiple pieces of spline to occur at walls to accommodate rooms that are out of square. Layout room to ensure tile dimension is never less than 4" in any direction. Consult Architect in areas of question or unusual difficulty.
  - 5. Install after major above ceiling work is complete. Coordinate location of hangers with other work.
  - 6. Install hanger clips during steel deck erection. Install additional hangers and inserts as required.
  - 7. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
  - 8. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.
  - 9. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
  - 10. Do not eccentrically load system, or produce rotation of runners.
  - 11. Perimeter Molding:
    - a. Install edge molding at intersection of ceiling and vertical surfaces.
    - b. Use longest practical lengths.
    - c. Overlap corners.
    - d. Install at junctions with other interruptions.
  - 12. Form expansion joints. Form to accommodate plus or minus 1-inch movement. Maintain visual closure.
- B. Acoustic Units:
  - 1. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.



2. Lay directional patterned units one way with pattern parallel to shortest room axis. Fit border trim neatly against abutting surfaces.
  3. Install units after above ceiling work is complete.
  4. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
  5. Cutting Acoustic Units:
    - a. Cut to fit irregular grid and perimeter edge trim.
    - b. Cut square reveal edges to field cut units.
    - c. Double cut and field paint exposed edges of tegular units.
  6. Where bullnose concrete block corners occur, install preformed closures to match perimeter molding.
- C. Specialty aluminum trim for free-form island ceilings:
1. Install in accordance with manufacturer's written instructions.
  2. Install in such a manner to conceal suspension system from view.
  3. If it is not possible to completely conceal suspension system from view, ensure suspension is installed in a manner which does not detract from the appearance of the island.

### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

### 3.4 SCHEDULES

END OF SECTION

SECTION 09650  
RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes resilient tile flooring and resilient base. Section also includes stripping and application of 5 coats of wax on VCT flooring.
- B. Related Sections:
  - 1. Division 15: Recessed floor accessories.
  - 2. Division 16: Execution requirements for electrical floor cover plates for installation of resilient flooring specified by this section.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
  - 2. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
  - 3. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing.
  - 4. ASTM F1344 - Standard Specification for Rubber Floor Tile.
  - 5. ASTM F1861 - Standard Specification for Resilient Wall Base.
- B. Federal Specification Unit:
  - 1. FS L-F-475 - Floor Covering Vinyl, Surface (Tile and Roll), with Backing.
  - 2. FS RR-T-650 - Treads, Metallic and Nonmetallic, Skid Resistant.
- C. National Fire Protection Association:
  - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate seaming plan, custom patterns and inlay designs.
- C. Product Data: Submit data describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- D. Samples:
  - 1. Submit manufacturer's complete set of color samples for initial selection.
  - 2. Submit two samples, 2x2 inch in size illustrating color and pattern for each resilient flooring product specified.

- E. Submit name of C.F.I. Certified Installer and the certification qualification number.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum five years documented experience.
- C. The installer must be C.F.I. certified (C-2 level or higher) 7 days prior to submittal of first pay request. **A certified person should be on the job at all times during installation procedures.**

#### 1.6 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate installation of wall base with installation of custom casework. Wall base to be installed in recessed toe kick of all casework, except student cubbies and is work of this section.

#### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- C. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

#### 1.8 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish 1 box of each floor tile type and color used and 20 ft. of wall base.

## PART 2 PRODUCTS

### 2.1 TILE FLOORING

- A. Manufacturers, Vinyl Composition:
  - 1. Azrock Commercial Flooring, Cortina Colors.
  - 2. Armstrong World Industries, Inc.
  - 3. Mannington Commercial
  - 4. Tarkett Colorworks.
  - 5. Substitutions: Section 01600 - Product Requirements.
  
- B. Vinyl Composition Tile: ASTM F1066
  - 1. Size: 12 x 12 inch.
  - 2. Thickness: 0.125 inch.
  - 3. Pattern: Marbleized.

### 2.3 RESILIENT BASE

- A. Manufacturers:
  - 1. Flexco – Group II
  - 2. Johnsonite
  - 3. Roppe Corp.
  - 4. Substitutions: Section 01600 - Product Requirements.
  
- B. Base: ASTM F1861 Rubber top set; coved:
  - 1. Height: 4 inch.
  - 2. Thickness: 0.125 inch thick.
  - 3. Finish: Satin.
  - 4. Length: roll

### 2.4 NATURAL CORK TILE FLOORING

- A. Manufacturers:
  - 1. Expanko: Terra Tile Dark
  - 2. Ipocork: equal product
  - 3. Substitutions: Section 01600 - Product Requirements.
  
- B. Cork Tile: FS LLL-T-431bm Type 1 &2. Tile shade runs through entire thickness.
  - 1. Size: 12 x 12 inch, square.
  - 2. Thickness: 3/16 inch
  - 3. Composition: granulated natural cork
  - 4. Pattern: Terra Tile Dark
  - 5. Finish: Matte polurethane

### 2.5 ACCESSORIES

- A. Subfloor Filler: White premix latex type recommended by adhesive material manufacturer.

- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Tile adhesive shall be low VOC, clear or white in color. Equivalent tile adhesives are Azrock Clear Thin Spread Adhesive, Tarkett equal or DRITAC 6200 Adhesive in halls and general education areas. In cafeterias, art rooms, science rooms and other areas exposed to water or temperature changes (refrigerators/freezers) the equivalent adhesive is Azrock Polyurethane Adhesive, Tarkett equal or DRITAC 6200 Adhesive.
- D. Moldings and Edge Strips: Two component, metal track with ASTM F 1861 rubber insert.
  - 1. Metal Track: 1 ¼ inch wide aluminum, Mercer 980 or equal.
  - 2. Insert: 1 ¼ inch wide rubber insert with ¼ inch leg designed to join ¼ inch flooring to lesser gauge flooring. Mercer 940 or equal.
  - 3. Color: As selected from mfr's standard color options.
- E. Sealer and Wax: Types recommended by flooring manufacturer and coordinated with Owner's personnel to ensure compatibility.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01310 - Project Management and Coordination: Verification of existing conditions before starting Work.
- B. Verify concrete floors are dry to maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, and dusting.
- C. Verify floor and lower wall surfaces are free of substances capable of impairing adhesion of new adhesive and finish materials.

#### 3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. **Vacuum clean flooring substrate immediately prior to beginning tile installation.**
- D. Pay particular attention to locations where there is a control or expansion joint in the concrete slab and transitions through doors. Grind, fill, and prepare areas as required to receive resilient flooring.
- E. Verify C.F.I. certified installer is on site prior to, at commencement, and at all times during installation procedures.

### 3.3 INSTALLATION - TILE FLOORING

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set flooring in place, press with heavy roller to attain full adhesion.
- E. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern, minimize number of seams, and to prevent width of any tile from being less than 3". Where conditions require 3" or less pieces of tile, cut the last two rows of tile into two equal width rows.
- F. Install tile in single direction. Install tile in patterns as directed by Architect. Allow minimum 1/2 full size tile width at room or area perimeter.
- G. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- H. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- I. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- J. Install flooring in recessed floor access covers. Maintain floor pattern.

### 3.4 INSTALLATION – NATURAL CORK TILE FLOORING

- A. Cork flooring shall be installed over clean, dry stable wood or concrete substrate.
- B. Cork tile shall be acclimated for a period of 72 hours in the area of installation in original un-opened packaging.
- C. Using a 3/32" x 3/32" x 3/32" square notch trowel, apply Expanko 2255 adhesive to subfloor following specific guidelines as listed on adhesive container.
- D. After laying tiles, roll with a 100 lb, 12" wide roller three times.
- E. Allow floor to set for 72 hours before submitting it to use or finishing.

### 3.5 INSTALLATION – BASE

- A. Application of rubber cove base by single or multiple bead caulking guns shall not be allowed. Application shall be made with notched full-spread trowels covering the entire surface within 1/16" of all edges. The amount of adhesive shall be determined by manufacturer's recommendations and surface texture. All

excess adhesive shall be removed according to manufacturer's specifications.

- B. Trowel apply adhesive to back of base – covering the entire surface within 1/16" of all edges. The amount of adhesive shall be determined by manufacturer's recommendation and substrate surface texture. All excess adhesive shall be removed according to mfr. specifications.
- C. Fit joints tightly and make vertical. Minimize to greatest degree possible all joints. Maintain minimum dimension of 18 inches between joints.
- D. Miter internal corners. At external corners, "v" cut back of base strip to 2/3 of it's thickness and fold.
- E. Install base on solid backing. Bond tightly to wall and floor surfaces.
- F. Scribe and fit to door frames and other interruptions.

### 3.6 CLEANING AND WAXING (applicable to VCT Flooring)

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean, seal, and WAX (6 coats) resilient flooring products in accordance with manufacturer's instructions. Coordinate with Owner's Maintenance Division so they can follow with an additional 2 coats of wax before occupancy is allowed. If coatings of this contract are damaged by construction dirt or traffic before the Owner has applied the additional coats, the Contractor shall strip all wax start the process over again without additional cost to the Owner.

### 3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Prohibit traffic on resilient flooring for 72 hours after installation.
- C. Prohibit traffic on resilient flooring after clean/seal/wax process until Owner acceptance of floors.

### 3.8 SCHEDULE

END OF SECTION

SECTION 09686

SHEET CARPET

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes carpet direct-glued to substrate; and accessories.
- B. Related Sections:
  - 1. Section 03010 Concrete: Flooring Substrate
  - 2. Section 09650 Resilient Flooring: Termination edging of adjacent floor finish and wall base finish.
  - 3. Division 15: Plumbing floor cover plate with recess for carpet.
  - 4. Division 16: Electrical floor cover plate with recess for carpet.

1.2 REFERENCES

- A. Carpet and Rug Institute:
  - 1. CRI 104 - Standard for Installation of Commercial Carpet.
- B. Consumer Products Safety Commission:
  - 1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.
- C. National Fire Protection Association:
  - 1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples:
  - 1. Submit samples of all color options available for the specified product for selection.
  - 2. Submit two samples 18 inch x 18 inch in size illustrating color and pattern for each selection
- D. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.



- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

#### 1.5 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
  - 1. Floor Finishes: Comply with one of the following:
    - a. Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience approved by manufacturer.
  - 1. FCIB or IFCI certified carpet installers.

#### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Store materials in area of installation for 48 hours prior to installation.
- C. Maintain minimum 70 degrees F ambient temperature 3-days prior to, during and 24 hours after installation.
- D. Ventilate installation area during installation and for 3 days after installation.
- E. Provide not less than 80 footcandles of light during installation of carpet.

#### 1.8 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Supply Owner with all remaining waste materials.

#### PART 2 PRODUCTS

- A. Manufacturers:
  - 1. Cambridge Commercial Carpets (Basis of Specification)
  - 2. Bolyu
  - 3. Collins & Aikman
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Product:
  - 1. Pattern Name: Inventor
  - 2. Pattern Color: Telephone

3. Yarn Content: Diatron SD/BCF
4. Solution Dyed
5. Machine Gauge: 1/10"
6. Stitch Count: 12 spi
7. Yarn Weight: 36 oz/sq yd
8. Width: 12 feet
9. Static Control: Less than 3.5 K.V. Step
10. Flame Resistance – Passes DOC FF-1-70
11. Soil Resistance – Commercial anti-Soil Protection
12. Wear Warranty – 10 Yr Limited Warranty

## 2.2 ACCESSORIES

- A. Sub-Floor Filler: Type recommended by flooring material manufacturer.
- B. Moldings and Edge Strips: Specified in Section 09650
- C. Seam Adhesive: Recommended by manufacturer.
- D. Contact Adhesive: Compatible with carpet material and Recommended by carpet manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify floor surfaces are smooth and flat and are ready to receive work.
- C. Verify concrete floors are ready for carpet installation by testing for moisture emission rate and alkalinity. Obtain instructions when test results are not within specified limits.
  1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
  2. Alkalinity: pH range of 5-9.

### 3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- C. Vacuum clean substrate.

### 3.3 INSTALLATION

- A. Carpet products must be installed to the manufacturer's specification and comply with the manufacturer's requirements, and by a flooring covering contractor who is certified by the floor covering manufacturer.
- B. Install carpet in accordance with CRI 104.
- C. Verify carpet match before cutting to ensure minimal variation between dye lots.
- D. Lay out carpet and locate seams in accordance with CRI 104 section 7.2:
  - 1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
  - 2. Do not locate seams perpendicular through door openings.
  - 3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
  - 4. Locate change of color or pattern between rooms under door centerline.
  - 5. Provide monolithic color, pattern, and texture match within each contiguous area.
- E. Install carpet tight and flat on subfloor, well fastened at edges, with uniform appearance.
- F. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed.
- G. Direct Glue-Down Installation: CRI 104 Section 8.
  - 1. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.
  - 2. Apply seam adhesive. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.
  - 3. Roll with appropriate roller for complete contact of adhesive to carpet backing.
- H. Trim carpet neatly at walls and around interruptions.

### 3.4 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- C. Clean and vacuum carpet surfaces.

### 3.5 PROTECTION OF INSTALLED CONSTRUCTION

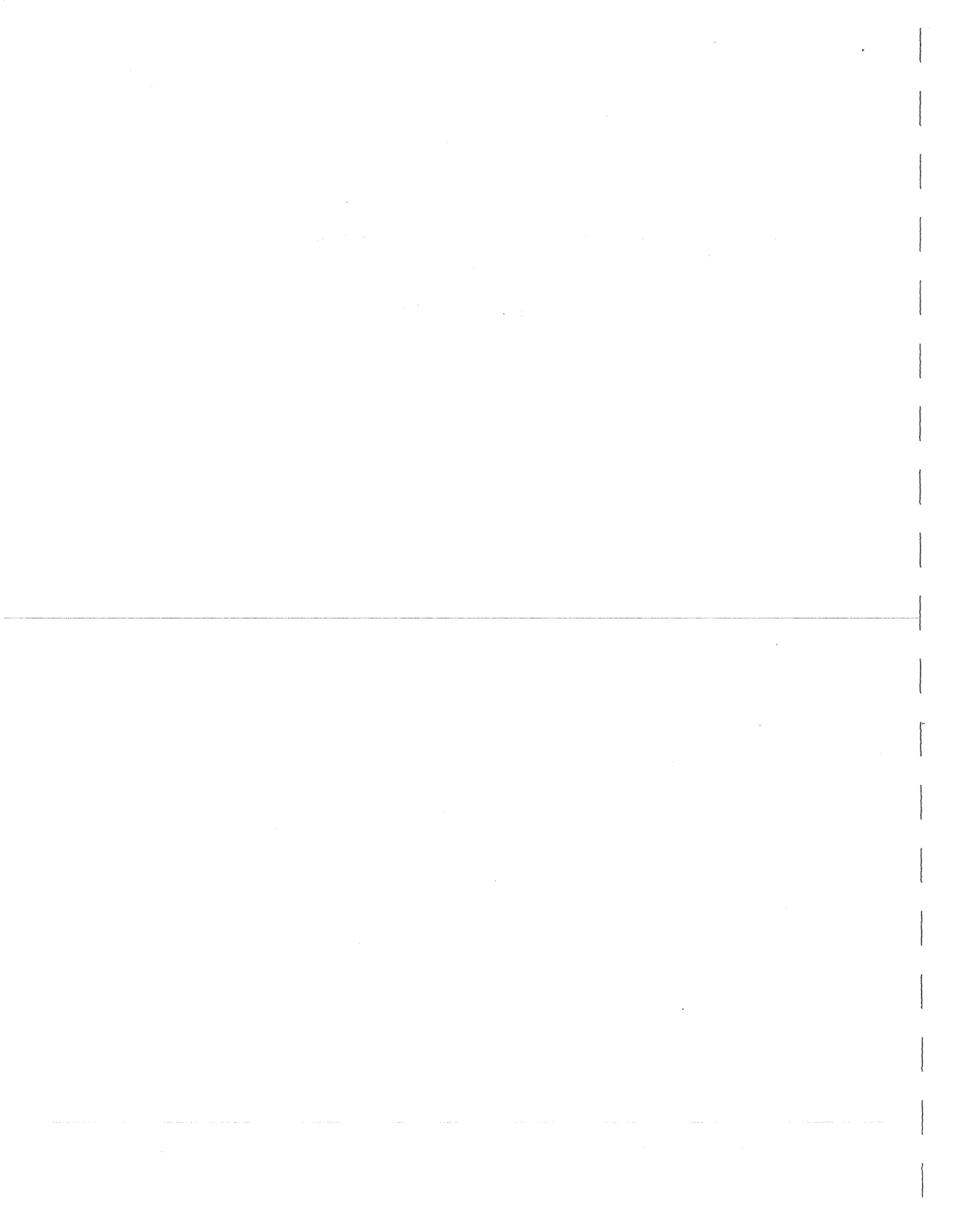
- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit traffic over unprotected floor surface.

