



SINCE 1896

REPORT

Intertek ETL SEMKO

3933 US ROUTE 11 CORTLAND, NEW YORK 13045



Accredited by the National Voluntary
Laboratory Accreditation Program for
the Specific Accreditation under Lab
Code 100402-0.

Order No. 3088583

Date: January 12, 2006

REPORT NO. 3088583CRT-001

SILENCER INSERTION LOSS WITH AND WITHOUT AIRFLOW AND AIRFLOW GENERATED SOUND TESTS ON A 600x600x600MM DUCT SILENCER

RENDERED TO

GULF MECHANICAL ACOUSTIC MANUFACTURING CO.
P.O. BOX 50174
DUBAI, UNITED ARAB EMIRATES

INTRODUCTION

This report gives the Insertion Loss in dB and generated sound power level (L_w) dB re 10^{-12} watt in relation to a given airflow in fpm on a 600x600x600mm Duct Silencer. The silencer was selected and supplied by the client and was received at the laboratories on December 13, 2005. The silencer appeared to be in new, unused condition upon arrival.

AUTHORIZATION

Signed Intertek Quotation No. 18987399.

TEST METHOD

The laboratory method used in conducting these tests is ASTM Standard E477-99, entitled "Standard Method of Testing Duct Liner Materials and Prefabricated Silencers for Acoustical and Airflow Performance".

Sound pressure level data was obtained using a Bruel and Kjaer Digital Frequency Analyzer Type 2131 and the data analysis was completed using a Compaq ProLinea 4/33 Computer and Epson LQ-850 Printer.

An independent organization testing for safety, performance, and certification.

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TEST METHOD - Cont'd

The Intertek 16,640 cu. ft. (470 cubic meters) reverberation room is qualified in accordance with ANSI S12.31 and S12.32 for sound measurement from 100 to 10,000 hertz.

The following note relates to the data submitted in the data pages.


Note: Sound power level data denoted with an asterisk 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. The generated sound data has been corrected for end reflection.

DESCRIPTION OF TEST SPECIMEN

The Duct Silencer measured 600mm wide by 600mm high by 610mm long. The outer casing consisted of 20 gauge galvanized sheet metal. The nose and tail of the side and center baffles were constructed from solid sheet metal. The side baffles were a nominal 105mm thick and the center baffle measured a nominal 200mm thick. Each 400mm long straight through perforated air passage measured a nominal 95mm wide by 600mm high. The straight air passages were constructed from perforated sheet metal having 1/8 inch diameter holes spaced on 3/16 inch staggered centers. The silencer weighed 73 pounds.

RESULTS OF TESTS

See pages 3 through 6.

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RESULTS OF MEASUREMENTS

600x600x600mm Duct Silencer

Forward Flow										
Insertion Loss (IL) in dB, Face Velocity in fpm, Static Pressure (SP) in inches water gauge										
			Octave Band Center Frequency (Hz)							
			63	125	250	500	1000	2000	4000	8000
IL @	0	fpm 0.00 in. SP	2	5	11	18	18	17	13	11
IL @	500	fpm 0.10 in. SP	2	5	11	18	18	17	14	12
IL @	1000	fpm 0.41 in. SP	2	5	10	17	18	16	14	12
IL @	1500	fpm 0.92 in. SP	2	4	10	16	17	16	14	11

Generated Sound in Sound Power Level (Lw) dB re 10 ⁻¹² Watt, Face Velocity in fpm										
			Octave Band Center Frequency (Hz)							
			63	125	250	500	1000	2000	4000	8000
Lw @	500	fpm	61	53*	45	42	40	34	27	31*
Lw @	1000	fpm	64	59	57	56	56	56	51	42
Lw @	1500	fpm	67	67	66	64	63	65	63	57

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


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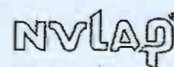
RESULTS OF MEASUREMENTS

