



# METEOROLOGICAL STATION CALIBRATION SUMMARY

Met Station: Ludeman

Date: 6-Nov-14

Performed By: K. Trentacosti, G. Wintermote -- IML Air Science

Sensor	Mfr./Model	Serial #	Reference Device	Serial ID	IML ID
Wind Speed (WS):	RM Young 05305	79704	RM Young 18802	IML 0896	IML 0896
Wind Direction (WD):	RM Young 05305	79704	Brunton F-2601	2610409451	IML 1405
Vertical Wind Speed (VWS):	RM Young 27106T	N/A	RM Young 18802	IML 0897	IML 0897
Temperature (T): 2 meter	RM Young RTD 41342	13131	Cole Parmer 90080-12	122501859	IML 1438
Temperature (T): 10 meter	RM Young RTD 41342	13129	Cole Parmer 90080-12	122501859	IML 1438
2 meter Asp. Radiation Shield	RM Young 43502	N/A	N/A	N/A	N/A
10 meter Asp. Radiation Shield	RM Young 43502	N/A	N/A	N/A	N/A
Relative Humidity:	Campbell SC215	E2335	Dwyer 485B-1	M53X0231BA0187	IML 1435
Barometric Pressure (BP):	Vaisala PTB 110	C470017	Meriam M2	1249000050	IML 1439
Solar Radiation:	Apogee PYR-P	6734	Eppeley 8-48	37405	37405
Precipitation:	Texas Electronics 8"	10868-5	Lab Grade Burette	N/A	N/A
Data acquisition system:	Campbell Scientific CR1000	16130	N/A	N/A	N/A

## System Description and Initial Inspection

Power to system?	Yes	Site Location:	4,752,034 m N 444,386 m E	Tower Condition:	Good
Aspirated Fans Operational?	Yes		Zone 13, NAD83		
Logger Power and Condition?	Yes	Magnetic		Sensor and Cable	
Telemetry Ok?	Yes	Declination:	9° E	Conditions:	Good
Notes-as found:		Time Offline:	14:40 MST	Time Online:	15:25 MST

## Calibration Results

Calibration Results						
WS (mph):	Reference	Reference	DAS Value	Difference	Specification	Pass/Fail
	RPM	mph				
WS (mph) = 0.1145 * rpm	0	0.00	0.00	0.00	0.45	Pass (2)
	300	3.44	3.44	0.00	0.45	Pass (2)
	800	9.16	9.16	0.00	0.45	Pass (2)
	3000	34.35	34.35	0.00	0.45	Pass (2)
	8000	91.60	91.60	0.00	0.45	Pass (2)
WS start torque (gm-cm)		1.0	t<1.0	N/A	t<1.0	Pass (3)
Crossarm Alignment (degrees)	Reference	DAS Value	Difference	Specification	Pass/Fail	
	180.0	180.4	0.4	5	Pass (2)	
WD start torque (gm-cm)		11.0	t<11.0	N/A	t<11.0	N/A (3)
WD (degrees)	Clockwise	0.0	0.0	0.0	5	Pass (2)
		90.0	89.6	0.4	5	Pass (2)
		180.0	180.4	0.4	5	Pass (2)
		270.0	269.9	0.1	5	Pass (2)
	Counter Clockwise	0.0	0.0	0.0	5	Pass (2)
		90.0	90.4	0.4	5	Pass (2)
		180.0	180.1	0.1	5	Pass (2)
		270.0	270.4	0.4	5	Pass (2)
Vertical WS (cm/s): 10 meters	Reference	Reference	DAS Value	Difference	Specification	Pass/Fail
	RPM	cm/s				
WS (cm/s) = 0.512 * rpm	0	0.00	0.00	0.00	20	Pass (2)
	20	10.00	8.56	1.44	20	Pass (2)
	60	30.00	28.73	1.27	20	Pass (2)
	200	100.00	98.34	1.66	20	Pass (2)
	500	250.00	246.47	3.53	20	Pass (2)
Vertical WS (cm/s): 10 meters	Reference	Reference	DAS Value	Difference	Specification	Pass/Fail
	RPM	cm/s				
WS (cm/s) = 0.5 * rpm	0	0.00	0.00	0.00	20	Pass (2)
	20	-10.00	-9.78	0.22	20	Pass (2)
	60	-30.00	-30.57	0.57	20	Pass (2)
	200	-100.00	-99.66	0.34	20	Pass (2)
	500	-250.00	-247.04	2.96	20	Pass (2)

		Reference Temp (°C)	DAS Value	Difference	Specification	Pass/Fail	
Temperature (°C): 2 Meter		-0.40	-0.34	0.06	0.5	Pass	(2)
		25.75	25.77	0.02	0.5	Pass	(2)
		77.01	77.03	0.02	0.5	Pass	(2)
Temperature (°C): 10 Meter		-0.40	-0.34	0.06	0.5	Pass	(2)
		25.75	25.79	0.04	0.5	Pass	(2)
		77.01	77.06	0.05	0.5	Pass	(2)
Delta Temperature (°C)		Upper Sensor	Lower Sensor	Difference	Specification	Pass/Fail	
		-0.34	-0.34	0.00	0.1	Pass	(2)
		25.79	25.77	0.02	0.1	Pass	(2)
		77.06	77.03	0.03	0.1	Pass	(2)
Barometric Pressure ("Hg)		Reference	DAS Value	Difference	Specification	Pass/Fail	
		24.75	24.76	0.01	0.09	Pass	(2)
Relative Humidity (%)		25.8	28.6	2.8	7	Pass	(2)
Solar Radiation (W/m <sup>2</sup> )	covered measurement	0.00	0.00	0.0	25	Pass	(2)
	daylighted measurement	209.30	205.10	4.2	25	Pass	(2)
Precipitation (0.1" equiv.)		DAS Value (in)	Reference (ml)	DAS Equivalent	Difference	Specification	Pass/Fail
		0.10	86.4	82.4	4.0	8.2	Pass (2)
		0.10	86.6	82.4	4.2	8.2	Pass (2)
		0.10	86.4	82.4	4.0	8.2	Pass (2)
				Average Diff:	4.1		
<b>BOLD difference values exceed performance specifications</b>							
(1)= Performance specification listed in facilities' Quality Assurance Project Plan							
(2)= Performance specification listed In EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Vol. IV: Meteorological Measurements Version 2.0, March 2008							
(3)= Manufacturer's Specifications							
(4)= EPA On-Site Meteorological Program Guidance for Regulatory Modeling Applications, February 2000							

**Notes, Recommendations**