- C. Cover carpeting in traffic areas with protective non-staining building paper. Do not use plastic sheeting.

3.6 SCHEDULE

- A. Refer to Room Finish Schedule for location of areas specified to receive carpet floor finish.

END OF SECTION



SECTION 09900  
PAINTS AND COATINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paints, and other coatings.
- B. Related Sections:
  - 1. Section 02741 Hot-Mix Asphalt Paving: Pavement markings.
  - 2. Section 05120 Structural Steel: Shop primed structural steel components
  - 3. Section 05500 - Metal Fabrications: Shop primed items.
  - 4. Section 06410: Shop finished cabinet work.
  - 5. Section 08114 – Standard Steel Doors: Shop Primed doors
  - 6. Section 08115 – Standard Steel Frames: Shop Primed frames
  - 7. Section 15075 - Mechanical Identification.
  - 8. Section 16075 - Electrical Identification.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM D16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
  - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
  - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. National Fire Protection Association:
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- C. Painting and Decorating Contractors of America:
  - 1. PDCA - Architectural Painting Specification Manual.
- D. SSPC: The Society for Protective Coatings:
  - 1. SSPC - Steel Structures Painting Manual.
- E. Underwriters Laboratories Inc.:
  - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

#### 1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on finishing products.
- C. Samples: Submit one complete set of manufacturers paint deck for color selection.
- D. Manufacturer's Installation Instructions: Submit special surface preparation procedures and substrate conditions requiring special attention.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Applicator: Company specializing in performing work of this section with minimum five years documented experience.

#### 1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum two weeks prior to commencing work of this section.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

## 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

## 1.10 SEQUENCING

- A. Section 01100 - Summary: Work sequence.
- B. Sequence application to the following:
  - 1. Do not apply finish coats until paintable sealant is applied.

## 1.11 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for paints and coatings.

## 1.12 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Supply 1 full unopened gallon of each color, type, and surface texture; store where directed.
- C. Label each container with color, type, texture, room locations in addition to manufacturer's label.

## 1.13 MOCKUP

- A. Section 01400 - Quality Requirements: Mock-up requirements.
- B. When requested by the Architect, provide a 8 foot x 8 foot mock-up of a particular paint color to aid in the selection of a paint color. Allow for a total of 5 such mock-ups for 5 different colors.



- C. Locate where directed by Architect.
- D. If the color is accepted, or it is determined that only a minor adjustment is necessary; the mock-up may be incorporated as part of Work.
- E. If the color is determined to be not acceptable, recoat the surface area with new color selected.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers - Paint:
  - 1. Sherwin Williams.
- B. Manufacturers - Transparent Finishes:
  - 1. Sherwin Williams.
- C. Manufacturers - Stain:
  - 1. Sherwin Williams.
- D. Manufacturers - Primer Sealers:
  - 1. Sherwin Williams.
- E. Manufacturers - Block Filler:
  - 1. Sherwin Williams.
- F. Manufacturers - Field Catalyzed Coatings:
  - 1. Sherwin Williams.
- G. Other acceptable manufacturers:
  - 1. ICI
  - 2. Porter Paints
  - 3. Coronado
  - 4. Substitutions: Section 01600 - Product Requirements.

### 2.2 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Prepare pigments:
  - 1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
  - 2. For good flow and brushing properties.
  - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- C. Patching Materials: Latex filler.

- D. Fastener Head Cover Materials: Latex or Epoxy filler.

## 2.3 FINISHES

- A. Refer to schedule at end of section for surface finish.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces and substrate conditions are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Plaster and Gypsum Wallboard: 12 percent.
  - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
  - 5. Concrete Floors: 8 percent.

### 3.2 PREPARATION

- A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects including shop applied primers and zinc coatings.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

- F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply latex based compatible sealer or primer.
- G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Copper Surfaces Scheduled for Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.
- J. Copper Surfaces Scheduled for Natural Oxidized Finish: Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid. Rub on repeatedly for required effect. Once attained, rinse surfaces with clear water and allow to dry.
- K. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- L. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- M. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- N. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- O. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- P. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
- Q. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

- R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- S. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior paintable caulking compound after prime coat has been applied.
- T. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied.
- U. Metal Doors Scheduled for Painting: Prime metal door top and bottom edge surfaces.

### 3.3 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. Sand wood and metal surfaces lightly between coats to achieve required finish.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.
- F. Prime concealed surfaces of interior and exterior woodwork with primer paint.
- G. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.
- H. Finishing Mechanical And Electrical Equipment:
  - 1. Refer to Division 15 and Division 16 for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.
  - 2. Paint shop primed equipment.
  - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
  - 4. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
  - 5. Paint interior surfaces of air ducts and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

6. Paint exposed conduit and electrical equipment occurring in finished areas.
7. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
8. Color code equipment, piping, conduit, and exposed duct work in accordance with engineer's instructions. Color band and identify with flow arrows, names, and numbering.
9. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### 3.4 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements: Testing and Inspection Services.
- B. Inspect and test questionable coated areas in accordance with manufacturer's recommended method for determining thickness of applied coating.

### 3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

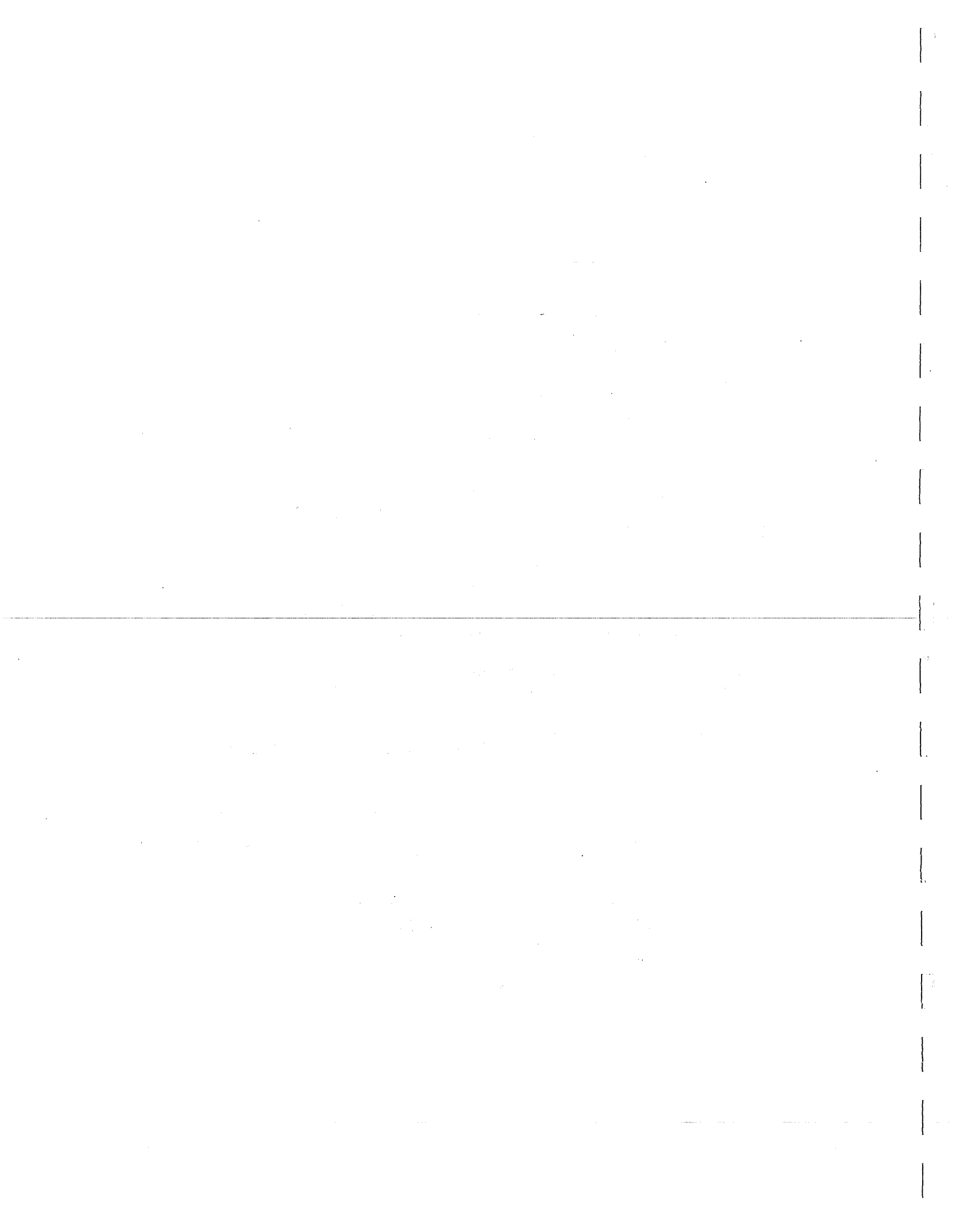
### 3.6 SCHEDULE - EXTERIOR SURFACES

- A. Steel - Shop Primed. Gloss Alkyd Finish:
  1. One Coat SW Kem Kromik Meal Primer B50 Series @ 3.0 mils dft
  2. Two coats SW Industrial Enamel B54 Series @ 2.0-4.0 mils dft per coat
- B. Steel - Galvanized. Gloss Alkyd Enamel System:
  1. One coat primer : SW Galvite HS B50WZ30 @ 3.0-4.5 mils dft.
  2. Two coats SW Industrial Enamel B50 Series @ 2.0-4.0 mils dft per coat
- C. Aluminum - Mill Finish. Satin Acrylic Latex Finish. (field application):
  1. Two coats SW Super Paint Exterior Latex Satin A89 Series @ 1.44 mils dft per coat.
- C. Aluminum - Mill Finish (shop application)
  1. One coat primer: SW DTM Wash Primer B71Y1
  2. Two coats SW DTM Acrylic Coating, Semi-Gloss (B66-200)
- D. Wood - Painted. Gloss Acrylic Latex Finish
  1. One coat primer: SW A-100 Exterior Alkyd Wood Primer Y24 Series @ 2.3 mils dft.
  2. Two coats SW SuperPaint Exterior Latex Gloss A84 Series @ 1.4 mils dft per coat.

### 3.7 SCHEDULE - INTERIOR SURFACES

- A. Wood – Painted. Semi-Gloss Alkyd Finish:
  - 1. One coat primer – SW PrepRite Wall and Wood Primer B49 Series @ 2.2 mils dft..
  - 3. Two coats SW ProMar 200 Interior Alkyd Semi-Gloss B34W200 @ 1.7 mils dft per coat.
  
- B. Wood – Transparent. Satin Varnish Finish:
  - 1. 1<sup>st</sup> coat – SW Wood Classics Interior Oil Stain
  - 2. 2<sup>nd</sup> coat – SW Wood Classics Fast Dry Sanding Sealer
  - 4. 3<sup>rd</sup> & 4<sup>th</sup> coats – SW Wood Classics Fast Dry Varnish Satin
  
- C. Concrete Masonry Units – Latex Finish System
  - 1. **Two coats** block filler - SW PrepRite Interior/Exterior Block Filler B42W46
    - a. First Coat Sprayed and backrolled
    - b. Second Coat Sprayed
  - 2. Two coats SW ProMar 400 Interior Latex Semi-Gloss B30W400 @ 1.2 mils dft per coat.
  
- D. Concrete Masonry Units – Epoxy Finish:
  - 1. **Two coats** block filler - SW PrepRite Interior/Exterior Block Filler B42W46
  - 2. Two coats Water Based Catalyzed Epoxy Primer, Semi-Gloss B70W100 @ 3-5 mils dft
  
- E. Steel – Primed. Gloss Alkyd Enamel Finish:
  - 1. One coat primer: SW Kem Kromik Metal Primer B50 Series @ 3.0 mils dft.
  - 2. Two coats SW Industrial Enamel B54 Series @ 2.0-4.0 mils dft per coat.
  
- F. Steel – Galvanized. Gloss Alkyd Enamel Finish:
  - 1. One coat primer: SW Galvite HS B50WZ30 @ 3.0-4.5 mils dft.
  
- E. Plaster, Gypsum Board. Egshel Latex Finish:
  - 1. Two Coats (primer and finish): ProMar 200XP Eg-Shel B20-3200
  
- F. Plaster, Gypsum Board. Epoxy Finish
  - 1. One coat primer: SW Prep Rite 200 Interior Latex Primer, B28W200 @1.1 mils dft per coat.
  - 2. Two coats Water Based Catalyzed Epoxy Primer, Semi-Gloss B70W100 @ 3-5 mils dft
  
- G. Exposed Concrete Floors. Single Component Urethane Finish
  - 1. Two coats ArmorSeal Rextthane I @ 2.0-3.0 mils dft/ct.

END OF SECTION



SECTION 10100  
VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes markerboards, tackboards and display rails.
- B. Related Sections:
  - 1. Section 04810 – Unit Masonry Assemblies: Substrate construction.

1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A135.4 - Basic Hardboard.
  - 2. ANSI A208.1 - Mat-Formed Wood Particleboard.
- B. ASTM International:
  - 1. ASTM A424 - Standard Specification for Steel, Sheet, for Porcelain Enameling.
  - 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 5. ASTM C36 - Standard Specification for Gypsum Wallboard.
  - 6. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board.
  - 7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. Federal Specification Unit:
  - 1. FS CCC-W-408 - Wall Covering, Vinyl-Coated.
  - 2. FS L-P-1040 - Plastic Sheets and Strips (Polyvinyl Fluoride).
- D. National Fire Protection Association:
  - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
  - 2. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
- E. Underwriters Laboratories Inc.:
  - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.



- B. Shop Drawings: Indicate wall elevations, dimensions, and joint locations, and special anchor details.
- C. Product Data: Submit data on markerboards, tackboards, display rails and accessories.
- D. Submit complete range of color sample options for powder coated trim frames.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit Operation and Maintenance Data.

#### 1.5 QUALITY ASSURANCE

- A. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

#### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

#### 1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

#### 1.8 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for visual display boards.
- C. Warranty: Include coverage of markerboard surface from discoloration due to cleaning, &/or staining.

### PART 2 PRODUCTS

- A. Manufacturers of Framed Marker and Tack Boards:
  - 1. Claridge Products and Equipment
    - a. Marker Board: size as scheduled LCS metal writing surface, 24 gauge, Type A, 5/8" frame, powder coated finish from manufacturer's standards, #507-2 mounting angles, equipped with map rail w/ cork inset, map hooks, map rail end stops, and chalktrough with end closures: Claridge Series #4, or equal.
    - b. Tack Board: size as scheduled framed tack board with 1/8" Nucork on 3/8" Duracore, Type CO, 5/8" frame, powder coated finish from manufacturer's standards, #507-2 mounting angles,

equipped with continuous (96 inch) map rail with map hooks and flag holder. Claridge Series #4.

- c. Display Rails: #51 Economy Display Rail
- 2. Polyvision – equal products
- 3. Best-Rite Chalkboard Co. Inc. – equal products
- 4. Substitutions: Section 01 60 00 - Product Requirements

## 2.2 COMPONENTS (FRAMED PRODUCTS)

- A. Sheet Steel: ASTM A653/A653M, coating class G90 designation. ASTM A424, Type I, commercial quality.
- B. Cork: Fine grain natural cork, homogeneous composition.
- C. Plywood: APA Structural I, Grade C-D.
- D. Hardboard: ANSI A135.4, tempered, smooth face.
- E. Particle Board: ANSI A208.1, wood set with waterproof resin binder, sanded faces.
- F. Gypsum Board: ASTM C36, paper/foil faced, moisture resistant type.
- G. Foil Backing: Aluminum foil sheet, .015 mil thick.
- H. Frame and Chalkrail: Aluminum extrusions, ASTM B221, 6061 alloy.

## 2.3 COMPONENTS (UNFRAMED TACK SURFACE)

- A. All natural product manufactured from linseed oil, granulated cork and pine rosins binders, calendered onto a jute back and emitting no harmful emissions, VOC's or carcinogens.
- B. Width: 48"
- C. Length: up to 90 linear feet
- D. Gauge: 1/4 inch
- E. Backing: Jute
- F. Fire Resistance: ASTM E-84 Class B
- G. Bacteria Resistant: Product shall provide self sanitizing quality in the form of a bactericidal effect.

## 2.4 ACCESSORIES

- A. Adhesives: Type recommended by manufacturer.
- B. Map Supports: Formed aluminum sliding hooks, to fit map rail.

- C. Temporary Protective Cover: Sheet polyethylene.

