

Electronic Cooling Solutions Inc.

612 National Avenue, Mountain View, CA 94043

Phone: (650) 988-1155

Fax: (650) 988-1153

July 31, 2008

Bob Mimlitch III
Innovation First, Inc.
1519 Interstate 30 West
Greenville, TX 75088

Dear Mr. Mimlitch,

Electronic Cooling Solutions Inc completed an airflow evaluation for the list of bezels shown below. The evaluation was performed in accordance with the Dell test document entitled, "*Procedure for 3rd Party Qualification of OEM Bezels for Dell Servers.*" This document has been attached to this letter as a reference.

Electronic Cooling Solutions is authorized by Dell to provide this test service to third parties that wish to qualify a non-Dell bezel for use on a Dell server product.

The test completed showed that each of these bezels was tested in accordance with the Dell generated procedure and each of these bezels passed the test that was performed.

Number	P/N
# 1	R71 -860-R1A-001
# 2	BZL-860-S1A-001
# 3	BZL-860-D1A-001
# 4	BZL-860-H1A-001
# 5	BZL-1950-D1A-001
# 6	BZL-1950-H1A-001
# 7	BZL-1950-R1A-001
# 8	BZL-1950-S1A-001
# 9	BZL-2950-D1A-001
# 10	BZL-2950-H1A-001
# 11	BZL-2950-R1A-001
# 12	BZL-2950-S1A-001
# 13	BZL-860-R1B-001
# 14	BZL-860-S1B-001
# 15	BZL-860-D1B-001
# 16	BZL-860-H1B-001
# 17	BZL-1950-D1B-001
# 18	BZL-1950-H1B-001
# 19	BZL-1950-R1B-001
# 20	BZL-1950-S1B-001
# 21	BZL-2950-D1B-001
# 22	BZL-2950-H1B-001
# 23	BZL-2950-R1B-001
# 24	BZL-2950-S1B-001
# 25	BZL-1950-APC-001
# 26	BZL-2950-APC-001

Sincerely,

William Maltz, President
Electronic Cooling Solutions Inc

Electronic Cooling Solutions Inc.

612 National Avenue, Mountain View, CA 94043

Phone: (650) 988-1155

Fax: (650) 988-1153

Procedure for 3rd Party Qualification of OEM Bezels for Dell Servers

Introduction

To enable unique customer front bezel designs, Dell has developed a procedure for testing OEM bezels using standard airflow measurement techniques. This specification details an empirical process for evaluating an OEM bezel against the Dell-designed bezel by comparing airflow rates through a functional system. This applies to 8th Generation and later Dell Power Edge servers, but does not include Power Edge SC servers. This procedure requires the test site to be capable of measuring airflow up to 300 CFM through a rackable server. Additionally, the site must have available the server for which the OEM bezel is being designed, the Dell-designed bezel, and a sample of the OEM bezel of such a quality to have production-representative airflow properties.

Airflow Measurement

The basis for this test procedure is a comparison of system-level airflow with the Dell bezel to the system-level airflow with the OEM bezel. This airflow measurement can be made using a metered airflow chamber designed in accordance with AMCA 210-99/ASHRAE 51-19 (Figure 1). These airflow chambers, also known as flow-benches, measure the pressure drop across a calibrated nozzle to determine volumetric airflow rates. Additionally, these airflow chambers are equipped to measure the impedance across a test section. Use of hotwire anemometers to estimate airflow based on local velocity measurements is not appropriate for this qualification testing.

Electronic Cooling Solutions Inc.

