



SINCE 1896

# REPORT

**Intertek** ETL SEMKO

3933 US ROUTE 11 CORTLAND, NEW YORK 13045

Order No. 3096540

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**REPORT NO. 3096540CRT-001c**

## **NEGATIVE STATIC PRESSURE VERSUS AIR FLOW AND SOUND POWER LEVEL TESTS ON SEVEN DOUBLE DEFLECTION RETURN AIR REGISTERS**

**RENDERED TO**

**BEST CHOICE INDUSTRIES L.L.C.  
P. O. BOX 31567  
DUBAI, U.A.E.**

**NOTE:** Report revised to include watermark

### **INTRODUCTION**

This report gives the results of tests conducted on seven double deflection return air registers. The test results include Negative Static Pressure and Sound Power Level. The samples were selected and supplied by the client and were received at the laboratories on May 5, 2006. The samples appeared to be in new unused condition upon receipt.

### **AUTHORIZATION**

Signed Intertek Quotation No. 19932299.

### **TEST METHOD**

Each register was tested in accordance with the ASHRAE 70-1991 Standard "Method of Testing for Rating the Performance of Air Outlets and Inlets", which incorporates ADC 1062: GRD-84 Test Code for Grilles, Registers and Diffusers. Acoustical data was obtained employing a Bruel & Kjaer Digital Frequency Analyzer Type 2131 and analyzed on a CompuAdd 286 Computer and Epson LQ-850 printer. The reference sound source used for this test was a calibrated Bruel & Kjaer Type 4204, which conforms to the above standard. The octave band sound power levels were plotted on graph of Noise Criteria Curves which is in the ADC Test Code. These curves are reprinted with permission from the ASHRAE Handbook and Product Directory, 1976.

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**DESCRIPTION OF TEST SPECIMENS**

The registers were constructed of extruded aluminum and were equipped with airfoil designed blades. The blades were 17mm deep and the grille frame was 40mm deep. The blades were spaced on 20mm centers with the horizontal blades in front of the vertical blades. The vertical and horizontal blades were set at 0° deflection for all tests. The register sizes, in millimeters, supplied for testing were 450 X 150, 600 X 150, 900 X 150, 450 X 250, 600 X 250, 750 X 250 and 900 X 250. Each unit was installed in a return air plenum for this series of tests.

**RESULTS OF TESTS**

Octave Band Center Frequency Hertz	<b><u>RAR HFB DD Size 450 X150</u></b>						
	<b><u>Exhaust Air Sound Power Level dB re 10<sup>-12</sup> Watt</u></b>						
125	43.0*	43.0*	43.0*	43.0*	43.0*	44.0*	45.5
250	39.0*	42.5	43.5	46.5	49.5	52.0	50.5
500	33.0	38.0	40.5	44.5	47.5	52.0	54.5
1000	26.5	31.0	33.5	39.5	43.5	48.0	51.0
2000	18.5*	22.5	26.0	33.0	38.0	43.0	46.0
4000	20.5*	20.5*	20.5*	26.0	31.5	37.5	41.0
8000	26.0*	26.0*	26.0*	26.0*	26.0*	27.5*	30.0
Return Air Volume, CFM	500	550	600	700	800	900	1000
Negative Static Pressure, in. H <sub>2</sub> O	0.055	0.067	0.078	0.107	0.140	0.180	0.220
**Noise Criteria (NC)	17	22	25	30	33	37	40

\* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

\*\* Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.

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**RESULTS OF TESTS (cont'd)**

Octave Band Center Frequency Hertz	<u>RAR HFB DD Size 600 X150</u>					
	Exhaust Air Sound Power Level dB re 10 <sup>-12</sup> Watt					
125	43.0*	43.0*	43.0*	47.5*	48.0*	49.5
250	36.5*	41.0	45.0	46.0	50.5	50.5
500	27.5	33.0	41.0	46.0	51.0	54.0
1000	22.0*	27.0	32.5	37.5	45.0	50.5
2000	18.5*	19.5*	25.0	31.5	40.0	46.0
4000	20.5*	20.5*	20.5*	25.5*	34.0	41.0
8000	26.0*	26.0*	26.0*	26.0*	26.5*	30.0*
Return Air Volume, CFM	500	600	700	800	1000	1200
Negative Static Pressure, in. H <sub>2</sub> O	0.031	0.046	0.060	0.078	0.126	0.180
**Noise Criteria (NC)	<15	18	25	31	36	40

Octave Band Center Frequency Hertz	<u>RAR HFB DD Size 900 X 150</u>					
	Exhaust Air Sound Power Level dB re 10 <sup>-12</sup> Watt					
125	43.0*	43.0*	43.0*	43.0*	43.0*	44.0*
250	43.5	44.5	45.5	46.0	47.5	50.0
500	31.5	36.0	42.5	49.0	53.0	54.0
1000	24.5	28.5	32.5	36.5	40.0	44.5
2000	18.5*	20.0*	25.0	29.0	33.5	38.5
4000	20.5*	20.5*	20.5*	23.0	26.5	31.5
8000	26.0*	26.0*	26.0*	26.0*	26.0*	26.5*
Return Air Volume, CFM	800	900	1000	1100	1200	1400
Negative Static Pressure, in. H <sub>2</sub> O	0.031	0.040	0.050	0.060	0.072	0.096
**Noise Criteria (NC)	21	22	27	34	38	39

\* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

\*\* Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.