## 2.5 FABRICATION

- A. Outer Face Sheet: Steel, 24 gage thick.
- B. Core: Particle board 3/8 inch thick.
- C. Backing Surface: Aluminum sheet, 0.015 inch thick.
- D. Outer Facing: Cork, 1/4 inch thick.
- E. Core: Particle board, 3/8 inch thick.
- F. Backing Surface: Aluminum sheet, 0.015 inch thick.
- G. Aluminum Frame: Of manufacturer's standard 5/8 inch profile; concealed fasteners, map rail with cork insert over markerboard, surfaces.
- H. Aluminum Chalkrail: Of solid ribbed profile, one piece full length of chalkboard, molded closed ends; concealed fasteners.

## 2.6 FACTORY FINISHING

- A. Porcelain Enamel: Glass fibered enamel, baked to vitreous surfaces; Porcelain Enamel Institute Type A color white.
- B. Tackboard Surface: Natural light brown cork.
- C. Aluminum Frame , Chalkrail, and Accessories: Powdercoat finish on natural aluminum. Manufacturer's standard color

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify internal wall blocking is ready to receive Work and positioning dimensions are as instructed by manufacturer.

### 3.2 INSTALLATION

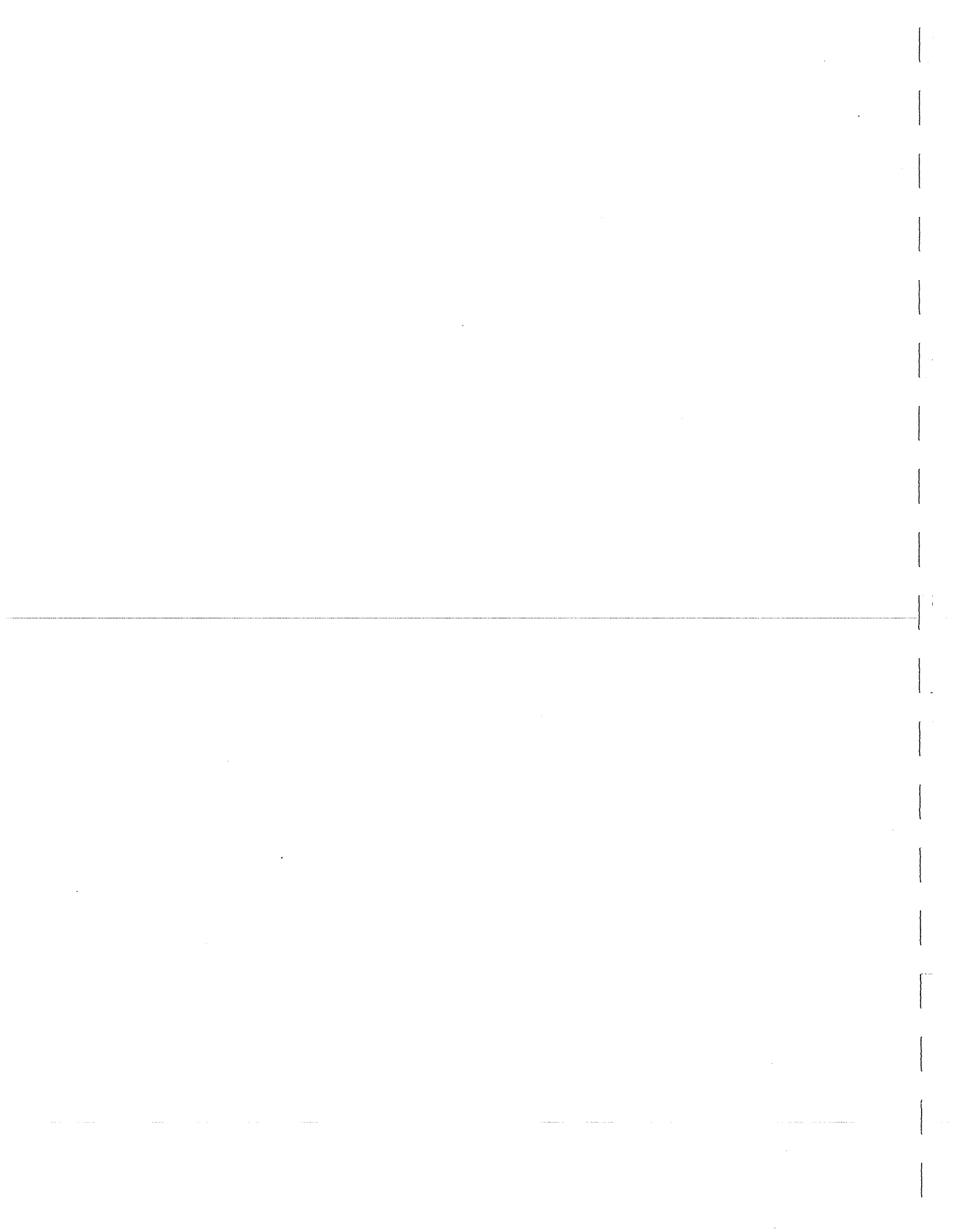
- A. Establish bottom of frame at specified height above finished floor. Mounting Heights:
  - 1. Top @ 82"; bottom @ 34"
- B. Secure units level and plumb.

3.3 CLEANING

- A. Section 01 70 00 - Execution Requirements: Final cleaning.
- B. Clean frame and cork board surfaces prior to Substantial Completion.

3.4 SCHEDULE

END OF SECTION



SECTION 10140

SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes interior plastic and exterior aluminum (cast letter) signage.
- B. Related Sections:
  - 1. Section 04 82 00 – Unit Masonry: mounting substrate
  - 2. Section 09 26 00 – Gypsum Board Assemblies: mounting substrate
  - 3. Division 23 - Mechanical Identification.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.
- C. Samples:
  - 1. Submit two interior signs, illustrating type, style, letter font, and colors specified; method of attachment.
  - 2. Submit two cast letters illustrating type, style, size, letter font and finish of selected letter.
- D. Manufacturer's Installation Instructions: Submit installation template and attachment devices.

1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Package signs, labeled in name groups.
- C. Store adhesive attachment tape at ambient room temperatures.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

- B. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- C. Maintain this minimum temperature during and after installation of signs.

## PART 2 PRODUCTS

### 2.1 INTERIOR SIGNS

- A. Manufacturers:
  - 1. Best Signs.
  - 2. APCO Graphics Model.
  - 3. ASI Sign Systems.
  - 4. Mills Manufacturing
  - 5. Cornerstone Sign & Decal
  - 6. Substitutions: Section 01600 - Product Requirements.
- B. Product Description: Plastic signs.

### 2.2 EXTERIOR CAST LETTERS

- A. Manufacturers:
  - 1. Metal Arts
  - 2. A.R.K. Ramos Signage Sytems
  - 3. Mills Manufacturing
  - 4. Substitutions: Section 01600 - Product Requirements.

### 2.3 COMPONENTS

- A. Engraved Signs: Laminated colored plastic; lettering engraved through face to expose core color:
  - 1. Face Color: Color as selected.
  - 2. Core Color: As selected
  - 3. Total Thickness: 1/8 inch.
  - 4. Size: 6 x 6 inches (minimum)
  - 5. Edges: Radiused.
  - 6. Character Font: Helvetica Narrow
  - 7. Copy: Room name and number
  - 8. Restroom and Locker Rooms: Provide standard accessibility and gender logos with room name and number.
  - 9. Mounting: Glued and Screwed (4 points).
  - 10. Mounting Height: bottom of sign at 48 inches above finish floor.

- B. Individual Cast Aluminum Letters: Exterior letters shall be individual cast metal, aluminum – AAA C443.1 baked enamel finish in custom color as selected by the Architect, flush mounted. Lettering style shall be Helvetica Bold or equivalent. Upper and lower case as:

Uppercase: 8 inches high. Lower case: proportional. See exterior elevations for mounting location.

## 2.4 ACCESSORIES

- A. Mounting Hardware:
  - 1. Interior Signs: Chrome screws &/or silastic adhesive.
  - 2. Exterior Signs: Concealed type recommended by mfr. of letters.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 30 00 - Project Management and Coordination: Verification of existing conditions before starting Work.

### 3.2 INSTALLATION

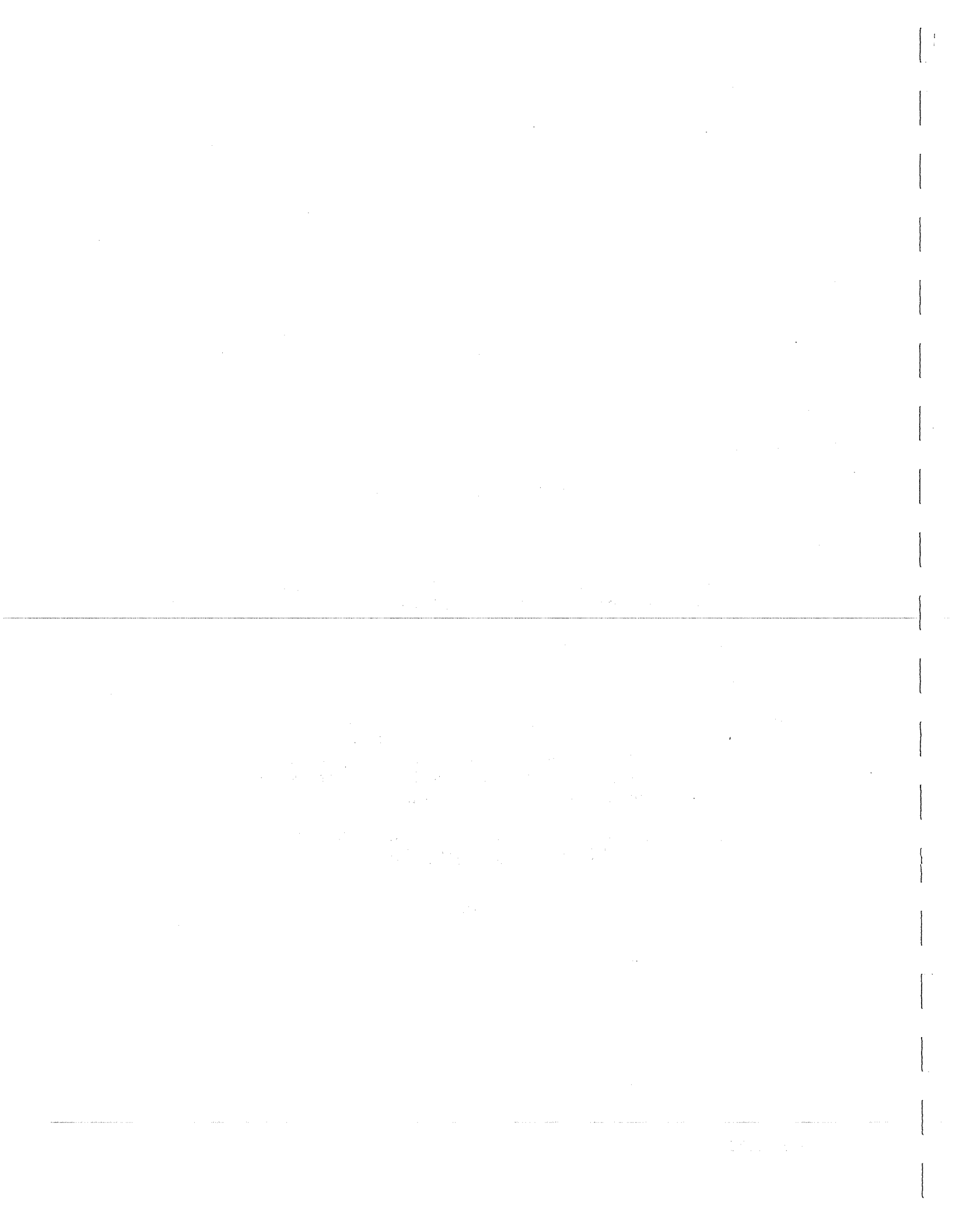
- A. Install signs after painting is finished, in locations in compliance with ADA Guidelines; latch side of door centered at 48 inches above the finished floor.
- B. Locate sign on wall surface, level.

### 3.3 SCHEDULES

- A. Provide one sign for every door opening listed in the Door Schedule, except for exterior doors, unless otherwise noted. Signs with graphic symbols shall be provided at all restrooms and locker rooms. "Copy" and room numbers will be similar to that shown in the Door Schedule; adjustments will be made during shop drawing review at no additional cost.
- B. Exterior Building Sign: SKRECC custom signage for front elevation – **MATERIALS AND TYPE TO BE DETERMINED**

END OF SECTION





SECTION 10165

PLASTIC LAMINATE TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes plastic laminate toilet compartments and urinal screens.
- B. Related Sections:
  - 1. Section 06001 – Carpentry: Concealed wood framing and blocking for compartment support.
  - 2. Section 10800 - Toilet, Accessories.

1.2 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI A208.1 - Mat-Formed Wood Particleboard.
- B. APA-The Engineered Wood Association:
  - 1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.
- C. ASTM International:
  - 1. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- D. National Electrical Manufacturers Association:
  - 1. NEMA LD 3 - High Pressure Decorative Laminates.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall, floor, and ceiling supports, door swings.
- C. Product Data: Submit data on panel construction, hardware, and accessories.
- D. Samples: Submit two samples illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

1.4 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with placement of support framing and anchors in wall.

## PART 2 PRODUCTS

### 2.1 PLASTIC LAMINATE TOILET COMPARTMENTS

- A. Manufacturers:
  - 1. Accurate Partitions Corp.
  - 2. Bobrick Washroom Equipment, Inc.
  - 3. Flush Metal Partition Corp.
  - 4. Global Steel Products Corp.
  - 5. Substitutions: Section 01600 - Product Requirements
- B. Product Description: Floor mounted and overhead braced.

### 2.2 COMPONENTS

- A. Particleboard for Core: ANSI A208.1, with waterproof resin binder; grade, sanded faces.
- B. Plastic Laminate: NEMA LD 3 High pressure melamine laminate, General Purpose Type 0.050 inch thick.
- C. Adhesive: Manufacturer's standard type.
- D. Toilet Compartments: Plastic laminate finished, floor-mounted headrail-braced.
- E. Doors, Panels, and Pilasters: Plastic laminate adhesive and pressure bonded to faces and edges of particleboard core, with beveled corners and edges; edges of cut-outs sealed.
  - 1. Reinforce pilasters and panels with steel plate sandwiched in particleboard core at attachment points. Router cut openings as required.
  - 2. Plastic Laminate Color: as selected
- F. Door and Panel Dimensions:
  - 1. Thickness: 1 inch
  - 2. Door Width: 24 inch
  - 3. Accessible Door Width: 36 inch, out-swinging.
  - 4. Height: 58 inch
  - 5. Thickness of Pilasters: 1-1/4 inch.
- G. Urinal Screens: Wall mounted with two panel brackets, and floor-to-ceiling vertical upright consisting of tubular headrail stock and sockets anchored to floor and ceiling.

### 2.3 ACCESSORIES

- A. Pilaster Shoe: ASTM A666 Type 304 stainless steel with No. 4 finish, 3 inch high, concealing floor fastenings. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: stainless steel, 1 x 1-5/8 inch size, with cast socket wall brackets.

- C. Brackets: stainless steel.
- D. Attachments, Screws, and Bolts: Stainless steel
  - 1. For attaching panels and pilasters to brackets: Through-bolts and nuts
- E. Hardware: Stainless steel:
  - 1. Pivot hinges, gravity type, adjustable for door close positioning; two for each door.
  - 2. Nylon bearings.
  - 3. Thumb turn door latch with exterior emergency access feature.
  - 4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
  - 5. Coat hook with rubber bumper; one for each compartment, mounted on panel.
  - 6. Furnish door pull for outswinging doors.
  - 7. Furnish continuous channel brackets at walls.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify field measurements are as indicated on shop drawings.
- C. Verify correct spacing of plumbing fixtures.
- D. Verify correct location of built-in framing, anchorage, and bracing.

#### 3.2 INSTALLATION

- A. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- B. Attach panel brackets securely to walls using anchor devices.
- C. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- D. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

#### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Indicated Position: 1/4 inch.
- C. Maximum Variation From Plumb: 1/8 inch.

3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- C. Adjust hinges to position doors in fully closed position when unlatched. Return out-swinging doors to closed position.
- D. Adjust adjacent components for consistency of line or plane.

3.5 SCHEDULES

- A. Refer to Drawings

END OF SECTION

## SECTION 10200 - LOUVERS AND VENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Fixed, extruded-aluminum louvers.
- B. Related Sections include the following:
  - 1. Division 7 Section "Joint Sealants" for sealants installed in perimeter joints between louver frames and adjoining construction.
  - 2. Division 15 Sections for louvers that are a part of mechanical equipment.

