

*Calibration Data*

**Airtech Environmental Services, Inc.**  
**Meter Box Full Test Calibration**

Date: 5/23/2011

Operator: |burton

Time	Orifice Data				Meter Box $\Delta H @$				Meter Box $V_d$				Barometric Pressure (in. Hg.)			
	$\theta$ (min)	K'	Vacuum	$T_{amb}$	$V_{or}$	$V_{initial}$	$V_{final}$	$V_d$	$\Delta H$	$T_i$	$T_o$	$T_{avg}$	$V_{meas}$	Q	$Y_d$	$\Delta H @$
5.0	0.3445	20.0	76	2.195	740.70	742.98	2.28	0.84	75	73	74	2.225	0.439	0.9863	1.817	
5.0	0.3445	20.0	76	2.195	742.98	745.27	2.29	0.84	76	74	75.0	2.231	0.439	0.9838	1.804	
5.0	0.3445	20.0	76	2.195	745.27	747.57	2.30	0.84	76	74	75.0	2.241	0.439	0.9795	1.789	
5.0	0.4436	19.0	76	2.826	748.00	750.96	2.96	1.10	77	74	75.5	2.884	0.565	0.9798	1.858	
5.0	0.4436	19.0	76	2.826	750.96	753.90	2.94	1.10	78	75	76.5	2.859	0.565	0.9884	1.887	
5.0	0.4436	19.0	76	2.826	753.90	756.85	2.95	1.10	79	75	77.0	2.867	0.565	0.9859	1.876	
5.0	0.5885	17.0	77	3.746	757.20	761.09	3.89	1.8	81	76	78.5	3.776	0.749	0.9920	1.770	
5.0	0.5885	17.0	77	3.746	761.09	764.99	3.90	1.8	82	76	79.0	3.782	0.749	0.9904	1.763	
5.0	0.5885	17.0	77	3.746	764.99	768.89	3.90	1.8	83	77	80.0	3.775	0.749	0.9922	1.766	
5.0	0.7954	15.0	77	5.063	769.50	774.76	5.26	3.3	86	78	82.0	5.092	1.013	0.9943	1.786	
5.0	0.7954	15.0	77	5.063	774.76	780.04	5.28	3.3	88	79	83.5	5.097	1.013	0.9933	1.778	
5.0	0.7954	15.0	77	5.063	780.04	785.32	5.28	3.3	98	80	89.0	5.046	1.013	1.0033	1.796	
														Average	0.9891	1.807

Nomenclature	
K'	Critical Orifice Coefficient
$T_{amb}$	Ambient Temperature (°F)
$V_{or}$	Volume Through Orifice (scf)
$V_d$	Gas Meter Volume (ft <sup>3</sup> )
$\Delta H$	Orifice Pressure Differential (in. H <sub>2</sub> O)
$T_i$	Meter Inlet Temperature (°F)
$T_o$	Meter Outlet Temperature (°F)
$T_{avg}$	Average Meter Box Temperature (°F)
$V_{meas}$	Volume Metered Standardized (scf)
Q	Flow Rate (scfm)
$Y_d$	Meter Correction Factor (dimensionless)
$\Delta H @$	$\Delta H$ yielding 0.75 scfm

Vacuum Gauge (in. Hg.)		Thermometers (°F)			Equations	
Standard	Vacuum Gauge	Ch. No.	Ch. No.	Ch. No.		
5	5.0	33	2	3	$V_{cr} = K' * E_c * \theta$ $(T_{amb} + 460)^{0.5}$	
10	10.0	51	33	33	$V_{meas} = 17.64 * V_d * Y_d * (P_b + \Delta H) / 3.61$ $(T_{in} + 460)$	
15	15.0	101	51	51	$Q = V_{cr} * \theta$	
20	20.0	152	101	102	$Y_d = V_{cr} / V_{meas}$	
25	25.0	152	151	151	$\Delta H @ = 0.319 * \Delta H * (T_{meas} + 460) * \theta^2$ $P_b * Y_d^2 * V_{cr}^2$	
		213	151	214		
		252	252	251		
		301	301	302		
		352	352	351		
		401	401	402		
		502	502	501		
		602	602	602		

## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.500	Date	7/27/2011
Highest Field Vacuum (inches Hg)	5	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.784	Meter ID	M-3

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	248.00	251.92	255.84
Final Volume (ft <sup>3</sup> )	251.92	255.84	259.75
Volume Metered (ft <sup>3</sup> )	3.92	3.92	3.91
DGM Inlet Temperature (°F)	87	88	89
DGM Outlet Temperature (°F)	82	83	83
Average DGM Temperature (°F)	84.5	85.5	86.0
Ambient Temperature (°F)	80	80	80
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.80	1.80	1.80
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	18	18	18
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.735	3.735	3.735
V <sub>mstd</sub> (ft <sup>3</sup> )	3.763	3.756	3.743
Post Test Y <sub>c</sub>	0.9926	0.9945	0.9979
Full Test Y <sub>d</sub>	0.9891	0.9891	0.9891
% Difference	-0.36	-0.54	-0.89
<b>Average % Difference</b>			<b>-0.60</b>



## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	2.000	Date	7/27/2011
Highest Field Vacuum (inches Hg)	11	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.778	Meter ID	M-5

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	702.00	705.89	709.79
Final Volume (ft <sup>3</sup> )	705.89	709.79	713.69
Volume Metered (ft <sup>3</sup> )	3.89	3.90	3.90
DGM Inlet Temperature (°F)	81	83	88
DGM Outlet Temperature (°F)	77	78	81
Average DGM Temperature (°F)	79.0	80.5	84.5
Ambient Temperature (°F)	80	79	79
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	2.00	2.00	2.00
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	20	20	20
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.735	3.739	3.739
V <sub>mstd</sub> (ft <sup>3</sup> )	3.774	3.774	3.746
Post Test Y <sub>c</sub>	0.9897	0.9908	0.9982
Full Test Y <sub>d</sub>	0.9953	0.9953	0.9953
% Difference	0.56	0.45	-0.29
<b>Average % Difference</b>			<b>0.24</b>



## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.500	Date	8/2/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.766	Meter ID	M-6

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	69.00	72.83	76.64
Final Volume (ft <sup>3</sup> )	72.83	76.64	80.47
Volume Metered (ft <sup>3</sup> )	3.83	3.81	3.83
DGM Inlet Temperature (°F)	90	91	92
DGM Outlet Temperature (°F)	87	88	89
Average DGM Temperature (°F)	88.5	89.5	90.5
Ambient Temperature (°F)	90	90	91
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.80	1.80	1.80
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	19	19	19
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.701	3.701	3.698
V <sub>mstd</sub> (ft <sup>3</sup> )	3.650	3.624	3.637
Post Test Y <sub>c</sub>	1.0141	1.0213	1.0168
Full Test Y <sub>d</sub>	1.0076	1.0076	1.0076
% Difference	-0.64	-1.36	-0.92
<b>Average % Difference</b>			<b>-0.97</b>





## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.300	Date	7/27/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.778	Meter ID	M-9

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	244.50	248.39	252.29
Final Volume (ft <sup>3</sup> )	248.39	252.29	256.19
Volume Metered (ft <sup>3</sup> )	3.89	3.90	3.90
DGM Inlet Temperature (°F)	82	84	84
DGM Outlet Temperature (°F)	79	80	80
Average DGM Temperature (°F)	80.5	82.0	82.0
Ambient Temperature (°F)	84	83	84
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.90	1.90	1.90
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	20	20	20
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.722	3.725	3.722
V <sub>mstd</sub> (ft <sup>3</sup> )	3.763	3.762	3.762
Post Test Y <sub>c</sub>	0.9890	0.9901	0.9892
Full Test Y <sub>d</sub>	0.9891	0.9891	0.9891
% Difference	0.01	-0.11	-0.01
<b>Average % Difference</b>			<b>-0.04</b>



## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.300	Date	7/27/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.762	Meter ID	M-10

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	884.60	888.41	892.23
Final Volume (ft <sup>3</sup> )	888.41	892.23	896.04
Volume Metered (ft <sup>3</sup> )	3.81	3.82	3.81
DGM Inlet Temperature (°F)	83	84	85
DGM Outlet Temperature (°F)	81	81	81
Average DGM Temperature (°F)	82.0	82.5	83.0
Ambient Temperature (°F)	88	88	89
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.80	1.80	1.80
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	17	17	17
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.708	3.708	3.705
V <sub>mstd</sub> (ft <sup>3</sup> )	3.674	3.681	3.668
Post Test Y <sub>c</sub>	1.0092	1.0074	1.0101
Full Test Y <sub>d</sub>	1.0091	1.0091	1.0091
% Difference	-0.01	0.16	-0.10
<b>Average % Difference</b>			<b>0.02</b>

**Airtach Environmental Services, Inc.**  
Meter Box Full Test Calibration

Date: 9/13/2010

Operator: i\_burton

Meter Box ID M-14		Meter Box ΔH@		Meter Box Y <sub>d</sub>		1.802		1.0087		Barometric Pressure (in. Hg.)		29.50			
Orifice Data						Meter Box Data						Results			
Time	K'	Vacuum	T <sub>amb</sub>	V <sub>cr</sub>	V <sub>final</sub>	V <sub>d</sub>	ΔH	T <sub>i</sub>	T <sub>o</sub>	T <sub>avg</sub>	V <sub>msld</sub>	Q	Y <sub>d</sub>	ΔH@	
5.0	0.3455	22.0	83	2.187	510.30	512.57	0.63	82	89	85.5	2.169	0.437	1.0083	1.772	
5.0	0.3455	22.0	83	2.187	512.57	514.83	0.63	83	80	81.5	2.175	0.437	1.0054	1.775	
5.0	0.3455	22.0	83	2.187	514.83	517.09	0.63	84	81	82.5	2.171	0.437	1.0072	1.778	
5.0	0.4434	20.0	84	2.804	517.40	520.33	1.05	85	82	83.5	2.813	0.561	0.9969	1.766	
5.0	0.4434	20.0	84	2.804	520.33	523.27	1.05	87	82	84.5	2.817	0.561	0.9954	1.757	
5.0	0.4434	20.0	84	2.804	523.27	526.17	1.05	89	83	86.0	2.771	0.561	1.0119	1.811	
5.0	0.5926	18.0	84	3.748	526.60	530.50	3.90	91	84	87.5	3.724	0.750	1.0062	1.817	
5.0	0.5926	18.0	84	3.748	530.50	534.40	3.90	93	85	89.0	3.714	0.750	1.0090	1.822	
5.0	0.5926	18.0	84	3.748	534.40	538.30	3.90	94	86	90.0	3.707	0.750	1.0108	1.826	
5.0	0.7965	15.0	84	5.037	538.90	544.13	5.23	97	87	92.0	4.972	1.007	1.0130	1.823	
5.0	0.7965	15.0	84	5.037	544.13	549.36	5.23	100	89	94.5	4.950	1.007	1.0176	1.831	
5.0	0.7965	15.0	84	5.037	549.36	554.50	5.22	102	90	96.0	4.927	1.007	1.0223	1.843	
													Average	1.0087	1.802