612 National Avenue, Mountain View, CA 94043

Phone: (650) 988-1155

Fax: (650) 988-1153

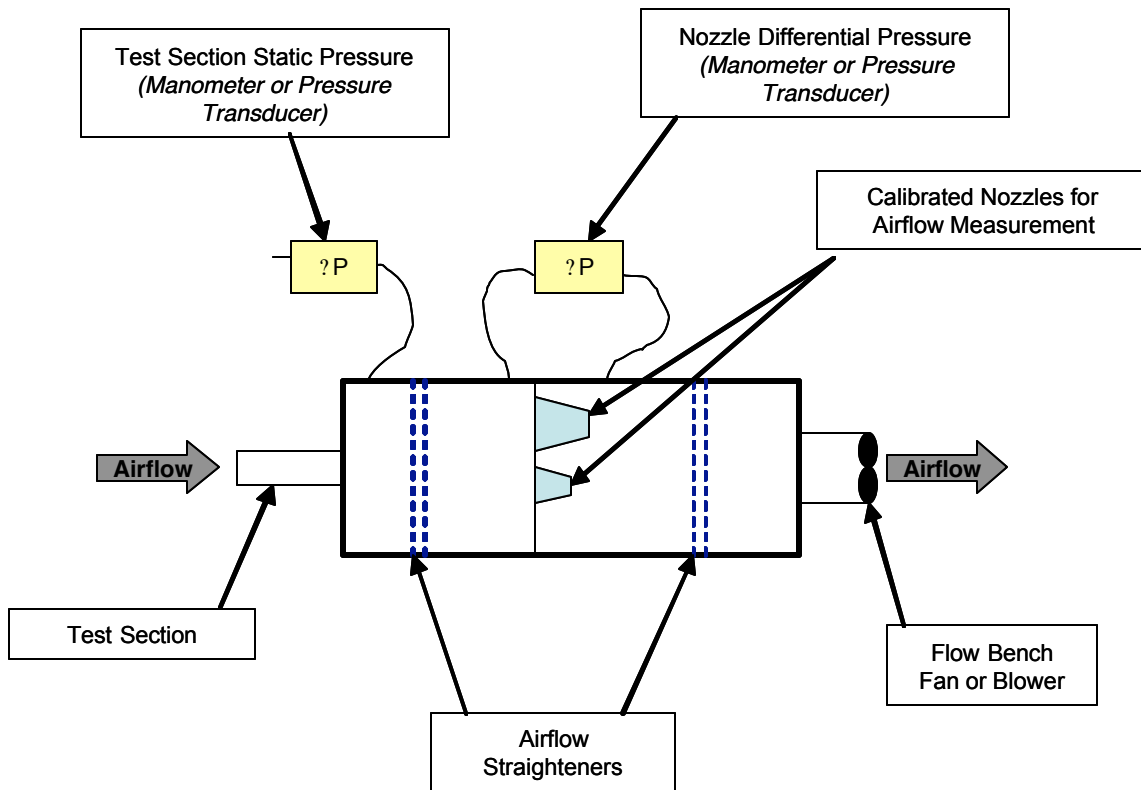


Figure 1: AMCA 210-99/ASHRAE 51-19 Airflow Measurement Chamber

Test Preparation

Fan Modification

To prepare a system for test, the system must first be modified to force the fans to run at full speed by disabling the tachometer output of a fan. This will simulate a fan-fail condition, and the Dell BMC (Base Management Controller) will trigger all fans to full-speed. Remove a single fan from the system to be tested and cut the yellow and blue wires between the fan housing and fan connector. Insulate the exposed conductors with shrink-wrap, electrical tape, or similar material, and reinstall the fan in the system. When the system is powered up it will flash a Fan RPM warning and all fans should run at full speed. This is an acceptable operating condition while the system is being used in a lab environment for this testing.

Note: The 8th Generation and later Dell Power Edge servers (PE x8xx or PE 8xx) use 4-wire PWM driven fans except for platforms in the 1U space that use voltage controlled, 3-wire axial fans.

System Configuration

The system being tested must be a Dell factory configuration.

Airflow Measurement

Electronic Cooling Solutions Inc.

612 National Avenue, Mountain View, CA 94043

Phone: (650) 988-1155

Fax: (650) 988-1153

When properly prepared for testing, the server should be fixtured on the inlet side of the flowbench, with the rear of the chassis discharging air into the flow chamber with either the Dell or OEM bezel candidate installed (Figure 2). The system should be powered-on, and the airflow measured at system free-flow with the Dell bezel and then the OEM bezel candidate. This is achieved by adjusting the blower on the flowbench until the static pressure loss across the server reads zero. The differential pressure across the nozzle can then be correlated to the system flow rate according to the test equipment's documentation.

When testing multiple bezels on a single server, the airflow with the Dell bezel should be measured:

- At least once per day.
- Each time the system is removed and re-secured to the flowbench.