#### 1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
  - 1. Wind Loads: Determine loads based on a uniform pressure of 20 lbf/sq. ft. (957 Pa), acting inward or outward.
- B. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

C. Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

## 1.5 SUBMITTALS

A. Product Data: For each type of product indicated. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.

C. Samples for Initial Selection: For units with factory-applied color finishes.

## 1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

## 1.7 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Basis-of-Design Product: The design for each louver is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

### 2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.

- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
  - 1. Use types and sizes to suit unit installation conditions.
  - 2. Use hex-head or Phillips pan-head screws for exposed fasteners, unless otherwise indicated.
- D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

### 2.3 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
  - 1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
  - 2. Exterior Corners: Prefabricated corner units with mitered and welded blades and with fully recessed mullions at corners.
- F. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

### 2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal Louver:



1. Basis-of-Design Product: As indicated on plans
2. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than thicknesses for models indicated.
3. Mullion Type: Hidden.
4. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

## 2.5 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
  1. Screen Location for Fixed Louvers: Interior face.
  2. Screening Type: Bird screening.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
  1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
  2. Finish: Same finish as louver frames to which louver screens are attached.
  3. Type: Non-rewirable, U-shaped frames for permanently securing screen mesh.
- D. Louver Screening for Aluminum Louvers:
  1. Bird Screening: Aluminum, 1/2-inch- (12.7-mm-) square mesh, 0.063-inch (1.6-mm) wire.

## 2.6 BLANK-OFF PANELS

- A. Insulated, Blank-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with metal sheets.
  1. Thickness: 1 inch (25 mm).
  2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.8-mm) nominal thickness.
  3. Insulating Core: Unfaced mineral-fiber or foamed-plastic rigid insulation board.
  4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames, not less than 0.080-inch (2.0-mm) nominal thickness, with corners mitered and with same finish as panels.
  5. Seal perimeter joints between panel faces and louver frames with 1/8-by-1-inch (3.2-by-25-mm) PVC compression gaskets.
  6. Panel Finish: Same finish applied to louvers.
  7. Attach blank-off panels to back of louver frames with stainless-steel, sheet metal screws.

## 2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish louvers after assembly.

## 2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
  - 1. Color: Match Architect's sample.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

### 3.3 INSTALLATION

- A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

- F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

### 3.4 ADJUSTING AND CLEANING

- A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
  - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 10200

FLAGPOLES  
SECTION 10350

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes ground-set flagpoles made from aluminum.

1.2 SUBMITTALS

- A. Product Data: For each type of flagpole required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Concord Industries, Inc.
  - 2. American Flagpole
  - 3. Baartol
  - 4. Morgan-Francis Flagpoles
  - 5. PoleTech

2.2 FLAGPOLES

- A. Flagpole Construction, General: Construct flagpoles in one piece if possible. If more than one piece is necessary, provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.
- B. Exposed Height: As shown on the plans.
- C. Aluminum Flagpoles: Provide cone-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/ (B 241M), Alloy 6063, with a minimum wall thickness of 3/16 inch (4.8 mm). Heat treat after fabrication to comply with ASTM B 597, Temper T6.

- D. Foundation Tube: Galvanized corrugated-steel foundation tube, 0.064-inch- (1.6-mm-) minimum nominal wall thickness. Provide with 3/16-inch (4.8-mm) steel bottom plate and support plate; 3/4-inch- (19-mm-) diameter, steel ground spike; and steel centering wedges all welded together. Galvanize steel parts, including foundation tube, after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole. Provide flashing collar of same material and finish as flagpole.

## 2.3 FITTINGS

- A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter; finished to match flagpole.
- B. Internal Halyard, Winch System: Manually operated winch with control stop device and removable handle, stainless-steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Provide flush access door secured with cylinder lock. Finish truck assembly to match flagpole.
- C. Elastomeric Joint Sealant: Single-component urethane or single-component neutral-curing silicone joint sealant complying with requirements in Division 7 Section "Joint Sealants" for Use NT (nontraffic) and for Use M, G, A, and, as applicable to joint substrates indicated, O joint substrates.

## 2.4 FINISHES

- A. Aluminum: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
  - 1. Class I, Clear Anodic Finish: AA-M12C22A41

## PART 3 - EXECUTION

### 3.1 FLAGPOLE INSTALLATION

- A. General: Install flagpoles where shown and according to manufacturer's written instructions.
- B. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.
- C. Foundation-Tube Installation: Install flagpole in foundation tube, seated on bottom plate between steel centering wedges. Plumb flagpole and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION

## SECTION 10500

### LOCKERS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes metal lockers, accessories and locker benches.
- B. Related Sections:
  - 1. Section 06114 - Wood Blocking and Curbing: Wood grounds and attachment strips.

##### 1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

##### 1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locker plan layout, and numbering plan.
- C. Product Data: Submit data on locker types, sizes and accessories.
- D. Manufacturer's Installation Instructions: Submit installation template and attachment devices.

##### 1.4 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Protect locker finish and adjacent surfaces from damage.

#### PART 2 PRODUCTS

##### 2.1 LOCKERS

- A. Manufacturers:
  - 1. List Industries, Inc.: Marquis Student KD Lockers
  - 2. Art Metal Products
  - 3. Lyon Metal Products, Inc.
  - 4. Penco Products, Inc.
  - 5. Republic Storage Systems Co., Inc.

6. Substitutions: Section 01600 - Product Requirements.

2.2 COMPONENTS

- A. Sheet Steel: ASTM A653/A653M, commercial quality, coating class G90, stretcher leveled; to the following minimum thicknesses:
1. Body and Shelf: 24 gage
  2. Door: 14 gage
  3. Frame: 14 gage vertical channel welded to 16 gage horizontal channel
  4. Door Stiffeners: 18 gage
  5. Hinges: Side hinged with 3.5 inch tight pin type, 7 knuckle, 13 gage
  6. Sloping Top 16 gage
  7. Lock Pocket Recessed 1 1/8 inch, stainless steel.

2.3 ACCESSORIES

- A. For Each Locker: Three double prong wall hooks and hat shelf.
- B. Locker Benches: Stationary, Free standing type; bench top of laminated maple species wood, stained, sealed and varnished; pedestals of chrome steel 18 inches high.

2.4 FABRICATION

- A. Locker Units:
1. Width: 12 inches.
  2. Depth: 12 inches.
  3. Height: 72 inches.
  4. Configuration: double tier.
  5. Mounting: Surface mounted.
  6. Base: On new concrete base
  7. Top: Sloped metal with closures.
  8. Locking: Recessed Lock Pocket
  9. Type: Quiet.
- B. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
- C. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
- D. Doors: Channel construction, 14 gage; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind and finish edges smooth. Doors shall be equipped with a nylon friction bumper attached to the bottom return of the door designed to hold the door close to the frame. There shall be no moving parts or latching mechanism.
- E. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; weld securely to locker body and door.

- F. Locking device supplied by Owner.
- G. Number Plates: Furnish oval shaped aluminum plates. Form numbers in contrasting color.
- H. Furnish ventilation openings at top and bottom of each locker.
- I. Form recess for operating handle and locking device.
- J. Finish edges smooth without burrs.
- K. Fabricate sloped metal tops, ends and closure pieces.
- L. Furnish end panels and filler strips.

## 2.5 FACTORY FINISHING

- A. Clean, degrease, and neutralize metal; prime and finish with two coats of baked enamel.
- B. Paint locker units of 1 color throughout.
- C. Color: As selected from manufacturer's standard range.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify prepared bases are in correct position and configuration.
- C. Verify bases and embedded anchors are properly sized.

### 3.2 INSTALLATION

- A. Install lockers plumb and square.
- B. Place and secure on prepared base.
- C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.
- D. Bolt adjoining locker units together to provide rigid installation.
- E. Install end panels, filler panels, and sloped tops.
- F. Install accessories.



G. Replace components not operating smoothly.

3.3 CLEANING

A. Section 01700 - Execution Requirements: Final cleaning.

B. Clean locker interiors and exterior surfaces.

3.4 SCHEDULES

END OF SECTION

SECTION 10523  
FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire extinguishers; fire extinguisher cabinets; and brackets for wall mounting.
- B. Related Sections:
  - 1. Section 06001 - Carpentry: Wood blocking and shims.
  - 2. Section 04810 Unit Masonry Assemblies: Roughed-in wall openings.

1.2 REFERENCES

- A. National Fire Protection Association:
  - 1. NFPA 10 - Standard for Portable Fire Extinguishers.
- B. Underwriters Laboratories Inc.:
  - 1. UL - Fire Protection Equipment Directory.

1.3 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.
- C. Provide fire extinguisher cabinets classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, and locations.
- C. Product Data: Submit extinguisher operational features, color and finish, and anchorage details.
- D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

## 1.5 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperature are capable of freezing extinguisher ingredients.

## PART 2 PRODUCTS

### 2.1 FIRE EXTINGUISHERS, CABINETS AND BRACKETS

- A. Manufacturers:
  - 1. Larsen: MP6 extinguisher, Cabinet No. SS2409-R2, and mfr's standard bracket where applicable
  - 2. Grinnell Corp.: equal products
  - 3. JL Industries: equal products
  - 4. Kidde Fire Extinguishers: equal products
  - 5. Potter Roemer: equal products
  - 6. Substitutions: Section 01600 - Product Requirements.
- B. Dry Chemical Type: Heavy duty DOT steel cylinder with pressure gage; UL rating 3A-40BC.
- C. Extinguisher Finish: Corrosion and impact resistant polyester/epoxy paint finish.
- D. Metal Cabinet: One piece type 304 stainless steel with #4 finish.
- E. Configuration: Recessed type, exterior nominal dimensions of 13 inch wide x 27 inch high x 6 inch deep.
- F. Trim Type: Flat with 5/16 inch wide face.
- G. Door: Manufacturer's standard Vertical Duo.
- H. Door Glazing: Glass, clear, 1/8 inch thick float tempered.
- I. Cabinet Mounting Hardware: Appropriate to cabinet.
- J. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim.
- K. Pre-drill for anchors

- L. Hinge door for 180 degree opening with continuous piano hinge. Furnish catch.
- M. Weld, fill, and grind components smooth.
- N. Glaze doors with resilient channel gasket glazing.
- O. Finishing Cabinet Exterior Trim and Door: Stainless Steel #4 Finish
- P. Finishing Cabinet Interior: Baked Enamel.

## 2.2 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chromed finish.
- B. Graphic Identification: Provide vinyl adhesive backed white letters mounted vertically on the cabinet. Copy: FIRE EXTINGUISHER

## PART 3 EXECUTION

### 3.1 EXAMINATION

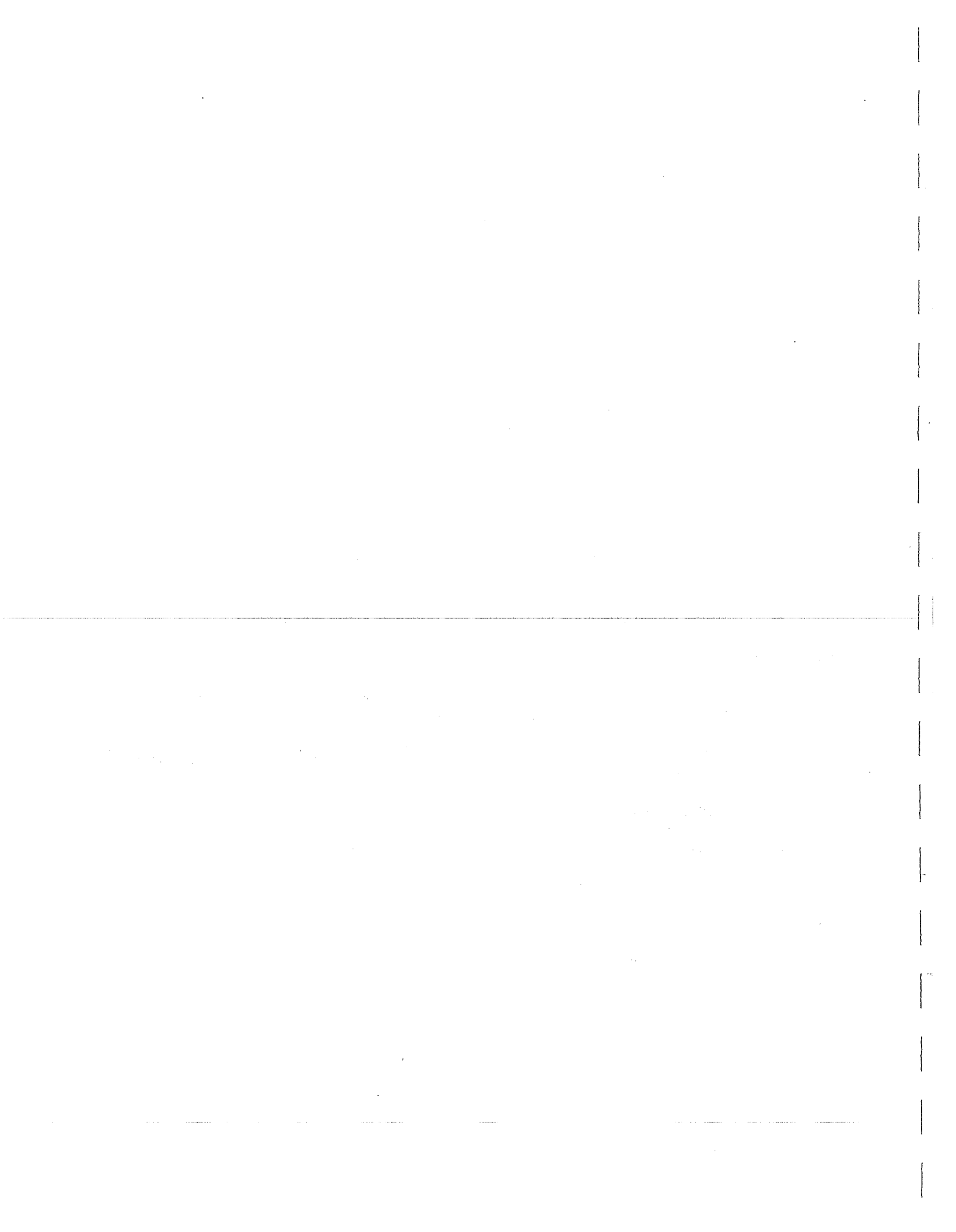
- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify rough openings for cabinet are correctly sized and located.

### 3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings, maximum 32 inches from finished floor to inside bottom of cabinet.
- B. Install wall brackets, maximum 48 inches from finished floor to top of extinguisher handle.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets or on wall brackets.
- E. Position cabinet signage vertically.

### 3.3 SCHEDULES

END OF SECTION



SECTION 10800  
TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes toilet accessories; and utility room accessories.
- B. Related Sections:
  - 1. Section 04810 Unit Masonry Assemblies: Mounting Substrate
  - 2. Section 06001 Carpentry: Concealed wood blocking
  - 3. Section 09260 Gypsum Board Assemblies: Mounting Substrate
  - 4. Section 10170 - Plastic Toilet Compartments.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 3. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - 4. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 5. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - 6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
  - 7. ASTM C1036 - Standard Specification for Flat Glass.
- B. Federal Specification Unit:
  - 1. FS A-A-3002 - Mirrors, Glass.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Submit special procedures, and conditions requiring special attention.

#### 1.4 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement.

#### 1.5 QUALITY CONTROL

- A. All toilet accessories shall be manufactured by a single source

#### 1.6 PROJECT CLOSEOUT

- A. Section 01700 Execution Requirements: Manual for Materials
- B. Include in the Materials Manual a list of all toilet accessories, name of the manufacturer, model number for each accessory, cleaning and maintenance instructions and name and telephone number where replacement parts may be obtained.

### PART 2 PRODUCTS

#### 2.1 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
  - 1. Bobrick Washroom Accessories: Basis of Specification
  - 2. American Specialties, Inc.
  - 3. Bradley Corp.
  - 4. Substitutions: Section 01600 - Product Requirements.

#### 2.2 COMPONENTS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Furnish 2 keys for each accessory to Owner.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269, stainless steel.
- E. Mirror Glass: Float glass, tempered, Quality q2 (ASTM C 1036), with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with FS A-A-3002.
- F. Adhesive: Two component epoxy type, waterproof.