Nomenclature	
K'	Critical Orifice Coefficient
T <sub>amb</sub>	Ambient Temperature (°F)
V <sub>cr</sub>	Volume Through Orifice (scf)
V <sub>d</sub>	Gas Meter Volume (ft³)
ΔH	Orifice Pressure Differential (in. H <sub>2</sub> O)
T <sub>i</sub>	Meter Inlet Temperature (°F)
T <sub>o</sub>	Meter Outlet Temperature (°F)
T <sub>avg</sub>	Average Meter Box Temperature (°F)
V <sub>msld</sub>	Volume Metered Standardized (scf)
Q	Flow Rate (scfm)
Y <sub>d</sub>	Meter Correction Factor (dimensionless)
ΔH@	ΔH yielding 0.75 scfm

Vacuum Gauge (in. Hg.)		Thermometers (°F)				Equations	
Standard	Vacuum Gauge	Std	Ch No	Ch No	Ch No	Ch No	
5	5.0	32	32	33	2	3	$V_{cr} = K' * P_b * \theta / (T_{amb} + 460) ^{0.5}$
10	10.0	50	51	51	51	50	$V_{msld} = 17.64 * V_d * (P_b + (\Delta H / 13.6)) / (T_{avg} + 460)$
15	15.0	100	100	101	101	100	$Q = V_{cr} * \theta$
20	20.0	150	151	151	151	150	$Y_d = V_{cr} / V_{msld}$
25	25.0	212	213	213	213	212	$\Delta H@ = 1.0319 * \Delta H * (T_{avg} + 460) * \theta^2 / (P_b * Y_d^2 - V_m^2)$
		250	251	251	251	250	
		300	300	301	301	300	
		350	350	350	350	349	
		400	400	400	400	399	
		500	500	500	500	498	
		600	600	599	599	598	

## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.300	Date	7/27/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.754	Meter ID	M-14

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	603.10	606.87	610.63
Final Volume (ft <sup>3</sup> )	606.87	610.63	614.40
Volume Metered (ft <sup>3</sup> )	3.77	3.76	3.77
DGM Inlet Temperature (°F)	82	83	84
DGM Outlet Temperature (°F)	78	78	78
Average DGM Temperature (°F)	80.0	80.5	81.0
Ambient Temperature (°F)	86	87	88
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.80	1.80	1.80
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	18	18	18
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.715	3.711	3.708
V <sub>mstd</sub> (ft <sup>3</sup> )	3.649	3.636	3.643
Post Test Y <sub>c</sub>	1.0180	1.0207	1.0180
Full Test Y <sub>d</sub>	1.0087	1.0087	1.0087
% Difference	-0.92	-1.19	-0.92
<b>Average % Difference</b>			<b>-1.01</b>



## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.500	Date	8/9/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.75	Meter ID	M-15

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	174.50	178.25	182.02
Final Volume (ft <sup>3</sup> )	178.25	182.02	185.78
Volume Metered (ft <sup>3</sup> )	3.75	3.77	3.76
DGM Inlet Temperature (°F)	85	86	87
DGM Outlet Temperature (°F)	79	80	80
Average DGM Temperature (°F)	82.0	83.0	83.5
Ambient Temperature (°F)	85	85	85
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.80	1.80	1.80
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	19	19	19
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.718	3.718	3.718
V <sub>mstd</sub> (ft <sup>3</sup> )	3.617	3.629	3.616
Post Test Y <sub>c</sub>	1.0281	1.0246	1.0282
Full Test Y <sub>d</sub>	1.0159	1.0159	1.0159
% Difference	-1.20	-0.85	-1.21
<b>Average % Difference</b>			<b>-1.09</b>





## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.500	Date	8/9/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.772	Meter ID	M-16

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	627.50	631.36	635.21
Final Volume (ft <sup>3</sup> )	631.36	635.21	639.08
Volume Metered (ft <sup>3</sup> )	3.86	3.85	3.87
DGM Inlet Temperature (°F)	86	87	88
DGM Outlet Temperature (°F)	82	82	82
Average DGM Temperature (°F)	84.0	84.5	85.0
Ambient Temperature (°F)	88	87	87
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.80	1.80	1.80
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	20	20	20
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.708	3.711	3.711
V <sub>mstd</sub> (ft <sup>3</sup> )	3.709	3.696	3.712
Post Test Y <sub>c</sub>	0.9998	1.0042	0.9999
Full Test Y <sub>d</sub>	0.9907	0.9907	0.9907
% Difference	-0.91	-1.36	-0.93
<b>Average % Difference</b>			<b>-1.07</b>

**Airtech Environmental Services, Inc.**  
Meter Box Full Test Calibration

Date: 12/14/2010

Operator: Jhurton

Meter Box ID M-17		Meter Box $\Delta H @$			Meter Box $Y_d$			Barometric Pressure (in. Hg.)			29.50					
Time		Orifice Data					Meter Box Data					Results				
$\theta$ (min)	K'	Vacuum	$T_{amb}$	$V_{cr}$	$V_{inlet}$	$V_{final}$	$V_d$	$\Delta H$	$T_i$	$T_o$	$T_{avg}$	$V_{mcd}$	Q	$Y_d$	$\Delta H @$	
5.0	0.3455	22.0	76	2.201	780.30	782.52	2.22	0.63	72	68	70	2.183	0.440	1.0083	1.781	
5.0	0.3455	22.0	76	2.201	782.52	784.73	2.21	0.63	73	69	71.0	2.169	0.440	1.0147	1.801	
5.0	0.3455	22.0	76	2.201	784.73	786.94	2.21	0.63	73	69	71.0	2.169	0.440	1.0147	1.801	
5.0	0.4434	20.0	75	2.828	787.30	790.15	2.85	1.05	74	69	71.5	2.798	0.566	1.0107	1.806	
5.0	0.4434	20.0	75	2.828	790.15	793.01	2.86	1.05	74	70	72.0	2.805	0.566	1.0081	1.795	
5.0	0.4434	20.0	75	2.828	793.01	795.86	2.85	1.05	75	70	72.5	2.792	0.566	1.0126	1.810	
5.0	0.5926	18.0	76	3.775	796.20	800.01	3.81	1.8	76	70	73.0	3.736	0.755	1.0104	1.737	
5.0	0.5926	18.0	76	3.775	800.01	803.81	3.80	1.8	78	71	74.5	3.716	0.755	1.0169	1.751	
5.0	0.5926	18.0	76	3.775	803.81	807.63	3.82	1.8	79	71	75.0	3.732	0.755	1.0116	1.735	
5.0	0.7965	16.0	78	5.065	806.20	813.27	5.07	3.2	81	72	76.5	4.957	1.013	1.0218	1.756	
5.0	0.7965	16.0	78	5.065	813.27	818.37	5.10	3.2	83	73	78.0	4.972	1.013	1.0187	1.740	
5.0	0.7965	16.0	78	5.065	818.37	823.46	5.09	3.2	84	73	78.5	4.958	1.013	1.0216	1.748	
														Average	1.0141	1.772

Nomenclature	
K'	Critical Orifice Coefficient
$T_{amb}$	Ambient Temperature (°F)
$V_{cr}$	Volume Through Orifice (scf)
$V_d$	Gas Meter Volume (ft³)
$\Delta H$	Orifice Pressure Differential (in. H <sub>2</sub> O)
$T_i$	Meter Inlet Temperature (°F)
$T_o$	Meter Outlet Temperature (°F)
$T_{avg}$	Average Meter Box Temperature (°F)
$V_{mcd}$	Volume Metered Standardized (scf)
Q	Flow Rate (scfm)
$Y_d$	Meter Correction Factor (dimensionless)
$\Delta H @$	$\Delta H$ yielding 0.75 scfm

Vacuum Gauge (in. Hg.)		Thermometers (°F)			Equations	
Standard	Vacuum Gauge	Ch. No.	Ch. No.	Ch. No.	Ch. No.	
5	5.0	32	33	33	33	$V_{cr} = K' * P_b * \theta / (T_{amb} + 460) * 0.5$
10	10.0	50	51	51	51	$V_{mcd} = 17.64 * V_d * (P_b + \Delta H / 13.6) / (T_{avg} + 460)$
15	15.0	100	101	102	102	$Q = V_{cr} * \theta$
20	20.0	150	151	152	152	$Y_d = V_{cr} / V_{mcd}$
25	25.0	212	213	214	214	$\Delta H @ = 0.0319 * \Delta H * (T_{avg} + 460) * \theta / (P_b * Y_d^2 * V_{mcd}^2)$
		250	251	252	252	
		300	301	303	303	
		350	352	353	353	
		400	401	402	403	
		500	501	503	503	
		600	601	602	603	

## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.500	Date	8/8/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.754	Meter ID	M-17