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**RESULTS OF TESTS (cont'd)**

Octave Band Center Frequency Hertz	<b>RAR HFB DD Size 450 X200</b>						
	Exhaust Air Sound Power Level dB re 10 <sup>-12</sup> Watt						
125	46.0*	46.0*	46.0*	46.0*	46.0*	47.0*	
250	41.5	42.5	44.0	46.0	48.5	49.0	
500	36.0	42.0	45.0	46.0	52.0	53.5	
1000	28.5	33.5	35.5	40.0	47.0	53.5	
2000	21.0*	26.0	28.0	33.5	41.5	47.5	
4000	22.0*	22.0*	22.5*	26.0	35.5	42.0	
8000	29.0*	29.0*	29.0*	29.0*	29.5*	33.0	
Return Air Volume, CFM	800	900	1000	1100	1300	1500	
Negative Static Pressure, in. H <sub>2</sub> O	0.061	0.077	0.095	0.116	0.160	0.215	
**Noise Criteria (NC)	20	27	30	31	37	43	

Octave Band Center Frequency Hertz	<b>RAR HFB DD Size 600 X 200</b>						
	Exhaust Air Sound Power Level dB re 10 <sup>-12</sup> Watt						
125	42.5*	42.5*	42.5*	42.5*	42.5*	43.0*	45.5
250	40.5*	41.5*	43.0*	43.5*	44.0*	47.5	50.5
500	32.0	35.0	37.5	42.0	44.5	50.0	54.5
1000	24.5*	30.0	31.0	33.0	35.5	44.0	50.0
2000	20.0*	22.0	22.5	25.0	27.5	37.0	44.5
4000	21.0*	21.0*	21.0*	21.0*	21.5*	30.5	39.0
8000	26.0*	26.0*	26.0*	26.0*	26.0*	26.0*	23.0*
Return Air Volume, CFM	600	650	700	750	800	1000	1200
Negative Static Pressure, in. H <sub>2</sub> O	0.040	0.048	0.053	0.062	0.072	0.115	0.160
**Noise Criteria (NC)	17	19	22	27	30	35	40

\* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

\*\* Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.

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**RESULTS OF TESTS (cont'd)**

Octave Band Center Frequency Hertz	<b>RAR HFB DD Size 750 X200</b>							
	Exhaust Air Sound Power Level dB re 10 <sup>-12</sup> Watt							
125	42.5*	43.0*	43.0*	42.5*	44.5	45.5	48.0	
250	39.5*	43.0	45.5*	45.5*	48.0	50.0	52.5	
500	29.5	35.5	41.0	47.5	52.5	53.5	57.0	
1000	23.0*	27.5	33.0	36.5	44.0	47.0	54.0	
2000	20.0*	20.0*	24.0	28.5	38.0	40.5	47.5	
4000	21.0*	21.0*	21.0*	21.5*	31.0	33.5	42.0	
8000	26.0*	26.0*	26.0*	26.0*	26.0*	26.5*	31.0*	
Return Air Volume, CFM	700	800	900	1000	1200	1400	1600	
Negative Static Pressure, in. H <sub>2</sub> O	0.031	0.042	0.052	0.065	0.095	0.130	0.170	
**Noise Criteria (NC)	16	20	25	33	38	39	43	

Octave Band Center Frequency Hertz	<b>RAR HFB DD Size 900 X 200</b>				
	Exhaust Air Sound Power Level dB re 10 <sup>-12</sup> Watt				
125	46.0*	46.0*	47.0*	47.0*	49.0
250	38.0	46.0	52.0	51.5	54.0
500	33.0	40.0	46.5	51.0	53.5
1000	25.0	33.0	39.0	43.5	47.5
2000	21.0*	25.5	31.0	36.0	40.5
4000	22.0*	22.0*	24.5	28.5	34.0
8000	29.0*	29.0*	29.0*	29.0*	29.0*
Return Air Volume, CFM	1250	1500	1750	2000	2250
Negative Static Pressure, in. H <sub>2</sub> O	0.049	0.070	0.098	0.124	0.158
**Noise Criteria (NC)	17	24	32	36	39

\* Sound Power Level data has reached ambient levels in the test room or is determined by instrument limitations. Actual levels are less than or equal to the levels indicated.

\*\* Noise Criteria ratings were determined by subtracting a room absorption of 10dB from the Sound Power Level data.

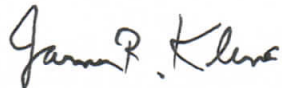
Checked by: 

**CONCLUSION**

The test method employed for this test has no pass-fail criteria; therefore, the evaluation of the test results is left to the discretion of the client.

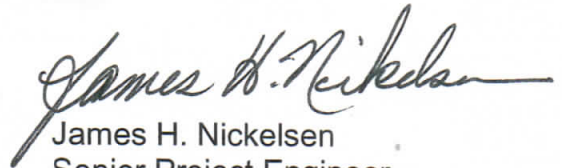
Date of Tests: May 23 through June 1, 2006

Report Approved By:



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Attachments: None