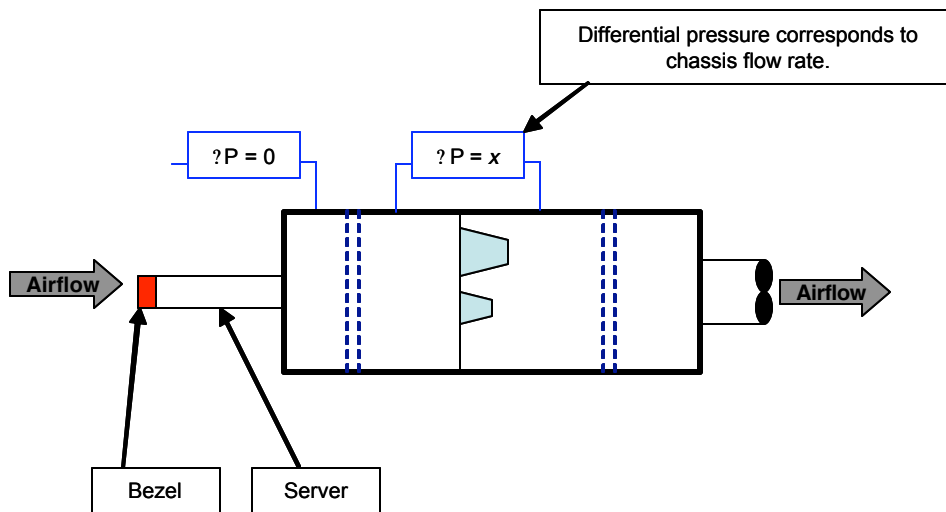


Figure 2: Server with Bezel Attached to Flowbench

Electronic Cooling Solutions Inc.

612 National Avenue, Mountain View, CA 94043

Phone: (650) 988-1155

Fax: (650) 988-1153

Pass/Fail Criteria and Data Reporting

An OEM bezel is considered acceptable if the airflow through the system with the OEM bezel is equal to or greater than the airflow with the Dell bezel. The attached data sheet should be used to record the airflow of both the Dell bezel and the OEM bezel and submitted to Dell for review and final approval.



Bezel Test Template

References

Airflow Measurement Systems Website: www.fantester.com, 10/31/05.
500cfm chamber

Pressure Measurement Equipment Website: www.dwyer-inst.com
Differential Pressure Transducers

Dwyer Model Number: 607-3, 607-7

Digital Displays

Dwyer Model Number: A701

Electronic Cooling Solutions Inc.

612 National Avenue, Mountain View, CA 94043

Phone: (650) 988-1155

Fax: (650) 988-1153

Test Equipment Images

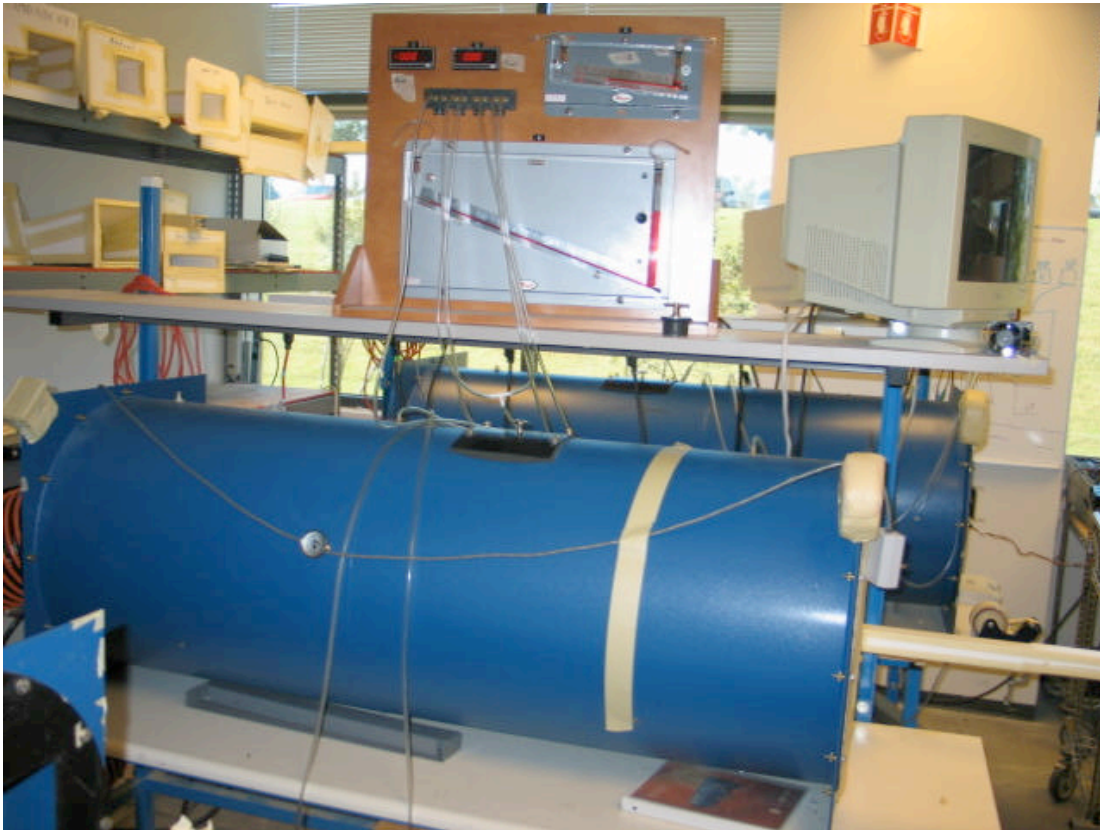


Figure 3: AMCA 210-99 Flow bench