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	267.50	271.27	275.05
Final Volume (ft <sup>3</sup> )	271.27	275.05	278.81
Volume Metered (ft <sup>3</sup> )	3.77	3.78	3.76
DGM Inlet Temperature (°F)	93	93	94
DGM Outlet Temperature (°F)	86	86	87
Average DGM Temperature (°F)	89.5	89.5	90.5
Ambient Temperature (°F)	85	85	86
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.80	1.80	1.80
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	19	19	19
K'	0.5885	0.5885	0.5885
V <sub>cr</sub> (ft <sup>3</sup> )	3.718	3.718	3.715
V <sub>mstd</sub> (ft <sup>3</sup> )	3.586	3.596	3.570
Post Test Y <sub>c</sub>	1.0368	1.0341	1.0405
Full Test Y <sub>d</sub>	1.0141	1.0141	1.0141
% Difference	-2.24	-1.97	-2.60
<b>Average % Difference</b>			<b>-2.27</b>



## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate ( $\Delta H$ )	1.500	Date	8/8/2011
Highest Field Vacuum (inches Hg)	5	Client	BREC
Critical Orifice ID	AA-63	Project No.	3648
Orifice Flow Rate (cfm)	0.766	Meter ID	M-20

	Run 1	Run 2	Run 3
Initial Volume (ft <sup>3</sup> )	825.60	829.43	833.26
Final Volume (ft <sup>3</sup> )	829.43	833.26	837.08
Volume Metered (ft <sup>3</sup> )	3.83	3.83	3.82
DGM Inlet Temperature (°F)	90	90	90
DGM Outlet Temperature (°F)	84	84	84
Average DGM Temperature (°F)	87.0	87.0	87.0
Ambient Temperature (°F)	90	89	88
Elapsed Time (min.)	5	5	5
$\Delta H$ (inches H <sub>2</sub> O)	1.80	1.80	1.80
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	18	18	18
K'	0.5885	0.5885	0.5885
Vcr (ft <sup>3</sup> )	3.701	3.705	3.708
Vmstd (ft <sup>3</sup> )	3.660	3.660	3.650
Post Test Yc	1.0113	1.0122	1.0158
Full Test Yd	0.9952	0.9952	0.9952
% Difference	-1.62	-1.71	-2.07
<b>Average % Difference</b>			<b>-1.80</b>

CAE RI

# Meter Box Initial Calibration

Client

Operator OLEG LAVROV

Project No MET 30

Date 10/20/2010

Meter Box No 207191-A Meter Box Vacuum 1.0 in. H<sub>2</sub>O

Barometric Pressure 29.02

Q	ΔH	ΔP	Y <sub>ds</sub>	Standard Meter Gas Volume (cu.ft.)			Meter Box Gas Volume (liters)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Calibration Results		
				Initial	Final	V <sub>ds</sub> Net	Initial	Final	V <sub>d</sub> Net	Ambient Temperature	T <sub>ds</sub> Avg.	In	T <sub>o</sub> Out	T <sub>d</sub> Avg.	Θ Time	Y <sub>d</sub>	C. factor	
0.035	0.00	0.00	1.0000	0.000	0.362	0.362	0.000	10.214	10.214	10.214	70.0	70.00	76.0	77.0	76.50	10.00	1.0148	1.6050
0.069	0.00	0.00	1.0000	0.000	0.710	0.710	0.000	20.154	20.154	20.154	70.0	70.00	77.0	79.0	78.00	10.00	1.0130	1.6050
0.103	0.00	0.00	1.0000	0.000	1.067	1.067	0.000	30.270	30.270	30.270	71.0	71.00	80.0	81.0	80.50	10.00	1.0157	1.6050

Averages 1.01450 1.60500

Nomenclature		Equations	
P <sub>b</sub>	Barometric Pressure (in. Hg)		
Q	Flow Rate (cfm)		
ΔH	Orifice Pressure differential (in. H <sub>2</sub> O)		
ΔP	Inlet Pressure Differential (in. H <sub>2</sub> O)		
V <sub>d</sub>	Gas Meter Volume - Dry (ft <sup>3</sup> )		$Y_d = (Y_{ds}) \left[ \frac{V_{db}}{V_d} \right] \left[ \frac{T_d + 460}{T_{db} + 460} \right] \left[ \frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6} \right]$
V <sub>ds</sub>	Standard Meter Volume - Dry (ft <sup>3</sup> )		$\Delta H @ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)} \left[ \frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})} \right]^2$
T <sub>d</sub>	Average Meter Box Temperature (°F)		$Q = \frac{17.64(V_{db})(P_b)}{(T_{ds} + 460)(\Theta)}$
T <sub>o</sub>	Outlet Meter Box Temperature (°F)		
T <sub>ds</sub>	Average Standard Meter Temperature (°F)		
Y <sub>d</sub>	Meter Correction Factor (unitless)		
Y <sub>ds</sub>	Standard Meter Correction Factor (unitless)		
ΔH@	Orifice Pressure Differential giving 0.75 cfm of air at 88°F and 29.92 in. Hg (in. H <sub>2</sub> O)		
Θ	Duration of Run (minutes)		



# Meter Box Initial Calibration

CAE R2

Client

Operator OLEG LAVROV

Project No

MET 30

Date

10/20/2010

Meter Box No

207191-B

Meter Box Vacuum

1.0 in. H<sub>2</sub>O

Barometric Pressure

29.02

Q	ΔH	ΔP	Y <sub>ds</sub>	Standard Meter Gas Volume (cu.ft.)			Meter Box Gas Volume (liters)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Calibration Results		
				Initial	Final	Net	V <sub>ds</sub> Net	Initial	Final	Net	V <sub>d</sub> Net	Ambient Temperature	T <sub>ds</sub> Avg.	T <sub>o</sub> In	T <sub>o</sub> Out	T <sub>d</sub> Avg.	Time	Y <sub>d</sub>
0.035	0.00	0.00	1.0000	0.000	0.358	0.358	0.358	0.000	10.363	10.363	10.363	71.0	71.00	71.00	78.50	10.00	0.9929	1.6650
0.069	0.00	0.00	1.0000	0.000	0.718	0.718	0.718	0.000	20.914	20.914	20.914	72.0	72.00	72.00	81.50	10.00	0.9896	1.6650
0.102	0.00	0.00	1.0000	0.000	1.063	1.063	1.063	0.000	31.051	31.051	31.051	72.0	72.00	72.00	84.50	10.00	0.9925	1.6650

Averages 0.99167 1.66500

## Nomenclature

- P<sub>b</sub> Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H<sub>2</sub>O)
- ΔP Inlet Pressure Differential (in. H<sub>2</sub>O)
- V<sub>d</sub> Gas Meter Volume - Dry (ft<sup>3</sup>)
- V<sub>ds</sub> Standard Meter Volume - Dry (ft<sup>3</sup>)
- T<sub>d</sub> Average Meter Box Temperature (°F)
- T<sub>o</sub> Outlet Meter Box Temperature (°F)
- T<sub>ds</sub> Average Standard Meter Temperature (°F)
- Y<sub>d</sub> Meter Correction Factor (unitless)
- Y<sub>ds</sub> Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H<sub>2</sub>O)
- ⊙ Duration of Run (minutes)

## Equations

$$Y_d = (Y_{ds}) \left[ \frac{V_{ds}}{V_d} \right] \left[ \frac{T_d + 460}{T_{ds} + 460} \right] \left[ \frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6} \right]$$

$$\Delta H @ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)} \left[ \frac{(T_{ds} + 460)(\odot)}{(V_{ds})(Y_{ds})} \right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\odot)}$$

# Meter Box - Pyrometer Calibration Sheet

Meter Box No: 207191

Office: \_\_\_\_\_

Calibrated by: OLEG LAVROV

Client: \_\_\_\_\_

Date: 10/20/10

Job No: \_\_\_\_\_

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1	2	3	4	5	6	7
	Stack	Traps	HSL	Imp Out	Aux	DGM In	DGM Out
50	50	52	51				
100	100	102	101				
150	150	152	151				
200	200	202	201				
250	250	252	251				
300	300	302	301				
350	350	352	350				
400	400	402	401				
450	451	452	451				
500	501	502	501				
550	551	552	551				
600	601	602	601				

*Tolerance = ±2°F difference from reference setting.*

## Calibration Reference Information

Reference Used: <u>Omega CL23A</u>	Serial No: <u>T-225950</u>
Calibrated By: <u>JH Metrology</u>	Exp. Date: <u>8/17/2011</u>
Calibration Report No: <u>1000150487</u>	



# Meter Box - Pyrometer Calibration Sheet

Meter Box No: 207191

Office: Rentals

Calibrated by: W. Berry

Client: \_\_\_\_\_

Date: 1/13/11

Job No: \_\_\_\_\_

Temperature Scale Used: Fahrenheit

Type of Calibration: Post-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)					
	1 Stack	2 Traps	3 Heated Line	4 Aux 1	5 Aux 2	
50	49	49	50	50	50	
100	99	99	100	100	100	
150	149	150	150	150	150	
200	199	200	200	200	200	
250	249	250	250	250	250	
300	299	300	300	300	300	
350	349	350	350	350	350	
400	399	400	400	400	400	
450	449	450	450	450	450	
500	499	500	500	500	500	
550	549	550	550	550	550	
600	599	600	600	600	600	

*Tolerance = ±2°F difference from reference setting.*

### Calibration Reference Information

Reference Used: <u>Tegam</u>	Serial No: <u>T-242231</u>
Calibrated By: <u>JH Metrology</u>	Exp. Date: <u>11/24/2011</u>
Calibration Report No: <u>1000152056</u>	

## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate (lpm)	0.500	Date	7/22/2011
Highest Field Vacuum (Inches Hg)		Client	BREC
Critical Orifice ID	.5LPM	Project No.	3648
Orifice Flow Rate (lpm)	0.4375	Meter ID	207191-A

