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OTECH
ENGINEERING INC.

ANEMOMETER CALIBRATION REPORT

Customer: NRG Systems, Inc.

This document reports that a wind tunnel test was performed for the anemometer listed below in accordance with transfer function protocols defined by ASTM D 5096-02 and IEC 61400-12-1. The following data and transfer function is the relationship between the reference wind speed measurement in the wind tunnel test section and the unadjusted signal output from the instrument under test (IUT) given the prescribed speed range.

IUT Model No: NRG #40
IUT Serial No: 179500041325
Test Date: 6/5/07 2:51 PM
Test Speed Range: 4 - 26 m/s

IUT Output: AC Sine Wave
IUT Conditioner: NRG #3070 SCM Card
IUT Conditioner Power Supply: 12 VDC
IUT Conditioner Output: 0 - 10VDC Square Wave

Wind Tunnel Test Facility

Otech Tunnel ID: WT1A
Type: Eiffel (open circuit, suction)
Test Section Size: 0.61 m x 0.61 m x 1.22 m
Manufacturer: Engineering Laboratory Design, Inc.

Measuring Equipment

Reference Speed: Four United Sensor Type PA Pitot-static tubes sensed by an MKS Barotron Type 220D Differential Pressure Transducer (NIST traceable)
Amb. Pressure: Setra Model 270 Barometer (NIST traceable)
Amb. Temperature: OMEGA HX94 SS Probe (NIST traceable)
Relative Humidity: OMEGA HX94 SS Probe (NIST traceable)

Data Acquisition

Hardware: National Instruments PCI-MIO-16E-4 A/D Board with SC-2345
Software: National Instruments LabVIEW 8.0
Signal Reduction Method for IUT: FFT to determine frequency

Test Conditions

Reference Speed Position Correction = 1
Reference Speed Blockage Correction = 1
Mean Ambient Pressure = 100719 Pa
Mean Ambient Temperature = 28.8 deg C
Mean Relative Humidity = 39.3% RH
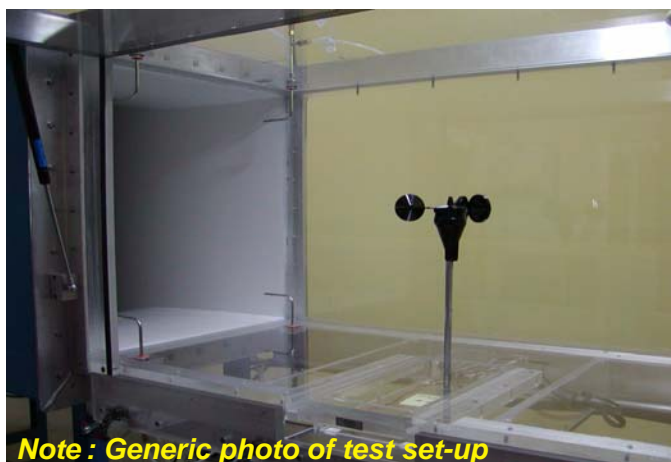Mean Density = 1.1556 kg/cubic meter
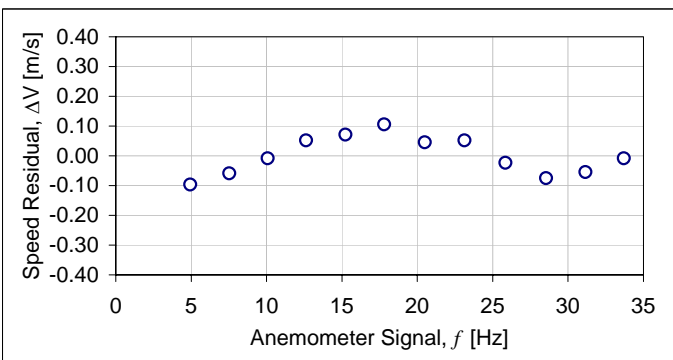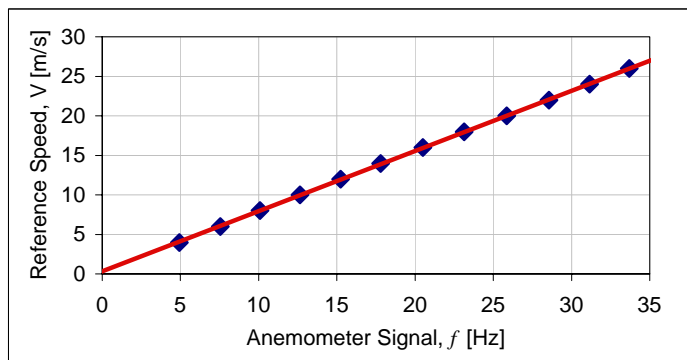
Transfer Function Test Results:

$$V [m/s] = 0.762\, f\,[Hz] + 0.32$$

r = 0.99996   std. err. estimate = 0.0678 m/s

Note : Generic photo of test set-up

Reference Speed [m/s]	Anemometer Output [Hz]	Residual [m/s]	Ref. Speed Uncertainty
3.987	4.937	-0.097	0.541%
8.000	10.090	-0.008	0.499%
12.003	15.241	0.071	0.481%
15.987	20.507	0.045	0.475%
19.996	25.862	-0.023	0.478%
24.002	31.164	-0.055	0.476%
25.979	33.698	-0.008	0.476%
21.995	28.555	-0.075	0.480%
17.990	23.130	0.052	0.486%
13.985	17.799	0.106	0.489%
9.996	12.632	0.052	0.491%
6.011	7.544	-0.059	0.493%

References available upon request.