- G. Fasteners, Screws, and Bolts: stainless steel
- H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

### 2.3 TOILET, SHOWER AND UTILITY ROOM ACCESSORIES

- A. Designation T-1: Partition Mounted Toilet Paper Dispenser
  - 1. Product: B-386 Partition mounted dual-sided multi-roll Toilet Tissue Dispenser. 22 gage Stainless steel all welded construction requiring a rough opening of 11.5" x 10 7/8".
- B. Designation T-2: Toilet Paper Dispenser
  - 1. Product: B-4288 Surface mounted multi-roll toilet tissue dispenser. Type 304 stainless steel all welded construction with overall nominal dimensions of 6" x 11" x 6".
- C. Designation T-3: Partition Mounted Sanitary Napkin Disposal
  - 1. Product: B-4354 Partition-Mounted Sanitary Napkin Disposal. 22 gage stainless steel all welded construction requiring a rough opening of 11" x 9 3/8".
- D. Designation T-4: Surface Mounted Sanitary Napkin Disposal
  - 1. Product: B-270 Surface-Mounted Sanitary Napkin Disposal. 22 gage stainless steel all welded construction requiring a rough opening of 11" x 9 3/8".
- E. Designation T-5: Grab Bars
  - 1. Product: B-6806 Stainless Steel, 1 1/2 inch outside diameter, concealed flange mounting; 1 1/2 inch clearance between wall and inside of grab bar.
  - 2. Length and configuration as shown on drawings &/or as specified in schedule at end of this section.
- F. Designation T-6: Automatic Lavatory-Mounted Soap Dispenser
  - 1. Product: B-826 & B-826.18 bright polished chrome plated plastic with LED light indicators and integral plastic shank and battery pack.
- G. Designation T-7: Shower Rod
  - 1. Product: B-207 Heavy Duty Curtain Rod with concealed mounting. 20 gage stainless steel tubing with satin finish. 1" outside diameter tubing equipped with concealed mounting brackets.
- H. Designation T-8: Framed Mirror
  - 1. Product: B-290 Series. One piece roll formed stainless steel framed with satin finish, and no. 1 quality, 1/4 inch **tempered** float/plate glass electrolytically copper-plated by the galvanic process, guaranteed against spoilage for 15 years. Mirror edges shall be protected with plastic filler strips.
  - 2. Size: 18" x 40" unless otherwise noted on drawings



3. Frame: 3/4 x 3/4 SS angle with mitered, welded and ground corners and tamperproof hanging system; satin finish.
4. Backing: Full-mirror sized, 3/16 inch thick water-resistant, polyethylene padding.

## 2.4 FACTORY FINISHING

- A. Stainless Steel: No. 4 satin brushed finish.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify exact location of accessories for installation.
- C. Verify field measurements, including recess wall depth requirements are as indicated on shop drawings prior to release of order.
- D. See Section 06001 for installation of blocking, reinforcing plates, and concealed anchors in walls.

### 3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

### 3.3 INSTALLATION

- A. Install plumb and level, securely and rigidly anchored to substrate.
- B. Mounting Heights and Locations: As required by accessibility regulations; submit written inquiry to architect on items in question.

### 3.4 SCHEDULES

END OF SECTION

SECTION 11132  
PROJECTION SCREENS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Manually operated surface mounted projection screens
  - 2. Ceiling hung, electrically operated projection screens
  - 3. Related accessories.
- B. Related Sections:
  - 1. Section 09 51 23 - Acoustical Ceilings

1.2 REFERENCES

- A. Underwriters Laboratories Inc.:
  - 1. UL - Electrical Appliance and Utilization Equipment Directory.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer's product data on materials, finishes, operation of unit, and electrical requirements.
- C. Samples: Submit two samples, 4x4 inch in size illustrating screen case prefinished components, and screen surface.
- D. Manufacturer's Installation Instructions: Submit detailed installation instructions including rough-in measurements.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution Requirements: Requirements for submittals.
- B. Operation and Maintenance Data:
  - 1. Submit parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
  - 2. Submit technical information for servicing operating equipment.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

- B. Installer: Company specializing in performing work of this section with minimum 5 years documented experience.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver projection screens after building is enclosed, other work within spaces where screens are to be installed is substantially complete, and installation of screens is ready to take place.
- C. Protect projection screens from damage before, during and after installation.

#### 1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

#### 1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate installation of ceilings, walls, electric service power characteristics, and location.

---

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

1. Claridge Products, Inc..(Basis of Design: Mira Series – Manually controlled units, Paramount Series – Electrically controlled unit)
2. Da-Lite Screen Co., Inc.
3. Bretford Manufacturing Inc.
4. Substitutions: Section 01 60 00 - Product Requirements

#### 2.2 PROJECTION SCREENS

- A. Provide manufacturer's standard units consisting of case, screen, mounting accessories and other components as required for a complete installation and complying with descriptive requirements indicated below.
- B. Spring-Loaded-Operated Projection Screens (for manual units): Equal to Claridge "MIRA". Units designed and fabricated for wall or ceiling installation.
- C. Electric Operated Unit: Key operated power supply, preset limit switch for electric unit, 38 ft per minute operating speed, factory sealed and oiled for life.
- D. Screen Case: fabricated in one piece from not less than 22-gage steel with flat back design, vinyl coated or baked enamel finish, and end caps with integral roller brackets and furnished with universal mounting brackets in finish matching end caps to enable attachment to wall or ceiling.

- E. Mounting Brackets: Pre-finished steel angle mounting brackets. Provide for each screen as per manufacturer's recommendations for size specified. Bracket to be manufacturer's standard 6" non-adjustable extension brackets with baked enamel finish. Install screen to brackets with "s" hooks.
- F. Sizes: As indicated on Drawings.

### 2.3 SCREEN SURFACES

- A. Screen: Glass beaded with black masking borders for Multi-Purpose Room. Matte white fiberglass for classrooms.
- B. Glass bead screens: Optical-quality spherical glass beads, chemically coated and applied to backing, forming optical-quality screen surface. Surface 3 times brighter than matte white.
- C. Mildew and flame resistant with top edge mounted on, and securely anchored to, rigid metal roller supported by self-aligning bearings in brackets.
- D. Bottom Edge: Mounted into metal strip in tubular steel slat with baked enamel finish. Furnish end caps and pull attached to slat. Furnish hook and cleat to secure screen in open position.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify rough-in opening and conditions are acceptable.

### 3.2 INSTALLATION

- A. Install projection screens at location indicated on Drawings.
- B. Coordinate with electrical connection.
- C. Securely anchor to supporting substrate.
- D. Install to produce smoothly operating screen with plumb and straight vertical edges and plumb and flat viewing surfaces when lowered.

### 3.3 ADJUSTING

- A. Section 01 70 00 – Execution and Closeout Requirements: Requirements for balancing and adjusting.
- B. Adjust installed unit for smooth and balanced operation.

3.4 CLEANING

- A. Section 01 70 00 – Execution and Closeout Requirements: Requirements for cleaning.
- B. Remove protective coverings from finished surfaces. Clean surfaces and components ready for inspection.

3.5 DEMONSTRATION

- A. Section 01 70 0 – Execution and Closeout Requirements: Requirements for demonstration and training.

3.6 PROTECTION OF FINISHED WORK

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Do not permit use of projection screens after installation.

3.7 SCHEDULE

- A. ***TO BE DETERMINED***

END OF SECTION

SECTION 11150  
BANKING EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes banking equipment.
- B. Related Sections:
  - 1. Section 03130- Permanent Forms: Insulating Concrete Forms: formed openings in exterior walls to accommodate banking equipment
  - 2. Division 16- Electrical: Power and conduit requirements to support audio and electrical connections to banking equipment

1.2 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate locations, construction and anchorage details, dimensions, rough-in openings sizes, power and conduit requirements, and finish options.
- C. Product Data: Submit data for all components, including, but not limited to, transaction drawer, pneumatic teller system, bullet resistant window, teller audio system, envelope depository, vault door, and LED directional signage
- D. Samples: Submit two samples illustrating surface finishes.
- E. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention, and all other installation instructions

1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.4 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 BANK EQUIPMENT

- A. Supplier / Installer:
  - 1. QSI, 107 Schuler Drive, Bardstown KY 40004. 502-350-1001. Contact: Dave Discepoli.

2. Substitutions: Consult Owner's Representative on any proposed substitutions.

## 2.2 COMPONENTS

- A. Overhead Pneumatic System. QSI Model 3000-RT equipped with audio features, complete tubing system, with stainless steel, exterior high impact enamel customer unit cabinets and interior teller units
- B. Transaction Drawer. American Vault Model 1000A capable of 12" and 18" drawer travel and manual operation with stick shift handle operation. Drawer shall feature drop frame design permitting access for deposits from all vehicle heights and various inside/outside grade differences. Drawer shall accommodate items up to 12"w x 9"d x 6"h with weight capacity in excess of 300 lbs. Drawer shall carry UL level 1 bullet resistant rating. Unit shall be equipped with weatherproof customer speaker/mic and teller call button and be prewired for connection to audio system.
- C. Bullet Resistant Window. QSI Bullet Resistant vision window with stainless steel frame and clear, insulated glass.
- D. Teller Audio System. QSI Model AV-1500 Teller Audio System equipped with high level filtering system for noise reduction and wireless communication featuring 8 hours of talk time. System shall be equipped with state of the art "touch sense" buttons for lane selection and light activation when customer call button is pressed. System shall also include wireless motion detection activated "pre-notification" chime upon car approach.
- E. Envelope Depository. QSI model ENV-14 Envelope Depository with stainless steel box construction, fish resistant chute, and 14"w x 23"h x 7"d locker. Locker shall be equipped with combination lock.
- F. Vault Door – *TO BE DETERMINED*
- G. LED Directional Signage. Exitronix Model LC3 surface mounted LED Lane Control Signage.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify prepared openings are ready to receive work.
- C. Coordinate electrical requirements with electrician.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's written instructions.
- B. Install and secure products in position, neatly, and accurately.

3.3 ADJUSTING

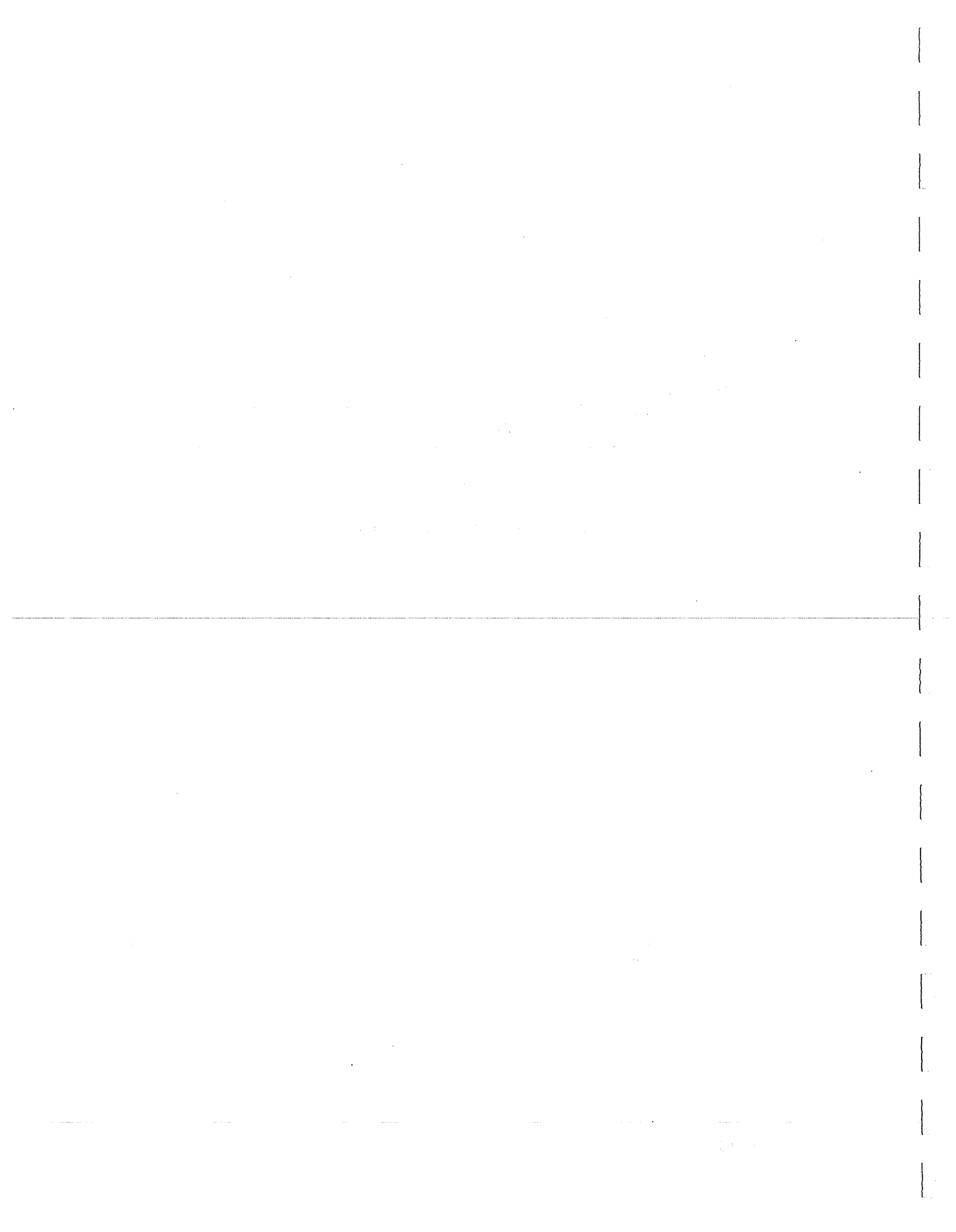
- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust components for proper operation.

3.4 SCHEDULES

- A. Banking Equipment requirements include:
  - 1. (2) station QSI Model 3000 pneumatic system with audio features
  - 2. 1 American Vault Model 1000A Transaction Drawer
  - 3. (2) Bullet Resistant Window with clear insulated glass. Refer to drawings for size.
  - 4. (2) station Teller Audio system
  - 5. 1 Envelope Depository
  - 6. 1 Vault Door (*model number to be determined*)
  - 7. (3) LED Lane Control Signs.
- B. Refer to drawing A1.0 for location of equipment.

END OF SECTION





SECTION 11161  
DOCK LEVELERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes prefabricated steel leveler operating hardware; and mechanical restraint safety vehicle lock.
- B. Related Sections:
  - 1. Section 03100 - Concrete Forms and Accessories: Execution requirements for placement of leveler frame into concrete [loading dock.
  - 2. Section 03300 - Cast-In-Place Concrete: Concrete pit.

1.2 REFERENCES

- A. ASTM International:
  - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. National Electrical Manufacturers Association:
  - 1. NEMA MG 1 - Motors and Generators.
- C. Underwriters Laboratories Inc.:
  - 1. UL - Electrical Appliance and Utilization Equipment Directory.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate required opening dimensions, tolerances of opening dimensions, [placement dimensions of safety lock device, and perimeter conditions of construction.
- C. Product Data: Submit materials and finish, installation details, roughing-in measurements, and operation of unit.
- D. Manufacturer's Installation Instructions: Submit special requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit operating instructions, identify unit limitations. Submit unit maintenance information, lubrication cycles, spare parts manual.

## 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of project.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.

## PART 2 PRODUCTS

### 2.1 DOCK LEVELERS

- A. Manufacturers:
  - 1. Rite-Hite Corp.: Model APB 1000 Series (basis of design)
  - 2. Advanced Lifts, Inc. – equivalent product
  - 3. Blue Giant USA Corp. – equivalent product
  - 4. Kelley Dock Systems– equivalent product
  - 5. W.B. McGuire Co. Inc. – equivalent product
  - 6. Substitutions: Section 01600 - Product Requirements

### 2.2 COMPONENTS

- A. Dock Leveler:
  - 1. Operation: Hydraulic.
  - 2. Deck Width:
  - 3. Deck Length:
  - 4. Operating Range: 12 inches above dock level, 12 inches below dock level.
  - 5. Capacity: lbs.
- B. Vehicle Restraint: Rite Height Vertical Restraint (VBR-300) fabricated and welded steel plate construction, spring loaded to automatically latch when activated, to conform to ICC semitrailer vehicle bumper requirements for dimension and placement.
- C. Leveler: 1/4 inch steel checker plate deck, reinforced on underside, welded to fabricated steel frame; counter balanced with 16 inch long automatically operated plate lip; lip to lock in downward vertical position when leveler is at rest at dock level.

### 2.3 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Section 16150 - Wiring Connections: Requirements for electrical characteristics.
  - 1. 1 hp motor
  - 2. 480 volts, three phase, 60 Hz.
  - 3. 21 amperes maximum overcurrent protection with automatic reset.
  - 4. 30 minimum circuit ampacity.
- B. Division 16 - Motors: Requirements for motors.

- C. Controls: [\_\_\_\_\_].
- D. Disconnect Switch: Factory mount disconnect switch [in control panel] [on equipment].

#### 2.4 FACTORY FINISHING

- A. Leveler Platform: Hot dip galvanized to 1.25 (min) oz/sq ft finish. Factory enameled finish.
- B. Leveler Frame: Hot dip galvanized to 1.25 (min) oz/sq ft finish. Factory enameled finish.
- C. Vehicle Restraint: Yellow painted hook, galvanized steel operating mechanism.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify rough-in opening is acceptable.

#### 3.2 PREPARATION

- A. Coordinate pit frame and integral anchor placement by Section 03100.