	Run 1	Run 2	Run 3
Initial Volume (l)	0.00	4.375	8.704
Final Volume (l)	4.375	8.704	12.956
Volume Metered (l)	4.375	4.329	4.252
DGM Inlet Temperature (°F)	87	86	86
DGM Outlet Temperature (°F)	87	86	86
Average DGM Temperature (°F)	87.0	86.0	86.0
Ambient Temperature (°F)	78	78	78
Elapsed Time (min.)	10	10	10
$\Delta H$ (inches H <sub>2</sub> O)	0.40	0.40	0.40
Barometric Pressure (Inches Hg)	29.5	29.5	29.5
Pump Vacuum (Inches Hg)	25	25	25
K'	0.0120	0.0120	0.0120
V <sub>cr</sub> (l)	4.322	4.322	4.322
V <sub>instd</sub> (l)	4.166	4.130	4.057
Post Test Yc	1.0373	1.0464	1.0654
Full Test Yd	1.0145	1.0145	1.0145
% Difference	-2.25	-3.15	-5.02
<b>Average % Difference</b>			<b>-3.47</b>

## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate (lpm)	0.500	Date	7/22/2011
Highest Field Vacuum (inches Hg)		Client	BREC
Critical Orifice ID	.5LPM	Project No.	3648
Orifice Flow Rate (lpm)	0.4475	Meter ID	207191-B

	Run 1	Run 2	Run 3
Initial Volume (l)	0.00	4.475	9.018
Final Volume (l)	4.475	9.018	13.576
Volume Metered (l)	4.475	4.543	4.558
DGM Inlet Temperature (°F)	89	89	88
DGM Outlet Temperature (°F)	89	89	88
Average DGM Temperature (°F)	89.0	89.0	88.0
Ambient Temperature (°F)	78	78	78
Elapsed Time (min.)	10	10	10
$\Delta H$ (inches H <sub>2</sub> O)	0.30	0.30	0.30
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	24	24	24
K	0.0120	0.0120	0.0120
Vcr (l)	4.322	4.322	4.322
Vmstd (l)	4.245	4.309	4.332
Post Test Yc	1.0181	1.0029	0.9977
Full Test Yd	0.99167	0.9917	0.9917
% Difference	-2.67	-1.13	-0.61
<b>Average % Difference</b>			<b>-1.47</b>

# Meter Box Full Test Calibration

R-20098

DATE: 7/10/2011

Operator: Joe Ward

Meter Box No.	DB30B-0711-2019	Meter Box H@:	0.0000	Meter Box Yd	1.0072	Meter Box Barometric Pressure:	29.79									
#1	Standard Meter Gas Volume			Meter Box Gas Volume (ft <sup>3</sup> )			Std. Meter Temperature (pF)		Meter Box Temperature (pF)							
	Q	P	H	Yds	Initial	Final	Vf	Initial	Final	Vf	Inlet	Outlet	Avg.	Time	Yd	H@
0.04	-0.30	0.00	1.0000	0.0	1.000	1.000	1.018	.000	1.018	1.018	75.0	75.0	75.0	26.40	1.0124	0.0000
0.04	-0.30	0.00	1.0000	0.0	1.000	1.000	1.019	0.000	1.019	1.019	75.0	75.0	75.0	26.38	1.0115	0.0000
0.02	-0.30	0.00	1.0000	0.0	.520	.520	.536	.000	.536	.536	75.0	75.0	75.0	22.14	1.0035	0.0000
0.02	-0.30	0.00	1.0000	0.0	.500	.500	.516	.000	.516	.516	75.0	75.0	75.0	22.09	1.0041	0.0000
0.02	-0.30	0.00	1.0000	0.0	.500	.500	.523	.000	.523	.523	76.0	76.0	76.0	32.22	1.0067	0.0000
0.02	-0.30	0.00	1.0000	0.0	.500	.500	.524	.000	.524	.524	76.0	76.0	76.0	32.20	1.0048	0.0000
AVERAGE													1.0072	0.0000		

Millennium Instruments Inc.  
 2402 Springridge Drive unit A  
 Spring Grove IL. 60081  
 PHONE#(815)675-3225  
 FAX#(815)675-6965  
 E-mail millennium@millinst.com  
 www.millinst.com

### Vacuum Gauge

(in. Hg)	Gauge
5.0	5.5
10.0	10.5
15.0	16.0
20.0	21.0

New Ashtead

# Meter Box Full Test Calibration

DATE: 7/11/2011

Operator: Joe Ward

Meter Box No: DB30B-0711-2019		Meter Box H@:		Meter Box Gas		Meter Box Yd		Barometric Pressure:				
#2		Volume		Volume (ft <sup>3</sup> )		Std. Meter Temperature (PF)		Temperature (PF)				
Q	P	H	Yds	Initial	Final	Vf	Inlet	Outlet	Avg.	Time	Yd	H@
0.03	-0.30	0.00	1.0000	0.0	1.000	1.000	75.0	75.0	75.0	30.56	1.0083	0.0000
0.03	-0.30	0.00	1.0000	0.0	1.000	1.025	75.0	75.0	75.0	30.48	1.0074	0.0000
0.02	-0.30	0.00	1.0000	0.0	.500	.518	75.0	75.0	75.0	22.10	1.0003	0.0000
0.02	-0.30	0.00	1.0000	0.0	.500	.518	75.0	75.0	75.0	21.90	1.0003	0.0000
0.01	-0.30	0.00	1.0000	0.0	.500	.528	76.0	76.0	76.0	38.94	0.9866	0.0000
0.01	-0.30	0.00	1.0000	0.0	.500	.527	76.0	76.0	76.0	38.85	0.9884	0.0000
<b>AVERAGE</b>											<b>0.9985</b>	<b>0.0000</b>

### Vacuum Gauge

(in. Hg)	Gauge
5.0	5.0
10.0	10.0
15.0	15.0
20.0	20.0

Millennium Instruments Inc.  
 2402 Springridge Drive unit A  
 Spring Grove IL. 60081  
 PHONE#(815)675-3225  
 FAX#(815)675-6965  
 E-mail millennium@millinst.com  
 www.millinst.com

R-20078

R-20078

### Pyrometer Calibration Sheet

Pyrometer No.:001

Office: Spring Grove  
Client: Ashtead Technology Rentals  
Job or Reference No.:DB30B-0711-2019

Temperature Scale Used

Fahrenheit  
 Celsius

Full Test  
 Post Test

Calibration Reference Settings for Fahrenheit Scale	Pyrometer Reading	Calibration Reference Settings for Celsius Scale
50° F	50° F	10°C
100° F	100° F	38°C
150° F	150° F	66°C
200° F	200° F	93°C
250° F	250° F	121°C
300° F	300° F	149°C
350° F	350° F	177°C
400° F	400° F	204°C
450° F	450° F	232°C
500° F	500° F	260°C
550° F	550° F	288°C
600° F	600° F	316°C

**Method 30B Post-Test Meter Calibration**

<b>Average Field Sample Rate (lpm)</b>	0.5	<b>Date</b>	8/8/2011
<b>Highest Field Vacuum (inches Hg)</b>	10.0	<b>Client</b>	BREC
<b>Critical Orifice ID</b>	.5LPM	<b>Project No.</b>	3648
<b>Orifice Flow Rate (lpm)</b>	0.473	<b>Meter ID</b>	R-20078A

	<b>Run 1</b>	<b>Run 2</b>	<b>Run 3</b>	
<b>Initial Volume (l<sup>3</sup>)</b>	0.000	4.676	9.411	
<b>Final Volume (l<sup>3</sup>)</b>	4.676	9.411	14.181	
<b>Volume Metered (l<sup>3</sup>)</b>	4.676	4.735	4.770	
<b>DGM Temperature (°F)</b>	106	108	112	
<b>Ambient Temperature (°F)</b>	87	88	88	
<b>Elapsed Time (min.)</b>	10.0	10.0	10.0	
<b>Setting (l/min)</b>	0.4	0.4	0.4	
<b>Barometric Pressure (inches Hg)</b>	29.50	29.50	29.50	
<b>Pump Vacuum (inches Hg)</b>	20.0	20.0	20.0	
<b>K'</b>	0.012	0.012	0.012	
<b>Vcr (l<sup>3</sup>)</b>	4.285	4.281	4.281	
<b>Vmstd (l<sup>3</sup>)</b>	4.303	4.342	4.344	
<b>Post Test Yc</b>	0.99572	0.98589	0.98555	
<b>Full Test Yd</b>	1.0072	1.0072	1.0072	
<b>% Difference</b>	1.14	2.12	2.15	
	<b>Average Difference</b>		<b>1.80</b>	

**Method 30B Post-Test Meter Calibration**

<b>Average Field Sample Rate (lpm)</b>	0.5	<b>Date</b>	8/8/2011
<b>Highest Field Vacuum (inches Hg)</b>	10.0	<b>Client</b>	BREC
<b>Critical Orifice ID</b>	.5LPM	<b>Project No.</b>	3648
<b>Orifice Flow Rate (lpm)</b>	0.487	<b>Meter ID</b>	R-20078B

	<b>Run 1</b>	<b>Run 2</b>	<b>Run 3</b>	
<b>Initial Volume (l<sup>3</sup>)</b>	0.000	4.891	9.779	
<b>Final Volume (l<sup>3</sup>)</b>	4.891	9.779	14.623	
<b>Volume Metered (l<sup>3</sup>)</b>	4.891	4.888	4.844	
<b>DGM Temperature (°F)</b>	116	116	115	
<b>Ambient Temperature (°F)</b>	87	87	86	
<b>Elapsed Time (min.)</b>	10.0	10.0	10.0	
<b>Setting (l/min)</b>	0.5	0.5	0.5	
<b>Barometric Pressure (inches Hg)</b>	29.50	29.50	29.50	
<b>Pump Vacuum (inches Hg)</b>	18.0	18.0	18.0	
<b>K'</b>	0.012	0.012	0.012	
<b>Vcr (l<sup>3</sup>)</b>	4.285	4.285	4.289	
<b>Vmstd (l<sup>3</sup>)</b>	4.424	4.422	4.389	
<b>Post Test Yc</b>	0.96853	0.96912	0.97712	
<b>Full Test Yd</b>	0.9985	0.9985	0.9985	
<b>% Difference</b>	3.00	2.94	2.14	
	<b>Average Difference</b>		<b>2.69</b>	





## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate (lpm)	0.500	Date	8/12/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	.5LPM	Project No.	3648
Orifice Flow Rate (lpm)	0.4486	Meter ID	M-25-A