600x600x600mm Duct Silencer

Forward Flow (cont'd)								
Frequency (Hz)	1/3 Octave Band Center Frequency Data							
	Insertion Loss (IL) in dB, Face Velocity in fpm				Generated Sound in Sound Power Level (Lw) dB re 10 ⁻¹² Watt, Face Velocity in fpm			
	0	500	1000	1500	500	1000	1500	
50	3	2	2	1	57*	61	63	
63	1	3	2	1	57*	57	61	
80	2	2	2	2	57	58	63	
100	4	4	4	3	49*	56	63	
125	5	5	5	5	51*	55	62	
160	7	7	7	6	42	53	61	
200	9	9	8	8	41	54	63	
250	11	11	10	10	39	52	61	
315	15	14	14	13	39	51	60	
400	17	16	15	15	38	52	60	
500	19	18	18	16	38	52	60	
630	20	19	18	17	37	51	59	
800	18	18	17	16	36	51	59	
1000	18	18	18	17	35	51	59	
1250	19	19	18	18	33	52	59	
1600	17	17	17	17	32	52	59	
2000	17	16	16	16	29	51	60	
2500	16	16	16	16	27	50	61	
3150	14	15	15	15	23	49	60	
4000	14	14	14	14	22*	46	58	
5000	13	13	13	13	22*	43	56	
6300	13	13	12	12	25*	40	54	
8000	11	12	12	11	25*	36	52	
10000	10	11	11	10	28*	33	49	

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RESULTS OF MEASUREMENTS (cont'd)

600x600x600mm Duct Silencer

Reverse Flow										
Insertion Loss (IL) in dB, Face Velocity in fpm, Static Pressure (SP) in inches water gauge										
			Octave Band Center Frequency (Hz)							
			63	125	250	500	1000	2000	4000	8000
IL @	0	fpm 0.00 in. SP	2	4	11	19	19	17	14	12
IL @	500	fpm 0.10 in. SP	2	5	12	19	19	17	13	10
IL @	1000	fpm 0.41 in. SP	3	6	12	19	19	17	14	10
IL @	1500	fpm 0.92 in. SP	3	6	12	19	19	17	13	10

Generated Sound in Sound Power Level (Lw) dB re 10 ⁻¹² Watt, Face Velocity in fpm										
			Octave Band Center Frequency (Hz)							
			63	125	250	500	1000	2000	4000	8000
Lw @	500	fpm	61	53*	43	37	37	32	27*	31*
Lw @	1000	fpm	64	57	54	52	52	55	49	41
Lw @	1500	fpm	70	65	64	63	61	65	63	55

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RESULTS OF MEASUREMENTS

600x600x600mm Duct Silencer

Reverse Flow (cont'd)								
Frequency (Hz)	1/3 Octave Band Center Frequency Data							
	Insertion Loss (IL) in dB, Face Velocity in fpm				Generated Sound in Sound Power Level (Lw) dB re 10 ⁻¹² Watt, Face Velocity in fpm			
	0	500	1000	1500	500	1000	1500	
50	2	4	3	5	57*	60	66	
63	2	1	3	3	57*	59	65	
80	2	2	3	3	55	58	63	
100	3	4	5	4	49*	53	62	
125	4	5	6	6	51*	54	61	
160	6	7	8	8	41	50	59	
200	9	9	10	10	40	51	60	
250	12	12	12	13	38	49	58	
315	15	16	16	16	34	48	58	
400	17	18	18	18	34	48	58	
500	20	20	20	20	31	47	58	
630	20	20	20	20	31	46	57	
800	19	19	19	19	33	46	56	
1000	19	19	20	20	33	47	56	
1250	19	19	20	19	32	48	56	
1600	17	18	18	18	30	49	57	
2000	17	17	17	18	26	50	59	
2500	16	16	16	16	24	50	62	
3150	14	15	15	14	23*	46	61	
4000	14	14	14	14	22*	43	57	
5000	13	12	12	12	22*	41	54	
6300	13	12	11	12	25*	38	52	
8000	12	11	10	10	25*	35	50	
10000	11	9	10	10	28*	33	47	

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REMARKS

Ambient Temperature: 71°F
Relative Humidity: 35%
Barometric Pressure: 28.75 in. Hg

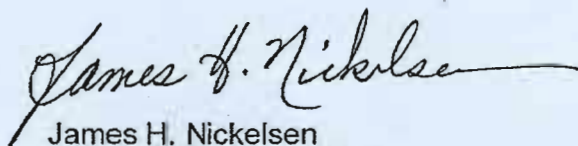
CONCLUSION

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.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

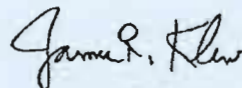
Date of Tests: January 3, 2006

Report Approved by:



James H. Nickelsen
Senior Project Engineer
Acoustical Testing

Report Reviewed By:



James R. Kline
Associate Engineer
Acoustical Testing

Attachments: None