#### 3.3 INSTALLATION

- A. Install dock leveler and mechanical safety vehicle lock unit in prepared opening.
- B. Set square and level.
- C. Anchor unit securely, flush with dock. Weld back of leveling dock to pit frame. Touch-up weld with primer.
- D. Anchor safety vehicle lock securely [and flush with vertical dock face].

#### 3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust installed unit [and safety vehicle device] for smooth and balanced operation.

#### 3.5 DEMONSTRATION AND TRAINING

- A. Demonstrate operation and maintenance requirements to Owner's personnel.

3.6 SCHEDULES

END OF SECTION

SECTION 11165  
DOCK BUMPERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes dock bumpers with attachment frame.
- B. Related Sections:
  - 1. Section 03100 - Concrete Forms and Accessories: Execution requirements for placement of bumper anchors into concrete loading dock.

1.2 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Product Data: Submit unit dimensions, method of anchorage, and details of construction.
- C. Manufacturer's Installation Instructions: Submit special installation requirements.

PART 2 PRODUCTS

2.1 DOCK BUMPERS

- A. Manufacturers:
  - 1. Rite-Hite Corp. Model Standard 410-10
  - 2. Blue Giant USA Corp. - equivalent product
  - 3. Chase/Durus - equivalent product
  - 4. Durable Corp. - equivalent product
  - 5. Kelley Dock Systems - equivalent product
  - 6. W.B. McGuire Co., Inc. - equivalent product
  - 7. Pawling Corp. - equivalent product
  - 8. Superior Bumper Products - equivalent product
  - 9. Substitutions: Section 01600 - Product Requirements

2.2 COMPONENTS

- A. Bumpers: Fabric reinforced rubber pads, ozone resistant, laminated and compressed in position with two galvanized steel rods with threaded ends, washers and nuts; between 3 x 2-1/2 x 1/4 10 inch galvanized steel angle end plates:
  - 1. Projection From Wall: 4 inches.
  - 2. Vertical Height: 10 inches.
  - 3. Length: 12 5/8 inches.
- B. Attachment Hardware: 3/4 inch diameter galvanized bolts.

- C. Touch-up Primer: Mfr's. recommended type.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify anchor placement is acceptable.

#### 3.2 PREPARATION

- A. Coordinate integral anchor placement by Section 03300 and 11161

#### 3.3 INSTALLATION

- A. Install dock bumpers.
- B. Set plumb and level.
- C. Secure angle end frames to concrete.
- D. Weld angle end frames to [steel dock frame] [embedded anchors]. Touch up weld with primer.

---

#### 3.4 SCHEDULES

END OF SECTION

SECTION 11250  
20,000 GPD Extended Aeration Wastewater Treatment Plant

PART 1 – GENERAL

A. WORK INCLUDED

1. The Work to be accomplished under this Section of the Specifications consists of the furnishing of all labor, materials, equipment, and services necessary for the construction of a 20,000 GPD Extended Aeration Wastewater Treatment Plant (WWTP), as shown on the Contract Drawings.
2. The WWTP shall meet the following effluent characteristics:

<u>Description</u>	<u>Influent</u>	<u>Plant Effluent</u>
Flow: GPD	20,000	
BOD5: PPM	250	<10
SS: PPM	250	<15
NH3: PPM	30	<1 Summer

3. Access to the plant shall be through a full grating over the total plant and equalization tank.
4. The WWTP footprint shall be no larger than 12' wide x 11'- 9" high x 59' long.

PART 2 – PRODUCTS

A. Equalization tank(s):

1. To make a two tank system, the plant will have an equalization tank of 34,836 gallons, which will be a duel tank the first tank being 25, 164 gallons and the second tank being 34,836 gallons: 12 feet wide x 11'-9" high x 38 feet long. The second tank for equalization will be for a total of 54,836 gallons: 12 feet wide x 11'-9" high x 59 feet long.
2. Flow equalization weir box.
3. Inlet coarse bar screen with ¼" flat bar on ¾" on center.
4. Two equalization pumps with controls.
5. One (1) aeration blower providing for 25,164 gallon Equaliztion tank - 31 CFM at 5 PSI with 1 HP TEFC motor operating at 460v/3ph/60HZ with a fiberglass enclosure and all accessories for mounting on the plant.
6. One (1) aeration blower providing for 34,836 gallon Equaliztion tank - 43 CFM at 53 PSI with 3 HP TEFC motor operating at 460v/3ph/60HZ with a fiberglass enclosure and all accessories for mounting on the plant.
7. One (1) aeration blower providing for 54,836 gallon Equaliztion tank - 69 CFM at 5 PSI with 5 HP TEFC motor operating at 460v/3ph/60HZ with a fiberglass enclosure and all accessories for mounting on the plant.

- B. Aeration tank - 21,055 Gallons - Two (2) aeration blowers to provide 46 CFM at 5 PSI with 2 Hp TEFC motor operating at 208v/3ph/60Hz for mounting on pad next to the plant. The blowers will have a fiberglass enclosure and have all the accessories.



- C. Sludge holding tank – 2,796 Gallons
  - 1. Includes an aeration system.
  - 2. Includes a 4" Diameter supernatant return pipe.
- D. Clarifier - 3,398 Gallons
  - 1. Includes two 3" Dia. sludge return airlifts.
  - 2. Includes two 2" Dia. scum return airlifts.
  - 3. Designed to meet the New York Standard of 12-foot side water depth.
- E. Chlorinator - 535 Gallons
  - 1. Includes one tablet chlorinator.
  - 2. Includes 45 lbs. of tablets.
- F. Dechlorinator:
  - 1. Includes one tablet dechlorinator.
  - 2. Includes 45 lbs. of tablets.
- G. Flow Meter: Ultrasonic flow meter with paper recorder.
- H. Control Panel: The control panel will be a NEMA 4 fiberglass enclosure and will contain starters and controls for all motors provided. All motors will have H-O-A switch. The panel will operate at 460V/3ph/60Hz.

### PART3 - EXECUTION

- A. PLANT COATING: All rust, dust and mill scale will be removed by sand blasting to an SP-6 finish on the outside and SP-10 interior. All interior and exterior vessel surfaces will be painted with two coats of epoxy.
- B. BACKFILL AND FINISH GRADING
  - 1. Class I (No. 9 crushed stone aggregate) backfill material shall be placed around the WWTP to within 24 inches of the surface of the surrounding ground, with sufficient allowance for settlement. The remaining fill shall be earth material free of rocks in the areas of piping and excavated material in all other areas. Rock and/or shale excavation may be placed in the top 24 inches of fill, but shall not be above piping or any closer than 12 inches from finished grade. The plant shall be 12 inches above grade.
  - 2. All fill shall be placed so as to load structures symmetrically. Rough grading shall be held below finish grade and then topsoil which has been stockpiled in work of Division 2, shall be evenly spread over the surface.
  - 3. Grading shall be brought to the levels shown on the Drawings or to elevations established by the Engineer. Final dressing shall be accomplished by hand work or machine work, or a combination of these methods as may be necessary to produce a uniform and smooth finish to all parts of the re-grade.
  - 4. The entire disturbed area around the WWTP shall be seeded in accordance with Section 02930.

C. ACCEPTANCE TESTS

1. After installation of the WWTP equipment, and after inspection, operation, testing, and adjustment have been completed by the manufacturer's representative, each piece of equipment shall be given a running test in the presence of the Engineer during which it shall determine its ability to operate without vibration or overheating, and to deliver its rated capacity under the specified conditions. All defects or defective equipment revealed by or noted during the tests shall be corrected or replaced promptly at the expense of the Contractor, and if necessary, the tests shall be repeated until results acceptable to the Engineer are obtained. The Contractor shall furnish all labor, piping, equipment, and materials necessary for conducting the tests.
2. All adjustments necessary to place the equipment in satisfactory working order shall be made at the time of the above tests.
3. The Contractor shall provide water for testing.
4. In the event that the Contractor is unable to demonstrate to the satisfaction of the Engineer that the equipment will satisfactorily perform the service required and that they will operate free from vibration and heating, the equipment may be rejected. The Contractor shall then remove and replace the equipment at his own expense.

D. WARRANTY

1. The manufacturer shall guarantee for twelve (12) months from date of acceptance/start-up that the structure and all equipment will be free from defects in design, material, and workmanship.
2. Warranties and guarantees by the suppliers of various components in lieu of a single source responsibility by the manufacturer will not be accepted. The manufacturer shall assume prime responsibility for the guarantee of the station and all components.
3. In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the manufacturer shall provide a replacement part without cost to the Owner. After start-up service has been performed, the labor to replace accessory items shall be the responsibility of others.
4. The replacement or repair (including cost of parts and labor) of those items normally consumed in service, such as pump seals, oil, grease, etc., shall be considered as part of routine maintenance and WWTP upkeep.
5. It is not intended that the manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material, workmanship or delays in delivery, replacement, or otherwise.

END OF SECTION 11250



SECTION 12486

FLOOR MATS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes carpet mat; link mat; rubber mat; cocoa mat; chenille mat; and recessed frame.
- B. Related Sections:
  - 1. Section 03300 - Concrete Forms and Accessories: Floor depression formed with frame.

1.2 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate dimensions.
- C. Product Data: Submit data indicating mat characteristics, component dimensions, and recessed frame and details.
- D. Samples: Submit two samples illustrating quality of the mat. Submit two samples of the frame indicating profile and metal finish.

1.3 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 – Execution Requirements: Closeout submittal procedures
- B. Submit manufacturers literature on recommended maintenance and cleaning procedures. Include name a telephone number where replacement parts can be obtained.

1.5 EXTRA STOCK

- A. Section 01700 – Execution Requirements: Spare parts and maintenance products.
- B. Provide 5 full length surface treads.

## PART 2 PRODUCTS

### 2.1 FLOOR MATS

- A. Manufacturers:
  - 1. Balco/Metalines Model Elastomeric Hinge Recessed FMV-R.
  - 2. Construction Specialties, Inc. – equivalent product.
  - 3. Reese Enterprises, Inc. – equivalent product.
  - 4. Substitutions: Section 01600 - Product Requirements

### 2.2 COMPONENTS

- A. Link Mat: Extruded aluminum treads (clear anodized finish) spaced at 2" O.C., with carpet surface treads connected by a continuous vinyl hinge, slotted for drainage. Treads to run counter to traffic flow.
- B. Surface Treads: 100% nylon fiber face, 1/4 inch finish pile height, 30 oz./sq yd, fusion bonded to prevent fraying, delamination or moisture penetration. Carpet to be positively locked into aluminum tread rails. Color to be selected by architect from manufacturer's standard colors available.
- C. Recessed Frame: 7/8 inch thick clear anodized, with anchoring features furnished by manufacturer of mat.

### 2.3 FABRICATION

- A. Construct recessed mat frames square, tight joints at corners, rigid. Coat surfaces with protective coating where in contact with cementitious materials.
- B. Fabricate mats in single unit sizes.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify floor opening for mats are ready to receive work.

### 3.2 PREPARATION

- A. Verify size of floor recess before fabricating mats.
- B. Vacuum clean floor recess.

3.3 INSTALLATION

- A. Install mat frames to achieve flush plane with finished floor surface.
- B. Install mats in floor recess flush with finish floor after cleaning of finish flooring.

3.4 INSTALLATION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Gap Formed at Recessed Frame From Mat Size: 1/4 inch.

3.5 ADJUSTING

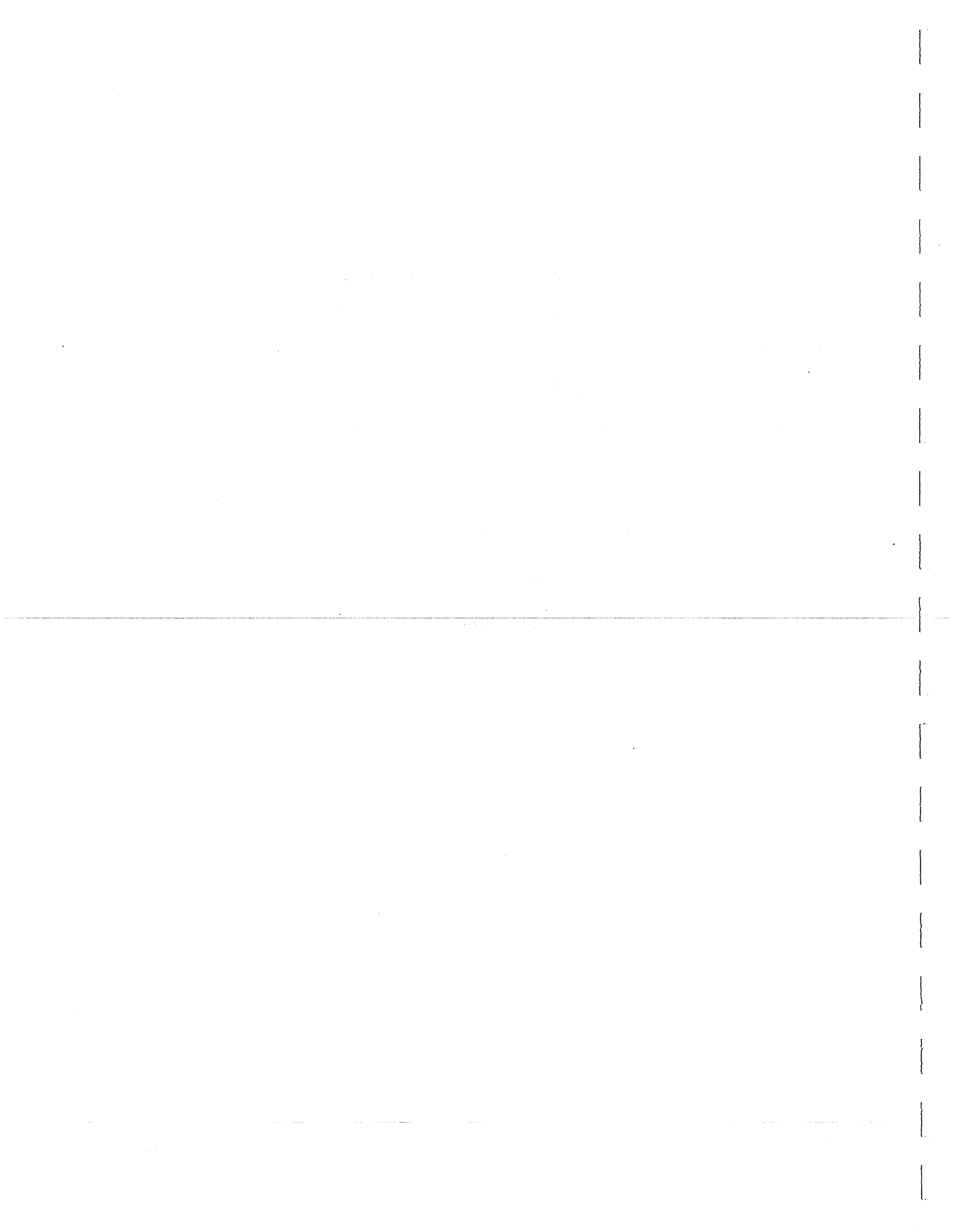
- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust floor mats and frames to prevent tripping hazard.

3.6 SCHEDULES

<u>Location</u>	<u>Type</u>	<u>Size (inches)*</u>	<u>Color</u>
Vestibule 100	Link Mat with carpet treads	144 x 108	TBD

\* Field Verify Size before fabrication.

END OF SECTION



SECTION 12494  
ROLLER SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manually operated sunscreen roller shades.
- B. Manually operated double-roller sunscreen and room-darkening shades.

1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.
- B. Section 09260 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.
- C. Section 09510 - Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.

1.3 REFERENCES

- A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. NFPA 70 - National Electrical Code.
- C. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
  - 3. Storage and handling requirements and recommendations.
  - 4. Mounting details and installation methods.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
  - 1. Prepare shop drawings on Autocad or Microstation format using base sheets provided electronically by the Architect.



- D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- E. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shade cloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.
- G. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
- C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
  - 1. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

#### 1.8 WARRANTY

- A. Roller Shade Hardware, Chain and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.

- B. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: MechoShade Systems, Inc.; 42-03 35th Street, Long Island City, NY 11101. ASD. Tel: (718) 729-2020. Fax: (718) 729-2941. Email: [info@mechoshade.com](mailto:info@mechoshade.com), [www.mechoshade.com](http://www.mechoshade.com).
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

### 2.2 APPLICATIONS/SCOPE

- A. Roller Shade Schedule:
  - 1. Shade Type 1: Manual operating, chain drive, sunscreen roller shades in all exterior windows of rooms and spaces shown on the Drawings.
  - 2. Shade Type 3: Manual operating interior, chain drive "double" solar and room darkening blackout roller shades, operating independently of each other, in Community Room 147, Training Room 170 and Board Room 202, and related mounting systems and accessories.