	Run 1	Run 2	Run 3
Initial Volume (l)	0.00	4.486	9.072
Final Volume (l)	4.486	9.072	13.869
Volume Metered (l)	4.486	4.586	4.797
DGM Inlet Temperature (°F)	94	99	104
DGM Outlet Temperature (°F)	94	99	104
Average DGM Temperature (°F)	94.0	99.0	104.0
Ambient Temperature (°F)	79	78	79
Elapsed Time (min.)	10	10	10
$\Delta H$ (inches H <sub>2</sub> O)	0.40	0.40	0.40
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	18	18	18
K'	0.0120	0.0120	0.0120
Vcr (l)	4.318	4.322	4.318
Vmstd (l)	4.218	4.273	4.430
Post Test Yc	1.0237	1.0113	0.9746
Full Test Yd	0.9994	0.9994	0.9994
% Difference	-2.43	-1.19	2.48
<b>Average % Difference</b>			<b>-0.38</b>

**Alrtch Environmental Services, Inc.**  
30B Meter Box Full Test Calibration

Date: 3/29/2011

Operator: Jburton

Meter Box		M-25B		Orifice Data		Meter Box $Y_d$		1.0017		Barometric Pressure (in. Hg.)		Results		
Time		Vacuum	$T_{amb}$	$V_{cr}$	$V_{inlet}$	$V_{final}$	$V_d$	LPM		$T_{in}$	$V_{mead}$	Q	$Y_d$	$\Delta H@$
10.0	0.012	21.0	70	4.354	0.000	4.634	4.634	0.46		100	4.311	0.435	1.0100	1.293
10.0	0.012	21.0	70	4.354	4.634	9.253	4.619	0.46		99	4.305	0.435	1.0115	1.299
10.0	0.012	21.0	70	4.354	9.253	13.827	4.574	0.46		98	4.271	0.435	1.0196	1.322
10.0	0.019	20.0	68	6.907	0.000	7.530	7.530	0.75		97	7.048	0.691	0.9800	0.794
10.0	0.019	20.0	69	6.901	7.530	14.961	7.431	0.74		96	6.968	0.690	0.9904	0.803
10.0	0.019	20.0	70	6.894	14.961	22.428	7.467	0.75		96	7.002	0.689	0.9846	0.806
10.0	0.028	20.0	69	10.169	0.000	10.753	10.753	1.08		96	10.091	1.017	1.0078	0.560
10.0	0.028	20.0	69	10.169	10.753	21.576	10.823	1.08		96	10.157	1.017	1.0012	0.552
10.0	0.028	20.0	68	10.179	21.576	32.297	10.721	1.07		95	10.079	1.018	1.0099	0.557
10.0	0.041	19.0	68	14.905	0.000	15.482	15.482	1.55		95	14.572	1.491	1.0228	0.387
10.0	0.041	19.0	68	14.905	15.482	30.965	15.483	1.55		95	14.573	1.491	1.0228	0.387
10.0	0.041	19.0	68	14.905	30.985	46.450	15.465	1.55		95	14.556	1.491	1.0240	0.388
												Average	1.0017	0.887

Nomenclature	
K'	Critical Orifice Coefficient
$T_{amb}$	Ambient Temperature (°F)
$V_{cr}$	Volume Through Orifice (L)
$V_d$	Gas Meter Volume (L)
$\Delta H$	Orifice Pressure Differential (in. H <sub>2</sub> O)
$T_i$	Meter Inlet Temperature (°F)
$T_o$	Meter Outlet Temperature (°F)
$T_{avg}$	Average Meter Box Temperature (°F)
$V_{mead}$	Volume Metered Standardized (L)
Q	Flow Rate (scfm)
$Y_d$	Meter Correction Factor (dimensionless)
$\Delta H@$	$\Delta H$ yielding 0.75 scfm

Vacuum Gauge (in. Hg.)		Thermometers (°F)	
Serial No.	Volume Range	Serial No.	Ext. No.
5	5.0	1	probe
10	10.0	32	32
15	15.0	50	49
20	20.0	100	101
25	25.0	152	152
		213	213
		250	251
		299	301
		350	351
		400	400
		501	501
		601	599

$$V_{cr} = K' \cdot P_c \cdot \theta \cdot \sqrt{\frac{P_c}{(T_{amb} + 460)} \cdot 0.5}$$

$$V_{mead} = 17.64 \cdot V_d \cdot \frac{(P_c + (\Delta H / 13.6))}{(T_{avg} + 460)}$$

$$Q = V_{cr} / \theta$$

$$Y_d = V_{cr} / V_{mead}$$

$$\Delta H@ = .0319 \cdot \frac{\Delta H \cdot (T_{amb} + 460)}{P_b \cdot Y_d^2 \cdot V_{mead}^2}$$

## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate (lpm)	0.500	Date	8/12/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	.5LPM	Project No.	3648
Orifice Flow Rate (lpm)	0.4864	Meter ID	M-25-B

	Run 1	Run 2	Run 3
Initial Volume (l)	0.00	4.864	9.786
Final Volume (l)	4.864	9.786	14.644
Volume Metered (l)	4.864	4.922	4.858
DGM Inlet Temperature (°F)	113	115	116
DGM Outlet Temperature (°F)	113	115	116
Average DGM Temperature (°F)	113.0	115.0	116.0
Ambient Temperature (°F)	82	81	81
Elapsed Time (min.)	10	10	10
$\Delta H$ (inches H <sub>2</sub> O)	0.40	0.40	0.40
Barometric Pressure (inches Hg)	29.5	29.5	29.5
Pump Vacuum (inches Hg)	19	19	19
K'	0.0120	0.0120	0.0120
V <sub>cr</sub> (l)	4.306	4.310	4.310
V <sub>mstd</sub> (l)	4.422	4.459	4.393
Post Test Yc	0.9738	0.9666	0.9810
Full Test Yd	1.0017	1.0017	1.0017
% Difference	2.79	3.51	2.07
<b>Average % Difference</b>			<b>2.79</b>

# Meter Box Full Test Calibration

M26

DATE: 7/8/2011

Operator: Joe Ward

Meter Box No: DB30B-0711-2018		Meter Box H@: 0.0000		Meter Box Yd 0.9958		Barometric Pressure: 29.78						
#1	Standard Meter Gas Volume		Meter Box Gas Volume (ft <sup>3</sup> )		Std. Meter Temperature (PF)		Meter Box Temperature (PF)					
	Initial	Final	Vf	Initial	Final	Vf	Inlet	Outlet	Avg.	Time	Yd	H@
0.04	0.0	1.000	1.000	.000	1.015	1.015	76.0	76.0	81.0	27.04	0.9951	0.0000
0.04	0.0	1.000	1.000	0.000	1.014	1.014	76.0	76.0	80.0	27.06	0.9943	0.0000
0.02	0.0	.500	.500	.000	.503	.503	77.0	77.0	80.0	29.91	1.0003	0.0000
0.02	0.0	.500	.500	.000	.502	.502	77.0	77.0	80.0	29.52	1.0023	0.0000
0.03	0.0	.500	.500	.000	.507	.507	78.0	78.0	81.0	17.92	0.9924	0.0000
0.03	0.0	.500	.500	.000	.508	.508	78.0	78.0	81.0	17.79	0.9905	0.0000
<b>AVERAGE</b>												
											<b>0.9958</b>	<b>0.0000</b>

Millennium Instruments Inc.  
 2402 Springridge Drive unit A  
 Spring Grove IL. 60081  
 PHONE#(815)675-3225  
 FAX#(815)675-6965  
 E-mail millennium@millinst.com  
 www.millinst.com

### Vacuum Gauge

(in. Hg)	Gauge
5.0	5.5
10.0	10.5
15.0	16.0
20.0	21.0
25.0	26.0

# Meter Box Full Test Calibration

DATE: 7/10/2011

*M-26*

Operator: Joe Ward

Meter Box No. DB30B-0711-2018		Meter Box H@:		Meter Box Gas		Meter Box Gas		Meter Box Yd		Meter Box Pressure:					
		0.0000		0.9902		29.75									
#2	Standard Meter Gas		Volume (ft <sup>3</sup> )		Std. Meter		Temperature (PF)		Meter Box		H@				
	Initial	Final	Vf	Vf	Inlet	Outlet	Avg.	Inlet	Outlet	Avg.		Time	Yd		
0.01	0.0	.280	.280	.280	.294	.294	.294	75.0	75.0	75.0	92.0	92.0	18.66	0.9834	0.0000
0.01	0.0	.285	.285	.285	.299	.299	.299	75.0	75.0	75.0	92.0	92.0	18.64	0.9842	0.0000
0.03	0.0	1.000	1.000	1.000	1.033	1.033	1.033	75.0	75.0	75.0	93.0	93.0	29.14	1.0014	0.0000
0.03	0.0	1.000	1.000	1.000	1.032	1.032	1.032	75.0	75.0	75.0	93.0	93.0	29.10	1.0023	0.0000
0.02	0.0	.500	.500	.500	.527	.527	.527	75.0	75.0	75.0	95.0	95.0	22.89	0.9850	0.0000
0.02	0.0	.500	.500	.500	.527	.527	.527	75.0	75.0	75.0	95.0	95.0	22.80	0.9850	0.0000
<b>AVERAGE</b>											<b>0.9902</b>	<b>0.0000</b>			

Millennium Instruments Inc.  
 2402 Springridge Drive unit A  
 Spring Grove IL. 60081  
 PHONE#(815)675-3225  
 FAX#(815)675-6965  
 E-mail millennium@millinst.com  
 www.millinst.com

### Vacuum Gauge

(in. Hg)	Gauge
5.0	5.0
10.0	10.0
15.0	15.0
20.0	20.0

# Pyrometer Calibration Sheet

Pyrometer No.:001

Office: Spring Grove

Client: Airtech Environmental

Job or Reference No.:DB30B-0711-2018

Temperature Scale Used



Fahrenheit



Celsius



Full Test



Post Test

Calibration Reference Settings for Fahrenheit Scale	Pyrometer Reading	Calibration Reference Settings for Celsius Scale
50° F	50° F	10°C
100° F	100° F	38°C
150° F	150° F	66°C
200° F	200° F	93°C
250° F	250° F	121°C
300° F	300° F	149°C
350° F	350° F	177°C
400° F	400° F	204°C
450° F	450° F	232°C
500° F	500° F	260°C
550° F	550° F	288°C
600° F	600° F	316°C

**Method 30B Post-Test Meter Calibration**

<b>Average Field Sample Rate (lpm)</b>	0.5	<b>Date</b>	8/8/2011
<b>Highest Field Vacuum (inches Hg)</b>	10.0	<b>Client</b>	BREC
<b>Critical Orifice ID</b>	.5LPM	<b>Project No.</b>	3648
<b>Orifice Flow Rate (lpm)</b>	0.479	<b>Meter ID</b>	M-26 A

	<b>Run 1</b>	<b>Run 2</b>	<b>Run 3</b>	
<b>Initial Volume (l<sup>3</sup>)</b>	0.000	4.798	9.564	
<b>Final Volume (l<sup>3</sup>)</b>	4.798	9.564	14.362	
<b>Volume Metered (l<sup>3</sup>)</b>	4.798	4.766	4.798	
<b>DGM Temperature (°F)</b>	104	105	107	
<b>Ambient Temperature (°F)</b>	88	87	88	
<b>Elapsed Time (min.)</b>	10.0	10.0	10.0	
<b>Setting (l/min)</b>	0.4	0.4	0.4	
<b>Barometric Pressure (inches Hg)</b>	29.50	29.50	29.50	
<b>Pump Vacuum (inches Hg)</b>	19.0	19.0	19.0	
<b>K'</b>	0.012	0.012	0.012	
<b>Vcr (l<sup>3</sup>)</b>	4.281	4.285	4.281	
<b>Vmstd (l<sup>3</sup>)</b>	4.431	4.394	4.408	
<b>Post Test Yc</b>	0.96609	0.97519	0.97123	
<b>Full Test Yd</b>	0.9958	0.9958	0.9958	
<b>% Difference</b>	2.98	2.07	2.47	
	<b>Average Difference</b>		<b>2.51</b>	



**Method 30B Post-Test Meter Calibration**

<b>Average Field Sample Rate (lpm)</b>	0.5	<b>Date</b>	8/8/2011
<b>Highest Field Vacuum (inches Hg)</b>	10.0	<b>Client</b>	BREC
<b>Critical Orifice ID</b>	.5LPM	<b>Project No.</b>	3648
<b>Orifice Flow Rate (lpm)</b>	0.480	<b>Meter ID</b>	M-26 B

	<b>Run 1</b>	<b>Run 2</b>	<b>Run 3</b>	
<b>Initial Volume (l<sup>3</sup>)</b>	0.000	4.802	9.592	
<b>Final Volume (l<sup>3</sup>)</b>	4.802	9.592	14.401	
<b>Volume Metered (l<sup>3</sup>)</b>	4.802	4.790	4.809	
<b>DGM Temperature (°F)</b>	106	108	107	
<b>Ambient Temperature (°F)</b>	88	87	88	
<b>Elapsed Time (min.)</b>	10.0	10.0	10.0	
<b>Setting (l/min)</b>	0.4	0.4	0.4	
<b>Barometric Pressure (inches Hg)</b>	29.50	29.50	29.50	
<b>Pump Vacuum (inches Hg)</b>	20.0	20.0	20.0	
<b>K'</b>	0.012	0.012	0.012	
<b>Vcr (l<sup>3</sup>)</b>	4.281	4.285	4.281	
<b>Vmstd (l<sup>3</sup>)</b>	4.419	4.393	4.418	
<b>Post Test Yc</b>	0.96871	0.97546	0.96901	
<b>Full Test Yd</b>	0.9902	0.9902	0.9902	
<b>% Difference</b>	2.17	1.49	2.14	
	<b>Average Difference</b>		<b>1.93</b>	



APEX INSTRUMENTS METER CONSOLE CALIBRATION

Meter Console Information

Console Model	XC-260	Console Serial Number	0905008-A	Encoder Model	HEDS-9100-F00
Gas Meter Model	SK25	Totalizer Scale Factor (Initial)	1.0000	Totalizer Model	RED LION
Gas Meter Serial#	8005093	Totalizer Scale Factor (Final)	0.9728	Temp Display Model	JENCO

Calibration Conditions

WTM ID	539783	Calibration Technician	EW	Calibration Date	16-Aug-10
WTM Cal Factor	1.0001	Barometric Pressure (Pb)	735.5 mm Hg		

Calibration Data

Run Time	Dry Gas Meter				Wet Test Meter				Standardized Volumes				Results		
	Gas Pressure (P <sub>m</sub> ) mm H <sub>2</sub> O	Gas Volume (V <sub>m</sub> ) liters	Gas Temp (t <sub>m</sub> ) °C	Totalizer Display	Gas Volume (V <sub>w</sub> ) liters	Gas Temp (t <sub>w</sub> ) °C	Totalizer Display	Initial SF	Totalizer SF	Final SF	Wet Test Meter (V <sub>w(std)</sub> ) std liters	Totalizer Gamma	Final Variation (Y)	Corrected Flowrate (Q <sub>m</sub> ) slm	
Run 1 - Initial	0	0	23.33	0.000	780.096	24.0									
Final	0	0	23.33	13.406	793.113	24.0									
Total/Avg	0	0	23.33	13.406	13.017	24.0	12.837	12.488	12.438	12.438	0.9960	-0.004	2.49		
Run 2 - Initial	0	0	23.33	13.406	793.113	24.0									
Final	0	0	23.33	26.513	805.870	24.0									
Total/Avg	0	0	23.33	13.107	12.757	24.0	12.551	12.209	12.189	12.189	0.9984	-0.002	2.03		
Run 3 - Initial	0	0	23.33	26.513	805.870	24.0									
Final	0	0	23.33	37.917	816.961	24.0									
Total/Avg	0	0	23.33	11.404	11.091	24.0	10.920	10.623	10.597	10.597	0.9976	-0.002	1.51		
Run 4 - Initial	0	0	23.33	37.917	816.961	24.0									
Final	0	0	23.89	50.554	829.294	24.0									
Total/Avg	0	0	23.61	12.637	12.333	24.0	12.089	11.760	11.784	11.784	1.0020	0.002	0.98		
Run 5 - Initial	0	0	23.89	50.554	829.294	24.0									
Final	0	0	23.89	63.375	841.845	24.0									
Total/Avg	0	0	23.89	12.821	12.551	24.0	12.254	11.920	11.993	11.993	1.0060	0.006	0.50		

Average Meter Calibration Factor Y

1.0000

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

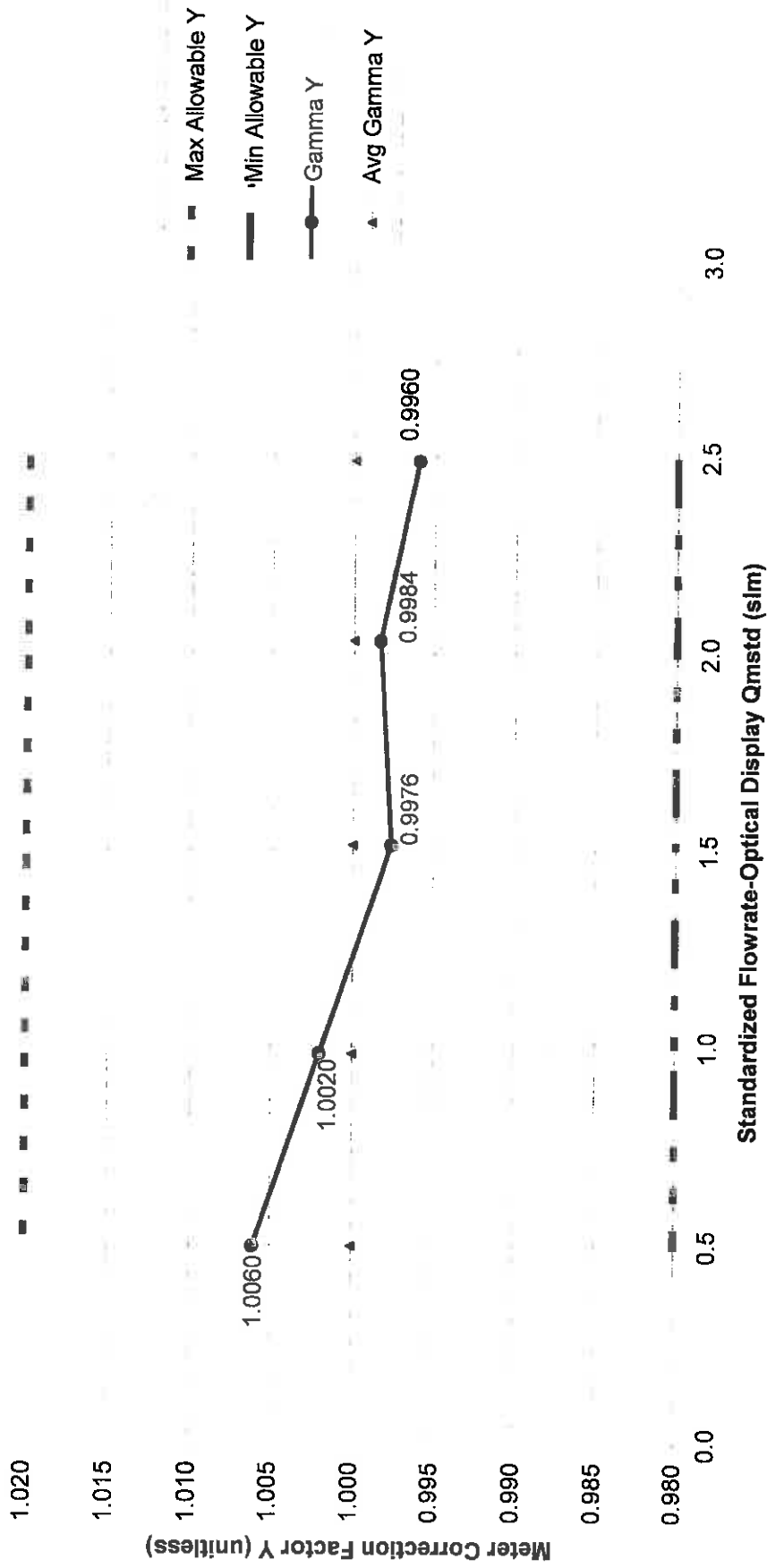
Certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using a Precision Wet Test Meter, which in turn was calibrated using the Argonspan Gas Prover #3795, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.)