### 2.3 SHADE CLOTH

- A. Visually Transparent Single-Fabric Shadecloth: MechoShade Systems, Inc., ThermoVeil group, single thickness non-raveling 0.030-inch (0.762 mm) thick vinyl fabric, woven from 0.018-inch (0.457 mm) diameter extruded vinyl yarn comprising of 21 percent polyester and 79 percent reinforced vinyl, in colors selected from manufacturer's available range.
  - 1. Dense Linear Weave: "1000 series", 3 percent open, dense linear-weave pattern.
  - 2. Color: Selected from manufacturer's standard colors.
- B. Room darkening (PVC Free) Shadecloth with opaque acrylic backing: MechoShade Systems, Inc., "Equinox 0100 series", .008 inches thick (.19 mm) blackout material and weighing .94 lbs. per square yard, comprising of 53% fiberglass, 45% acrylic, 2% poly finish.
  - 1. Color: Selected from manufacturer's standard colors.

### 2.4 SHADE BAND

- A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.

1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
2. Shade band and Shade Roller Attachment:
  - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.
  - b. Provide for positive mechanical engagement with drive / brake mechanism.
  - c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
  - d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
  - e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

## 2.5 SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:
  1. Bottom hem weights.
  2. Concealed hemtube.
  3. Exposed blackout hembar with light seal.
- C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.
- D. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of

seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.

- E. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.
- F. Blackout shadebands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in a integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
  - 1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
  - 2. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches (38.1 mm) high and be totally opaque. A see-through moiré effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.

## 2.6 COMPONENTS

- A. Access and Material Requirements:
  - 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
  - 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
  - 3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.
- B. Manual Operated Chain Drive Hardware and Brackets:
  - 1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
  - 2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
  - 3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
  - 4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.

5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
  6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
  7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
  8. Drive Bracket / Brake Assembly:
    - a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side / sill channels, center supports and connectors for multi-banded shades.
    - b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
    - c. The brake shall be an over -unning clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
    - d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
    - e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
- C. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

## 2.7 ACCESSORIES

- A. Fascia:
1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
  2. Fascia shall be able to be installed across two or more shade bands in one piece.
  3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
  4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
  5. Notching of Fascia for manual chain shall not be acceptable.
- B. Room Darkening Side and / or Sill Channels:

1. Extruded aluminum with polybond edge seals and SnapLoc-mounting brackets and with concealed fastening. Exposed fastening is not acceptable. Channels shall accept one-piece exposed blackout hembar with vinyl seal to assure side light control and sill light control.
  - a. MechoShade side channels, 1-15/16 inches (49.2 mm) wide by 1-3/16 inches (30.1 mm) deep, two-band center channels, 2-5/8 inches (66.6 mm) wide by 1-3/16 inches (30.1 mm) deep. The 2-5/8-inch (66.6 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. MechoShade side channels 2-5/8 inch (66.6 mm) may be used as center supports for ElectroShades; shadebands up to 8 high. For shadebands over 8 feet (2438 mm), provide ElectroShade side channels.
  - b. Color: Selected from manufacturer's standard colors.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### 3.3 INSTALLATION

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- D. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 13121  
PRE-ENGINEERED BUILDINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes pre-engineered, shop fabricated structural steel building frame; interior and exterior metal wall and sloped roof system including gutters and downspouts.
- B. Related Sections:
  - 1. Section 03100 - Concrete Forms and Accessories: Execution requirements for placement of anchor bolts and base plates specified in this section in concrete.
  - 2. Section 07214 Foamed-In-Place Insulation: Insulation for Pre-Engineered Building
  - 3. Section 07900 - Joint Sealers.
  - 4. Division 15 - Fire Protection Systems.
  - 5. Division 15: Mechanical rough-in utilities.
  - 6. Division 16: Electrical rough-in utilities.

1.2 REFERENCES

- A. American Institute of Steel Construction:
  - 1. AISC/ANSI 360-05 - Specification for Structural Steel Buildings
  - 2. AISC/RCSC Specification for Structural Joints Using ASTM or A490 Bolts, June 2004 Edition
  - 3. AISC 303-05 Code of Standard Practice for Steel Buildings and Bridges
  - 4. AISC Steel Design Guide Series 3, Serviceability Design Considerations for Low-Rise Buildings.
- B. ASTM International:
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
  - 5. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - 6. ASTM A490 - Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
  - 7. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  - 8. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.



9. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
  10. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
  11. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  12. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  13. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  14. ASTM C991 - Standard Specification for Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings.
  15. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
  16. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  17. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- C. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
  2. AWS D1.1 - Structural Welding Code - Steel.
- D. Metal Building Manufacturers Association:
1. MBMA - Low Rise Building Systems Manual, current edition.
- E. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- F. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
  2. SSPC- SP-3 Specification for Power Tool Cleaning
  3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
- G. Underwriters Laboratories Inc.:
1. UL - Building Materials Directory.
  2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

### 1.3 SYSTEM DESCRIPTION

- A. Rigid frames as indicated on drawings. All columns and beams to be straight section (no taper). Interior columns shall be round configuration unless they are located in a partition wall in which case they shall be tubular.
- B. Bay Spacing: Refer to Drawings

- C. Primary Framing: Rigid frame of rafter beams and columns, intermediate columns, braced end frames, end wall columns, and wind bracing.
- D. Secondary Framing: Purlins, girts, eave struts, flange bracing, sill supports, clips, and other items detailed and as required for complete structural building frame.
- E. Wall System: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly, liner sheets, and accessory components.
- F. Roof System: Preformed metal panels of upslope profile, with sub-girt framing/anchorage assembly, and accessory components.
- G. Roof Slope: 1 inches in 12 inches.

#### 1.4 DESIGN REQUIREMENTS

- A. The building shall be designed by the Manufacturer as a complete system. All components of the system shall be supplied by the manufacturer.
- B. Design structural systems according to professionally recognized methods and standards and legally adopted building codes.
- C. Design under the direct supervision of professional engineer licensed in Kentucky.
- D. Manufacturer must be certified by AISC in the Metal Building category.
- E. Supplier must be a primary manufacturer of frames, secondary steel, roof and wall sheeting and trim.
- F. Design Loads:
  - 1. Applicable Building Code: 2007 edition of the Kentucky Building Code
  - 2. Occupancy Category: III
  - 3. Roof Live Load: 20 lb/ft<sup>2</sup> not reducible
  - 4. Ground Snow Load: 15 lb/ft<sup>2</sup>
    - a. Calculate roof snow loads and snow drift loads as required
  - 5. Wind Loads:
    - a. Wind Speed: 90 mi/hr 3-second gust
    - b. Wind Exposure Category: C
    - c. Wind Importance Factor: 1.15
  - 6. Collateral Loads: 10 lb/ft<sup>2</sup> typical, 15 lb/ft<sup>2</sup> where suspended ceiling occurs
  - 7. Seismic Loads
    - a. Seismic Importance Factor: 1.25
    - b. Short Period Acceleration S<sub>s</sub>: 0.25g
    - c. One-Second Acceleration S<sub>1</sub>: 0.10g
    - d. Site Classification Category: C
    - e. Design using load combinations from ASCE minimum for buildings and other structures ASCE-7-05
    - f. Load application shall be in accordance with ASCE-7-05.

- G. Serviceability Criteria: Design frames to have a maximum lateral deflection (drift) of 1/120 of building height. The loading combination to be used for satisfying this criteria is 1.0D+0.5L+1.0W for wind using 50 year recurrence interval. Conform to ASCE 7-05 for seismic drift determination and acceptance criteria.
- H. Roof member deflection criteria:
  - 1. Purlins and Rafters, each: Span/180 typical, Span/240 and < 2" where suspended ceiling occurs
  - 2. Girts: Span/120 typical, Span/180 where gypsum board finish occurs
- I. In addition to specified criteria, deflections and drifts shall conform to the minimum requirements of the 2007 Kentucky Building Code
- J. Anchor Rods: Furnish anchor bolts as indicated on the Structural Engineer's drawings.
- K. Design members and connections to withstand UL 580 – Uplift Resistance, Uplift Class 90.
- L. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.
- M. Design gutter and downspouts to accommodate the most recent edition of the International Plumbing Code's 1-hour, 100 year rainfall intensity for the locale without overflowing, damaging or distorting the gutters, downspouts or their supports. Gutter overflow for rainfall intensity greater than the code shall be in a controlled fashion that does not damage the building, gutter, downspouts or their supports and does not backflow into the building.
- N. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of -10 to 100 degrees.
- O. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. Conform to Kentucky Building code for submission of design calculations, reviewed shop and erection drawings, and as required for acquiring permits.
- B. Cooperate with regulatory agency or authority and provide data as requested authority having jurisdiction.
- C. Provide components of each type from one manufacturer compatible with adjacent materials.

#### 1.6 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings:
  - 1. Provide 5 sets each of approval drawings and field use drawings and one set of complete calculations. In addition to structural calculations, provide gutter and downspout capacity calculations.
  - 2. Indicate design criteria, assembly dimensions, locations of structural members, connection details, attachments, openings, cambers, loads; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, methods of installation; framing anchor bolt settings, sizes, and locations from datum; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature on all drawings and calculations.
- C. Product Data: Submit data on profiles, component dimensions, fasteners, and performance characteristics.
- D. Samples: Submit two samples of precoated metal panels for each color selected illustrating color and texture of finish.
- E. Manufacturer's Instructions: Submit preparation requirements, and anchor bolt placement.
- F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of concealed components and utilities.

#### 1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with AISC S335, AISC S342L, AISC S344L, and MBMA Low Rise Building Systems Manual.

#### 1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience of projects of similar scope and complexity.
- B. Erector: Company specializing in performing Work of this section with minimum three years documented experience of projects of similar scope and complexity.

#### 1.10 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.

- B. Furnish five year manufacturer warranty for pre-engineered building systems and components.
- C. Furnish five year warranty to include coverage for exterior pre-finished surfaces color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

## PART 2 PRODUCTS

### 2.1 PRE-ENGINEERED BUILDINGS

- A. Manufacturers – including but not limited to the following:
  - 1. Ceco Building Systems
  - 2. Butler Manufacturing Co.
  - 3. Varco-Pruden Buildings
  - 4. Substitutions: Section 01600 - Product Requirements

### 2.2 COMPONENTS - FRAMING

- A. Structural Steel Members: ASTM A36, A572 Grade 50 or A992..
- B. Hollow Structural Sections: ASTM A500, Grade B.
- C. Plate or Bar Stock: ASTM A36.
- D. Anchor Rods: ASTM F1554 Grade 36, unprimed.
- E. Bolts, Nuts, and Washers: ASTM A325, A563 and F436 respectively.
- F. Welding Materials: AWS D1.1; type required for materials being welded.
- G. Primer: SSPC Paint 20, Gray.
- H. Grout: ASTM C1107, Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 4,000 psi in two days and 7000 psi in 28 days.

### 2.3 COMPONENTS - WALL AND ROOF SYSTEM

- A. Sheet Steel Stock (Wall Panels): ASTM A653 galvanized to G90 designation.
- B. Sheet Steel Stock (Roof Panels): ASTM A792/A792M aluminum-zinc alloy Coating Designation AZ55 .
- C. Insulation: Provided under work of Specification Section 07214.
- D. Joint Seal Gaskets: Manufacturer's standard type.

- E. Fasteners: Manufacturer's standard sealing type, galvanized, finish to match adjacent surfaces when exterior exposed.
- F. Bituminous Paint: Asphaltic type.
- G. Sealant: Manufacturer's standard type, non-staining, elastomeric, skinning.
- H. Trim, Closure Pieces, Caps, Flashings, Facias and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles. Provide all necessary trim and closures to fully and positively enclose the building envelope.

#### 2.4 COMPONENTS - METAL DOORS AND FRAMES

- A. Doors: Specified in Section 08111.
- B. Frames: Specified in Section 08112.

#### 2.5 COMPONENTS - OVERHEAD DOORS

- A. Overhead Doors: Specified in Section 08330.
- B. Overhead Door Frame: Formed steel sections braced to building frame specified in Section 05500.
- C. Glass and Glazing: Specified in Section 08800.

#### 2.6 COMPONENTS - WINDOWS

- A. Windows: Specified in Section 08520.

#### 2.7 FABRICATION - FRAMING

- A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes, and the MBMA Metal Building Systems Manual for building components as indicated therein.
- B. Anchor Rods: Straight threaded with nut each end, assembled with template for casting into concrete.
- C. Provide framing for door, window louver, curbs and all other wall/roof openings.
- D. Provide an additional king stud each side of opening for each 32" of opening where stud spacing is 16" OC and for each 24" of opening when stud spacing is 12" OC.

#### 2.8 FABRICATION - WALL AND ROOF SYSTEMS

- A. Siding: Minimum 24 gauge metal thickness, CECO standard MAP profile or Owner approved equal, lapped edges.

- B. Roofing: Minimum 24 gauge, CECO standard CLP profile or Owner approved equal lapped male/female edges fitted with continuous gaskets.
- C. Liner: Minimum 26 inch metal thickness, V crimped profile male/female edges fitted with continuous gaskets.
- D. Girts/Purlins: Rolled formed structural shape to receive siding, roofing and liner sheet.
- E. Internal and External Corners: Same material thickness and finish as adjacent material, profile shop cut and factory mitered to required angles. Back brace mitered internal corners.
- F. Expansion Joints: Same material and finish as adjacent material 24 gauge thick, manufacturer's standard brake formed type, of profile to suit system.
- G. Flashings, Closure Pieces, Fascia, Infills, and Caps: Same material and finish as adjacent material, profile to suit system &/or formed as detailed.
- H. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive finish.
- I. Column flange bracing is not permitted in office areas with gypsum board finishes on inside of exterior walls.

#### 2.9 FABRICATION - GUTTERS AND DOWNSPOUTS

- A. Fabricate of same material and finish as roofing metal.
- B. Form gutters and downspouts of profile and size indicated to collect and remove water. Fabricate with connection pieces.
- C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.
- D. Fabricate support straps of same material and finish as roofing metal, color as selected.

#### 2.10 FACTORY FINISHING

- A. Framing Members: Clean, prepare, and shop prime. Clean to SSPC Specification SP-3, power tool cleaning, prime to SSPC SP-20, zinc-rich type.
- B. Galvanizing for Nuts, Bolts and Washers where indicated on drawings: ASTM A153/A153M.
- C. Interior Surfaces of Wall/Roof Components and Accessories: Precoated silicone polyester on steel of manufacturer's standard finish of not less than .60 mil thickness, color as selected from manufacturer's standard range.

- D. Exterior Surfaces of Wall and Roof Components and Accessories:  
Manufacturer's Premium Paint, fluoropolymer coating utilizing Kynar 500 Resin  
with minimum dry film thickness of .75 mils.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position.

#### 3.2 ERECTION - FRAMING

- A. Erect framing in accordance with AISC Code of Standard Practice for Steel Buildings and Bridges, latest edition.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Set column base plates with non-shrink grout to achieve full plate bearing.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval of Architect/Engineer.
- E. After erection, prime welds, abrasions, and surfaces not shop primed.

**Comment [MWC1]:** I don't want to confuse temporary bracing with permanent bracing here.

#### 3.3 ERECTION - WALL AND ROOFING SYSTEMS

- A. Install all wall and roofing systems in accordance with manufacturer's instructions and details using proper fasteners.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.
- E. Install expansion joints where indicated on Drawings.
- F. Use exposed fasteners.
- G. Install sealant and gaskets to prevent weather penetration.



3.4 ERECTION - GUTTER AND DOWNSPOUTS

- A. Rigidly support and secure components. Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Apply bituminous paint on surfaces in contact with cementitious materials.
- C. Slope gutters minimum 1/16 inch/ft.
- D. Connect downspouts to storm sewer system.

3.5 ERECTION - ACCESSORIES

- A. Install door frame, door, overhead door, window and glass, louvers, and all other products specified.
- B. Seal wall and roof accessories watertight and weather tight with sealant in accordance with Section 07900.

3.6 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Install framing in accordance with MBMA Common Industry Practices.
- C. Framing Members: Erect building frame and panels true and plumb in accordance with the tolerances of the AISC Code of Standard Practice for Buildings and Bridges.
- D. Modifying, burning or cutting members or holes in members for erection is not permitted without approval of the Architect/Engineer and the Metal Building Manufacturer.
- E. Tighten bolts and nuts in accordance with the "Specification for Structural Joints Using ASTM A325 or A490 Bolts" using Direct Tension Indicating Washers.
- F. Prime welds, abrasions and surfaces not shop primed or needing touch-up after erection with specified primer.

END OF SECTION

SECTION 14245  
HYDRAULIC PASSENGER ELEVATORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hydraulic elevator systems; conventional hydraulic unit.
2. Passenger cabs with doors and frames; hoistway entrance doors and frames.
3. Elevator control system.
4. Motor and pump, controllers, hoistway equipment, and accessories including pit ladder.