Signature *[Signature]*

Date *8/16/10*

219075

### Electronic Totalizer Y vs Standardized Flowrate



## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate (lpm)	0.500	Date	8/1/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	.5LPM	Project No.	3648
Orifice Flow Rate (lpm)	0.4479	Meter ID	R19075A

	Run 1	Run 2	Run 3
Initial Volume (l)	0.00	4.479	8.984
Final Volume (l)	4.479	8.984	13.48
Volume Metered (l)	4.479	4.51	4.50
DGM Inlet Temperature (°F)	83	84	85
DGM Outlet Temperature (°F)	83	84	85
Average DGM Temperature (°F)	83.0	84.0	85.0
Ambient Temperature (°F)	80	80	80
Elapsed Time (min.)	10	10	10
$\Delta H$ (inches H <sub>2</sub> O)	0.40	0.40	0.40
Barometric Pressure (inches Hg)	29.58	29.58	29.58
Pump Vacuum (inches Hg)	22	22	22
K'	0.0120	0.0120	0.0120
Vcr (l)	4.325	4.325	4.325
Vmstd (l)	4.308	4.325	4.313
Post Test Yc	1.0040	1.0000	1.0030
Full Test Yd	1.000	1.0000	1.0000
% Difference	-0.40	0.00	-0.30
<b>Average % Difference</b>			<b>-0.23</b>



APEX INSTRUMENTS METER CONSOLE CALIBRATION

Meter Console Information			
Console Model	XC-260	Console Serial Number	0905008-B
Encoder Model		Totalizer Model	HEDS-9100-F00
Gas Meter Model	SK25	Totalizer Scale Factor (Initial)	1.0000
Temp Display Model		Totalizer Scale Factor (Final)	0.9756

Calibration Conditions			
WTM ID	539784	Calibration Technician	EW
WTM Cal Factor	1.0024	Barometric Pressure (Pb)	735.5 mm Hg
		Calibration Date	16-Aug-10

Calibration Data														
Run Time	Dry Gas Meter				Wet Test Meter				Standardized Volumes				Results	
	Gas Pressure (P <sub>m</sub> ) mm H <sub>2</sub> O	Gas Volume (V <sub>m</sub> ) liters	Gas Temp (T <sub>m</sub> ) °C	Totalizer Display	Gas Volume (V <sub>w</sub> ) liters	Gas Temp (T <sub>w</sub> ) °C	Initial SF (V <sub>m(Std)</sub> ) std liters	Final SF (V <sub>w(Std)</sub> ) std liters	Totalizer Wet Test Meter (V <sub>w(Std)</sub> ) std liters	Initial SF (V <sub>m(Std)</sub> ) std liters	Final SF (V <sub>w(Std)</sub> ) std liters	Totalizer Gamma	Corrected Flowrate (Q <sub>m</sub> ) slm	
Run 1 - Initial	0	0	23.89	0.000	195.508	24.0								
Final	0	0	24.44	13.356	208.479	24.0								
Total/Avg	0	0	24.17	13.356	12.971	24.0	12.753	12.443	12.422	0.9984	-0.002	2.49		
Run 2 - Initial	0	0	24.44	13.356	208.479	24.0								
Final	0	0	25.00	26.505	221.226	24.0								
Total/Avg	0	0	24.72	13.149	12.747	24.0	12.532	12.227	12.208	0.9984	-0.002	2.04		
Run 3 - Initial	0	0	25.00	26.505	221.226	24.0								
Final	0	0	25.00	37.866	232.244	24.0								
Total/Avg	0	0	25.00	11.361	11.018	24.0	10.818	10.554	10.552	0.9998	0.000	1.51		
Run 4 - Initial	0	0	25.00	37.866	232.244	24.0								
Final	0	0	25.00	50.775	244.775	24.0								
Total/Avg	0	0	25.00	12.909	12.531	24.0	12.292	11.992	12.001	1.0007	0.001	1.00		
Run 5 - Initial	0	0	25.00	50.775	244.775	24.0								
Final	0	0	25.56	64.499	258.111	24.0								
Total/Avg	0	0	25.28	13.724	13.336	24.0	13.056	12.738	12.772	1.0027	0.003	0.53		

Average Meter Calibration Factor Y 1.0000

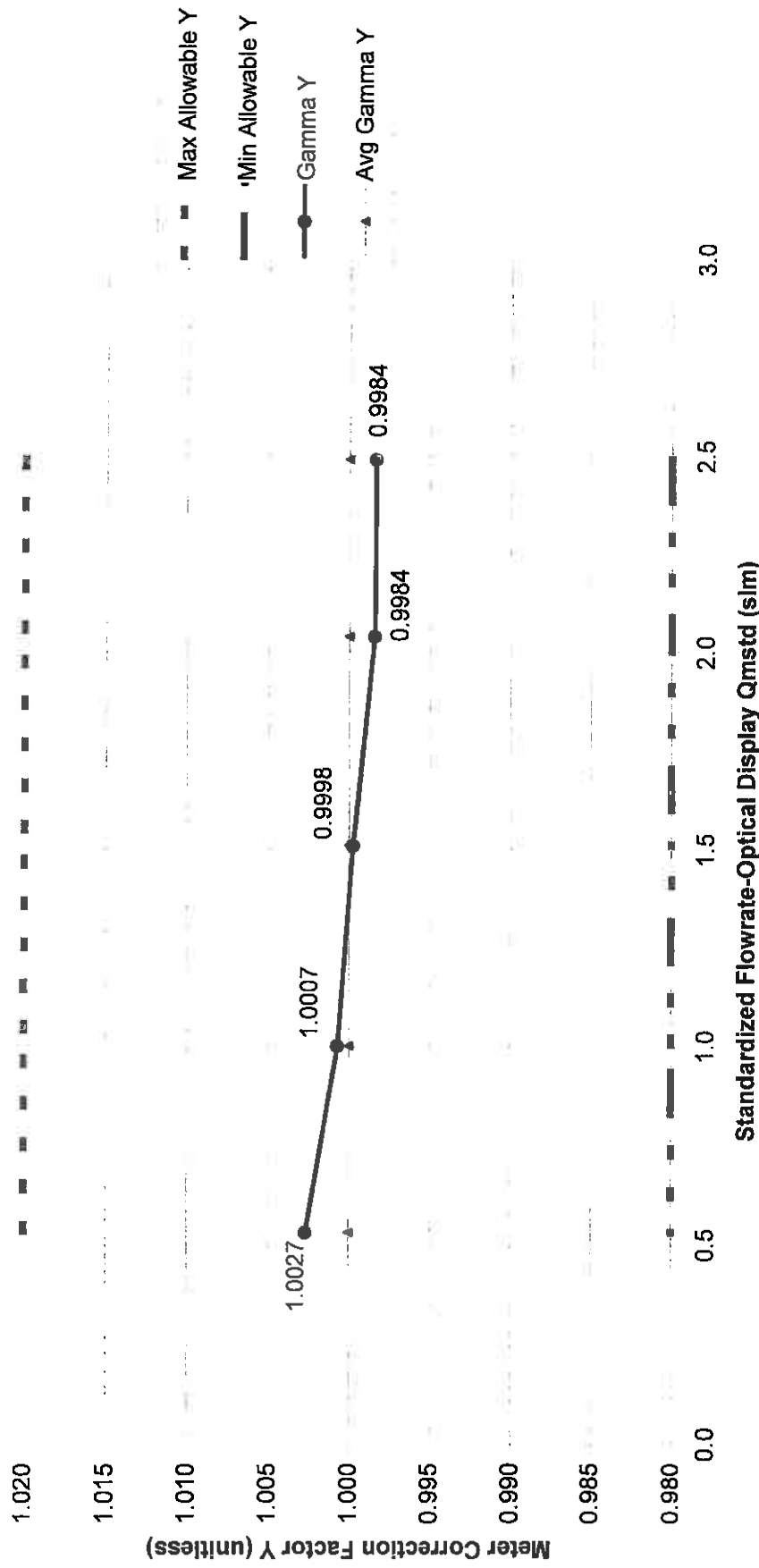
Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ±0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using a Precision Wet Test Meter which in turn was calibrated using the American Bell Prover # 3765, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature *[Signature]* Date *8/16/10*

19075

### Electronic Totalizer Y vs Standardized Flowrate



Console Serial: 0905008-B

## Airtech Environmental Services Meter Post Calibration

Average Field Sample Rate (lpm)	0.500	Date	8/1/2011
Highest Field Vacuum (inches Hg)	10	Client	BREC
Critical Orifice ID	.5LPM	Project No.	3648
Orifice Flow Rate (lpm)	0.4553	Meter ID	R19075B

	Run 1	Run 2	Run 3
Initial Volume (l)	0.00	4.553	9.078
Final Volume (l)	4.553	9.078	13.65
Volume Metered (l)	4.553	4.53	4.57
DGM Inlet Temperature (°F)	87	87	87
DGM Outlet Temperature (°F)	87	87	87
Average DGM Temperature (°F)	87.0	87.0	87.0
Ambient Temperature (°F)	80	80	80
Elapsed Time (min.)	10	10	10
$\Delta H$ (inches H <sub>2</sub> O)	0.40	0.40	0.40
Barometric Pressure (inches Hg)	29.58	29.58	29.58
Pump Vacuum (inches Hg)	21	21	21
K'	0.0120	0.0120	0.0120
V <sub>cr</sub> (l)	4.325	4.325	4.325
V <sub>mstd</sub> (l)	4.347	4.321	4.366
Post Test Y <sub>c</sub>	0.9949	1.0011	0.9908
Full Test Y <sub>d</sub>	1.000	1.0000	1.0000
% Difference	0.51	-0.11	0.92
<b>Average % Difference</b>			<b>0.44</b>

**Airtech Environmental Services, Inc.**  
**S-Type Pitot Tube Inspection Form**

Date 1/25/11  
Pitot ID AE5-6-2  
Operator EA

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.356	NA
Base To Opening Distance - Pb (inches)	0.356	NA
Pa/Dt	1.42	1.05-1.50
Pb/Dt	1.42	1.05-1.50
Angle $\alpha 1$ ( $^{\circ}$ )	2.7	10
Angle $\alpha 2$ ( $^{\circ}$ )	2.6	10
Angle B1 ( $^{\circ}$ )	4	5
Angle B1 ( $^{\circ}$ )	0.6	5
Opening to Opening Distance Pa+Pb (inches)	0.712	NA
Angle Z ( $^{\circ}$ )	0.4	NA
z (inches)	0.0050	0.125
Angle W ( $^{\circ}$ )	0	NA
w (inches)	0.000	0.031

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly Yes  
If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle (inches)	0.75	0.75 in.
Pitot to Thermocouple Distance (inches)	2	2 in.
Pitot to Sample Probe Distance (inches)	6.25	3 in.

Does the Pitot Tube Meet the Above Requirements Yes  
Is the Pitot Tube Free of Damage Yes

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned  
If No to Either, then the Pitot Tube Must be Calibrated



**Airtech Environmental Services, Inc.**  
**S-Type Pitot Tube Inspection Form**

Date 1/25/11  
Pitot ID AE-5-6-3  
Operator EA

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.362	NA
Base To Opening Distance - Pb (inches)	0.362	NA
Pa/Dt	1.45	1.05-1.50
Pb/Dt	1.45	1.05-1.50
Angle $\alpha 1(^{\circ})$	3.4	10
Angle $\alpha 2(^{\circ})$	2	10
Angle B1( $^{\circ}$ )	1.3	5
Angle B1( $^{\circ}$ )	2.1	5
Opening to Opening Distance Pa+Pb (inches)	0.724	NA
Angle Z ( $^{\circ}$ )	0	NA
z (inches)	0.0000	0.125
Angle W ( $^{\circ}$ )	0.9	NA
w (inches)	0.011	0.031

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly Yes  
If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle (inches)	0.75	0.75 in.
Pitot to Thermocouple Distance (inches)	2	2 in.
Pitot to Sample Probe Distance (inches)	4.25	3 in.

Does the Pitot Tube Meet the Above Requirements Yes  
Is the Pitot Tube Free of Damage Yes

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned  
If No to Either, then the Pitot Tube Must be Calibrated

**Airtech Environmental Services, Inc.**  
**S-Type Pitot Tube Inspection Form**

Date 1/25/11  
Pitot ID AE-5-6-4WC  
Operator EA

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.329	NA
Base To Opening Distance - Pb (inches)	0.329	NA
Pa/Dt	1.32	1.05-1.50
Pb/Dt	1.32	1.05-1.50
Angle $\alpha 1(^{\circ})$	2.3	10
Angle $\alpha 2(^{\circ})$	1.7	10
Angle B1( $^{\circ}$ )	3.9	5
Angle B1( $^{\circ}$ )	3.5	5
Opening to Opening Distance Pa+Pb (inches)	0.658	NA
Angle Z ( $^{\circ}$ )	2.5	NA
z (inches)	0.0287	0.125
Angle W ( $^{\circ}$ )	0.3	NA
w (inches)	0.003	0.031

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly Yes  
If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle (inches)	0.75	0.75 in.
Pitot to Thermocouple Distance (inches)	2	2 in.
Pitot to Sample Probe Distance (inches)	5	3 in.

Does the Pitot Tube Meet the Above Requirements Yes  
Is the Pitot Tube Free of Damage Yes

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned  
If No to Either, then the Pitot Tube Must be Calibrated

## Airtech Environmental Services, Inc. S-Type Pitot Tube Inspection Form

Date January 17, 2011  
 Pitot ID AE5-10-1  
 Operator A. Kienitz

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.363	NA
Base To Opening Distance - Pb (inches)	0.359	NA
Pa/Dt	1.452	1.05-1.50
Pb/Dt	1.436	1.05-1.50
Angle, $\alpha 1$ (°)	2	10
Angle, $\alpha 2$ (°)	2	10
Angle, B1 (°)	2	5
Angle, B1 (°)	4	5
Opening to Opening Distance Pa+Pb (inches)	0.722	NA
Angle, Z (°)	89	NA
z (inches)	0.015	0.125
Angle, W (°)	91	NA
w (inches)	0.010	0.031
Pitot to Thermocouple Distance W (inches)	2.125	$\geq 2$

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly **Yes**

If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle, X (inches)	0.75	0.75
Pitot to Sample Probe Distance, Y (inches)	4.25	3

Does the Pitot Tube Meet the Above Requirements **Yes**

Is the Pitot Tube Free of Damage **Yes**

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned

If No to Either, then the Pitot Tube Must be Calibrated

## Airtech Environmental Services, Inc. S-Type Pitot Tube Inspection Form

Date 1/26/11  
Pitot ID AE5-10-2  
Operator EA

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.346	NA
Base To Opening Distance - Pb (inches)	0.346	NA
Pa/Dt	1.38	1.05-1.50
Pb/Dt	1.38	1.05-1.50
Angle $\alpha 1$ ( $^{\circ}$ )	1.3	10
Angle $\alpha 2$ ( $^{\circ}$ )	1.6	10
Angle B1 ( $^{\circ}$ )	4.3	5
Angle B1 ( $^{\circ}$ )	2.3	5
Opening to Opening Distance Pa+Pb (inches)	0.704	NA
Angle Z ( $^{\circ}$ )	3.9	NA
z (inches)	0.0479	0.125
Angle W ( $^{\circ}$ )	0.7	NA
w (inches)	0.009	0.031

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly Yes  
If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle (inches)	0.75	0.75 in.
Pitot to Thermocouple Distance (inches)	3	2 in.
Pitot to Sample Probe Distance (inches)	5.5	3 in.

Does the Pitot Tube Meet the Above Requirements Yes  
Is the Pitot Tube Free of Damage Yes

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned  
If No to Either, then the Pitot Tube Must be Calibrated

**Airtech Environmental Services, Inc.**  
**S-Type Pitot Tube Inspection Form**

Date January 26, 2011  
 Pitot ID AE5-12-3  
 Operator EA

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.338	NA
Base To Opening Distance - Pb (inches)	0.338	NA
Pa/Dt	1.35	1.05-1.50
Pb/Dt	1.35	1.05-1.50
Angle $\alpha 1(^{\circ})$	1.1	10
Angle $\alpha 2(^{\circ})$	1.1	10
Angle B1( $^{\circ}$ )	2.1	5
Angle B2( $^{\circ}$ )	3.5	5
Opening to Opening Distance Pa+Pb (inches)	0.676	NA
Angle Z ( $^{\circ}$ )	4.3	NA
z (inches)	0.05	0.125
Angle W ( $^{\circ}$ )	0.9	NA
w (inches)	0.01	0.031

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly Yes  
 If Yes, Complete the Section Below

	Measured	Allowed
Distance From Nozzle, X (inches)	0.75	0.75 in.
Pitot to Thermocouple Distance, W (inches)	2.25	2 in.
Pitot to Sample Probe Distance, Y (inches)	3.500	3 in.

Does the Pitot Tube Meet the Above Requirements Yes  
 Is the Pitot Tube Free of Damage Yes

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned  
 If No to Either, then the Pitot Tube Must be Calibrated

**Airtech Environmental Services, Inc.**  
**S-Type Pitot Tube Inspection Form**

Date January 17, 2011  
Pitot ID AE5-12-4  
Operator A. Kienitz

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.356	NA
Base To Opening Distance - Pb (inches)	0.356	NA
Pa/Dt	1.424	1.05-1.50
Pb/Dt	1.424	1.05-1.50
Angle, $\alpha 1(^{\circ})$	1	10
Angle, $\alpha 2(^{\circ})$	0	10
Angle, B1( $^{\circ}$ )	0	5
Angle, B1( $^{\circ}$ )	3	5
Opening to Opening Distance Pa+Pb (inches)	0.712	NA
Angle, Z ( $^{\circ}$ )	89	NA
z (inches)	0.030	0.125
Angle, W ( $^{\circ}$ )	90	NA
w (inches)	0.003	0.031
Pitot to Thermocouple Distance, W (inches)	2.50	$\geq 2$

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly **Yes**  
If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle, X (inches)	0.75	0.75
Pitot to Sample Probe Distance, Y (inches)	4.50	3

Does the Pitot Tube Meet the Above Requirements **Yes**  
Is the Pitot Tube Free of Damage **Yes**

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned  
If No to Either, then the Pitot Tube Must be Calibrated

**Airtech Environmental Services, Inc.**  
**S-Type Pitot Tube Inspection Form**

Date 1/26/11  
 Pitot ID AE5/13/1  
 Operator EA

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.349	NA
Base To Opening Distance - Pb (inches)	0.349	NA
Pa/Dt	1.40	1.05-1.50
Pb/Dt	1.40	1.05-1.50
Angle $\alpha 1(^{\circ})$	1.2	10
Angle $\alpha 2(^{\circ})$	1	10
Angle B1( $^{\circ}$ )	1.3	5
Angle B1( $^{\circ}$ )	2.2	5
Opening to Opening Distance Pa+Pb (inches)	0.698	NA
Angle Z ( $^{\circ}$ )	0.9	NA
z (inches)	0.0110	0.125
Angle W ( $^{\circ}$ )	0.4	NA
w (inches)	0.005	0.031

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly Yes  
 If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle (inches)	0.75	0.75 in.
Pitot to Thermocouple Distance (inches)	2.5	2 in.
Pitot to Sample Probe Distance (inches)	5	3 in.

Does the Pitot Tube Meet the Above Requirements Yes  
 Is the Pitot Tube Free of Damage Yes

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned  
 If No to Either, then the Pitot Tube Must be Calibrated