B. Related Sections:

1. Section 03300 - Concrete: Concrete for elevator motor and pump foundation, grouting thresholds, and machine room floor slab.
2. Section 04810 - Unit Masonry Assemblies: Building-in and grouting hoistway door frames; masonry hoistway enclosure.
3. Section 05120 - Structural Steel: Hoistway framing, and overhead hoist beams.
4. Section 05500 - Metal Fabrications: none.
5. Section 09650 - Resilient Flooring: Floor finish in cab.
6. Section 15000: Mechanical: Pit Drain or sump pump as required.
7. Section 16000 - Electrical: Electrical service to main disconnect in elevator machine room including emergency power transfer cabinet.
8. Section 16000 - Electrical: Electrical service and lighting for machine room, machine room convenience outlets and including electrical power for elevator installation and testing.
9. Section 16000 - Electrical: Telephone service to machine room for each elevator.
10. Division 15: Sprinkler heads in hoistway.
11. Division 15: Mechanical fan for pressurization of elevator hoistway.
12. Division 15: Ventilation and temperature control of elevator equipment room.
13. Division 16:
  - a) Empty conduit to elevator equipment devices remote from elevator machine room or hoistway.
  - b) Empty conduit between controller cabinet to remote group supervisory panel.
14. Division 16:
  - a) Electrical characteristics and wiring connections.
  - b) Electrical service to main disconnect in elevator machine room including emergency power transfer cabinet; electrical power for elevator installation and testing.
  - c) Electrical disconnecting device to elevator equipment prior to activation of sprinkler system.
  - d) Electrical service for machine room, machine room convenience outlets, and pit.

- e) Lighting in elevator pit.
- f) Empty conduit for telephone service.
- 15. Division 16:
  - a) Fire and smoke detectors and interconnecting devices.
  - b) Fire alarm signal lines to elevator controller cabinet.
- 16. Division 3: Execution requirements for placement of elevator machine and pump anchors in concrete.
- 17. Division 5: Execution requirements for placement of special guide rail brackets and inserts for installation.
- 18. Section 02300: Excavation for cylinder well casing and hydraulic lines between plunger and remote machine room.
- 19. Section 02300: Backfilling at cylinder well casing and hydraulic lines between plunger and remote machine room.

## 1.1 REFERENCES

- A. American Institute of Steel Construction:
  - 1. AISC S335 - Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
- B. American Society of Mechanical Engineers:
  - 1. ASME A17.1 - Safety Code for Elevators and Escalators.
  - 2. ASME A17.2.2 - Inspector's Manual for Hydraulic Elevators.
- C. ASTM International:
  - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
  - 2. ASTM A139 - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over).
  - 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 4. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - 5. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - 6. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. American Welding Society:
  - 1. AWS D1.1 - Structural Welding Code - Steel.
- E. Copper Development Association Inc.:
  - 1. CDA 113/5 - Standards Handbook 2. Alloy Data.
- F. National Electrical Manufacturers Association:
  - 1. NEMA LD 3 - High Pressure Decorative Laminates.
  - 2. NEMA MG 1 - Motors and Generators.
- G. National Fire Protection Association:

1. NFPA 80 - Standard for Fire Doors, Fire Windows.
  2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
  3. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- H. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
- I. Underwriters Laboratories Inc.:
1. UL 10B - Fire Tests of Door Assemblies.
  2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

## 1.2 SYSTEM DESCRIPTION

- A. Hydraulic Elevator Systems: One unit; conventional jack cylinder; with motor and pump adjacent.
- B. Characteristics of elevator are as follows:
1. Rated Net Capacity: 2,500 lbs.
  2. Rated Speed: 100 ft/min.
  3. Clear Inside Cab Dimensions: 72"w x 51"d.
  4. Ceiling Height: 88 inches.
  5. Hoistway and Cab Entrance Frame Opening Sizes: 42 x 84 inches.
  6. Door Type: Single speed
  7. Door Operation: Center Opening
  8. Number of Stops: 2.
  9. Number of Openings: 2 Front
  11. Travel Distance: 14'-0" floor to floor.
- C. Door Control Features:
1. Program door control to open doors automatically when car arrives at floor.
  2. Render "Door Close" button inoperative when car is standing at dispatching terminal with doors open.
  3. If doors are prevented from closing for approximately twenty seconds because of an obstruction, automatically disconnect door re-opening devices, close doors more slowly until obstruction is cleared. Sound buzzer.
  4. Door Reversal System: Multi-beam infrared light curtain with a minimum of 40 beams.
- D. Interconnect elevator control system with building fire alarm and smoke alarm system. Control features by elevator contractor. Connections to be by electrical contractor.

## 1.3 DESIGN REQUIREMENTS

- A. Automatic Operation

1. Set system operation so that momentary pressure of hall button at other landing dispatches car to that landing.
  2. Allow call registered by momentary pressure of hall button at any time to remain registered until car stops in response to that call at that landing.
  3. If hoistway door is not opened within a short interval after car has stopped at terminal allow car to respond to any call from the other landing.
- B. Firefighter's Emergency Operation:
1. Provide "Firefighter's Operation" in accordance with ASME A17.1.
  2. Designated Landing: first floor (second landing).
- C. Independent Service:
1. Provide key operated "Independent Service" on car operating panel. Key activation will remove that car from normal operation and cancel all pre-registered car calls.
  2. Car will respond to selected floor. Car will not respond to any calls from hall call buttons. Car will only respond to calls placed on the car operating panel. Doors will remain open at last landing requested. Doors will close with a constant pressure on "DOOR CLOSE" button.
  3. Key activation to normal operation will return car to normal operation.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Conform to Kentucky Building code for manufacture and installation of elevator system.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc. as suitable for the purpose specified and indicated.

#### 1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate the following information:
  1. Section view, floor heights, sill supports, divider beams, pit ladder, location of pit equipment, location and means for disconnect.
  2. Motor and hydraulic pump, valves, piping, controller, selector, and other component locations.
  3. Car, guide rails, buffers, and other components in hoistway.
  4. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
  5. Individual weight of principal components; load reaction at points of support.
  6. Loads on hoisting beams.
  7. Clearances and over travel of car.
  8. Locations in hoistway and machine room of connections for car light and telephone.
  9. Location and sizes of access doors, doors, and frames.

10. Expected heat dissipation of elevator equipment in machine room.
  11. Applicable seismic design data; certified by a registered professional engineer.
  12. Interface with building security system.
  13. Electrical characteristics and connection requirements.
  14. Show arrangement of equipment in machine room so moving elements and other equipment can be removed for repairs or replaced without disturbing other components. Arrange equipment for clear passage through access door.
- C. Product Data: Submit data on the following items:
1. Signal and operating fixtures, operating panels, indicators.
  2. Cab design, dimensions, layout, and components.
  3. Cab and hoistway door and frame details.
  4. Electrical characteristics and connection requirements.
- D. Samples: Submit two samples, 3 x 3 inch in size illustrating cab interior finishes, cab and hoistway door and frame finishes, and handrail material and finish.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Section 01001 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data:
1. Include a parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
  2. Provide technical information for servicing operating equipment.
  3. Include legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus. Provide all information, wiring diagrams and tools available to manufacturer's and installer's personnel
  4. Provide one copy of master electric and hydraulic schematic and one copy of lubrication chart.

#### 1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with ASME A17.1, AWS D1.1, AISC, and as supplemented in this section.
- B. Fabricate and install door and frame assemblies in accordance with NFPA 80 and UL 10B.
- C. Maintain one copy of each document on site.

#### 1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

- B. Installer: Company specializing in performing Work of this section and approved by elevator equipment manufacturer.

#### 1.9 PRE-INSTALLATION MEETING

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing Work of this section.
- C. Require attendance of persons directly involved with the Work of this section.
- D. Review schedule of installation, installation procedures and conditions, and coordination with related Work.
- E. Review temporary use of elevator for construction purposes, hours of use, scheduling of its use, cleanliness of cab, employment of operator, maintenance of system.

#### 1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

#### 1.11 SCHEDULING

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.

---

#### 1.12 MAINTENANCE SERVICE

- A. Section 01700 - Execution Requirements: Maintenance service.
- B. Provide service and maintenance of elevator system and components for one year from Date of Substantial Completion.
- C. Examine system components monthly. Clean, adjust, and lubricate equipment.
- D. Include systematic examination, adjustment, and lubrication of elevator equipment; maintain hydraulic fluid levels. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment.
- E. Perform work without removing cars during peak traffic periods.
- F. Provide emergency call back service during working hours for this maintenance period.
- G. Maintain locally, near the Place of the Work, an adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.
- H. Perform maintenance work using competent and qualified personnel under the supervision of the elevator manufacturer or original installer.

- I. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

### 1.13 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish two extra keys.

## PART 2 PRODUCTS

### 2.1 HYDRAULIC PASSENGER ELEVATORS

- A. Manufacturers:
  1. ThyssenKrupp Elevator Systems - Model: Marquis 25 Plan 1
  2. Otis Elevator Company - Model: equal product.
  3. Substitutions: Section 01600 - Product Requirements.

### 2.2 COMPONENTS

- A. Materials:
  1. Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
  2. Casing: ASTM A139, Grade A steel.
  3. Sheet Steel: ASTM A366/A366M Class 1, with matte finish. ASTM A653/A653M, zinc coated to G90.
  4. Stainless Steel: ASTM A666 Type 304.
  5. Aluminum: ASTM B221, extruded.
  6. Plywood: APA/EWA Structural I, Grade C-D, sanded.
  7. Plastic Laminate: NEMA LD-3, color/pattern and surface finish as selected.
  8. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.
  9. Primer for Wood Surfaces: Alkyd primer sealer.
  10. Finish Paint for Metal Surfaces: Alkyd enamel, semi-gloss, color as selected.
  11. Finish Paint for Wood Surfaces: Alkyd enamel, semi-gloss, color as selected.
- B. Equipment:
  1. Motor, Pumps, Valves, Regulators, Fluid Tank, Hydraulic Fluid, Controller, Controls, Buttons, Wiring and Devices, Indicators.
  2. Guide Rails, Cables, Spring Buffers, Attachment Brackets and Anchors: Purpose designed, sized according to code with safety factors.
  3. Pit Ladder: Manufacturer's standard steel ladder, paint finish.
- C. Lubrication:
  1. Grease Fittings: For lubricating bearings requiring periodic lubrication.
  2. Lubrication Points: Visible and easily accessible.
- D. Car Fabrication:



1. Frame: Rigid and braced, rolled or formed steel section, mounted on resilient isolators.
2. Platform: Steel frame, with fire retardant treated plywood subflooring assembly, ready to receive floor finish.

E. Cab Fabrication:

1. Cab Design: Model DLP manufactured by ThyssenKrupp Elevator Systems.
2. Flooring: tile flooring, of type specified in Section 09650.
3. Walls: Plastic laminate facing on both sides of wood core construction panels.
4. Front Return Panel: Stainless steel.
5. Ceiling: Mfr's standard (6) halogen downlights with Stainless Steel #4 finish
6. Light Fixtures: halogen
7. Ventilation: Two speed fan, grille above ceiling.
8. Control Panel and Face Plate: Stainless steel #4 with illuminating call buttons.
9. Position Indicator: Above door with illuminating position indicators.
10. Hand Rail: Stainless steel flat bar stock; placed at rear wall.
11. Certificate Frame and Glazing: Stainless steel frame, clear plastic attached with tamper proof screws.

F. Cab Entrances:

1. Cab Doors: Steel construction clad with #4 brush finished stainless steel.
2. Cab Door Frames: # 4 brushed finish stainless steel.
3. Thresholds: Extruded aluminum.

G. Hoistway Entrances:

1. Hoistway Doors: Stainless Steel; insulated sandwich panel construction, flush design, rolled profiles, rigid construction.
2. Hoistway Door Frames: stainless steel; of rolled profiles, welded corner with smooth invisible joints and knocked down design.
3. Door and Frame Construction: One hour fire rating; insulated sandwich panel door construction 1-1/4 inch thick, minimum.
4. Sills: Extruded aluminum.

H. Car Operating Panel:

1. Provide one flush mounted operating panel per car with an integral face plate; with front return panels containing illuminated call buttons corresponding to floors served, in car alarm button, and DOOR OPEN and DOOR CLOSE buttons.
2. Include in each car station:
  - a) Independent service switch.
  - b) Fan or blower switch.
  - c) Light switch test switch.

- d) Emergency light.
  - 3. Car Position Indicators.
  - 4. Emergency Light.
  - 5. Telephone Cabinet: Provide ADA compliant telephone.
- I. Landing Controls:
- 1. Landing Buttons: Illuminating type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with arrows.
  - 2. Car Riding Lantern: #4 brushed stainless steel faceplate with UP/DN Indicators and audible signal.
- J. Pit Ladder:
- 1. Manufacturer's standard OSHA compliant steel ladder extending from top of finish floor at lowest level of service to finish floor of elevator pit.

### 2.3 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Section 16150 - Wiring Connections: Requirements for electrical characteristics.
- 1. 25 hp rated load amperes.
  - 2. 480 volts, three phase, 60 Hz.
  - 3. 175 amperes maximum circuit breaker size.
  - 4. Motor starting is to be solid state with the starting current adjustable between 200% and 450% of the full load running current.
- B. Disconnect Switch: Locate disconnect switch for elevator motor and for light/fan circuit in elevator machine room.
- C. Boxes, Conduit, Wiring, and Devices.
- D. Fittings: Steel compression type for electrical metallic tubing. Fittings with set screws are acceptable only when a separate grounding conductor is also installed across the joint.
- E. Spare Conductors: Include 10 percent extra conductors and two pairs of shielded audio cables in traveling cables. Do not parallel conductors to increase electric current capacity unless individually fused.
- F. Do not use armored flexible metal conduit as a grounding conductor.

### 2.4 FACTORY FINISHING

- A. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
- B. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.
- C. Galvanized Surfaces: Clean with neutralizing solvent; prime two coats.

- D. Aluminum: Clear anodized finish.
- E. Wood surfaces not Exposed to Public View: One coat primer; one coat enamel.
- F. Baked Enamel on Steel: Clean and degrease metal surface; apply one coat of primer sprayed and baked; two coats of enamel sprayed and baked; color as selected.
- G. Stainless Steel: #4 brushed finish.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify that hoistway, pit, and machine room are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify that electrical power is available and of the correct characteristics.

#### 3.2 PREPARATION

- A. Excavation And Backfilling For Casing:
  - 1. Excavating: Refer to Section 02200.

#### 3.3 INSTALLATION

- A. Install in accordance with ASME A17.1.
- B. Install system components. Connect equipment to building utilities. Install piping between hoistway plunger and pump unit.
- C. Provide conduit, boxes, wiring, and accessories.
- D. Mount motor and pump unit on vibration and acoustic isolators. Securely fasten to building supports. Prevent lateral displacement.
- E. Accommodate equipment in space indicated.
- F. Install guide rails using threaded bolts and lock washers under nuts. Compensate for expansion and contraction movement of guide rails.
- G. Accurately align guide rails. Form smooth joints with machined splice plates.
- H. Bolt or weld brackets directly to structural steel hoistway framing.

- I. Install hoistway door sills, frames, and headers in hoistway walls. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.
- J. Adjust equipment for smooth and quiet operation.
- K. Provide jack casing protection with Schedule 80 PVC casing with end cap or provide jack casing with HDPE coating.
- L. Install pit ladder in accordance with shop drawings.

### 3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- C. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

### 3.5 FIELD QUALITY CONTROL

- A. Section 01001 - Quality Requirements: Testing and Inspection Services - Execution Requirement: Testing, adjusting, and balancing.
- B. Perform tests required by ASME A17.2.
- C. Provide two weeks written notice of date and time of tests.

### 3.6 MANUFACTURER'S FIELD SERVICES

- A. Section 01001 - Quality Requirements: Manufacturers' field services.
- B. Obtain required permits to perform tests. Perform tests required by regulatory agencies.
- C. Schedule tests with agencies and Architect/Engineer, Owner, and Contractor present.
- D. Furnish test and approval certificates issued by jurisdictional authorities.

### 3.7 ADJUSTING

- A. Section 01001 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.
- C. Adjust automatic floor leveling feature at each floor to provide stopping zone of 1/4 inch.

3.8 CLEANING

- A. Section 01001 - Execution Requirements: Final cleaning.
- B. Remove protective coverings from finished surfaces.
- C. Clean surfaces and components ready for inspection.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit construction traffic within cab after cleaning.

3.10 SCHEDULES

- A. Elevator #1: 100 fpm , 2,500 lb capacity, cab interior as specified, 2 stops, 2 front and 0 rear opening doors.

END OF SECTION