

July 28, 2006

EXPERIMENT NUMBER 1200

TEST NUMBER 0038

Sound Tests

On Flexmaster USA

Flexible duct

RENDERED TO:

Flexmaster USA

NOTE

This report is submitted for the private use of the party to whom it is addressed. Its value to the client in regards to other equipment is subject to the representative character of the sample(s) submitted and the comprehensiveness of the tests requested. It is disclosed in confidence with the understanding that it shall not be duplicated, divulged to others, or used without our permission.

INTRODUCTION:

This report gives the test results of sound collected on various types and sizes of Flexmaster flexible duct. Each 6' test specimen was tested both straight and with a 90 degree bend for velocities of 0 FPM, 500 FPM and 1,000 FPM and compared to hard metal duct at the same velocities. Flexmaster provided the following samples for testing.

Type 6M R6, Type 8M R6, MGA TLB, TLM and TLD in R6.

All of the different test specimens of flex were 6' long. Each test specimen was supplied in 6", 8", 10", 12", 14" and 16" diameters.



TEST METHOD:

For the static tests, one end of each test specimen was connected to the test box that used a B&K sound source to generate the sound and the other end of the test specimen was connected to the reverberation room. Sound values were then collected for each of the test specimens.

For the air velocity tests, one end of each test specimen was attached to a box that used a B&K sound source to generate sound and also allowed airflow to pass through. The other end of the test specimen was connected to the reverberation room. Velocities of 500 FPM and 1,000 FPM were set and sound values were collected for each of the test specimens.

The testing was performed on straight lengths of the test specimens and then repeated with a 90 degree bend in the test specimens.

TEST EQUIPMENT:

1 specially built plywood box to hold the B&K sound source for the static sound testing.

1 specially built plywood box to hold the B&K sound source and allow airflow to pass through.

10" airflow meter with electronic drive and calibrated orifice plates to set 500 FPM and 1,000 FPM test points.

B&K 4204 Sound Source used to generate the constant sound level.

B&K 7507 Sound recording meter.

Digital manometers were used to record airflows.

Miscellaneous metal ducts and 90 degree elbows were used.

TEST AUTHORIZATION:

Written authorization from Richard Luck, Vice President, FLEXMASTER USA, INC.

TEST RESULTS:

Please see attached sheets for test results. For the purpose of this test, the only comparison made is test specimens to hard metal duct. The following sheets are included.

STRAIGHT DUCT SUMMARY; 0 AIRFLOW
STRAIGHT DUCT SUMMARY AT 500 FPM; AT 1,000 FPM; DIFFERENCE
90° ELBOW SUMMARY AT 500 FPM; AT 1,000 FPM; DIFFERENCE
90° ELBOW SUMMARY; 0 AIRFLOW
STRAIGHT DUCT SUMMARY(A); 90° ELBOW SUMMARY(D); DIFFERENCE
SOUND WORK SHEETS FOR ALL TEST SPECIMENS

Report submitted by:
ENERGISTICS LABORATORY



Jack Stegall

November 10, 2011

EXPERIMENT NUMBER 1200

TEST NUMBER 0328R1

Sound Tests on Flexmaster USA Flexible Duct Type 1M-R6

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RENDERED TO:

Flexmaster USA, Inc.

NOTE

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INTRODUCTION:

This report gives the test results of sound collected on Flexmaster Type 1M-R6 flexible duct. Each 6 foot test specimen was tested both straight and with a 90° bend for velocities of 0, 500, and 1000 feet per minute (FPM) and compared to hard metal duct at the same velocities. Each test specimen was supplied in 6, 8, 10, 12, 14, and 16 inch diameters.

TEST METHOD:

For the static tests, one end of each test specimen was connected to the test box that used a B&K sound source to generate the sound and the other end of the test specimen was connected to the reverberation room. Sound values were then collected for each of the test specimens.

For the air velocity tests, one end of each test specimen was attached to a box that used a B&K sound source to generate sound and also allowed airflow to pass through. The other end of the test specimen was connected to the reverberation room. Velocities of 500 FPM and 1,000 FPM were set and sound values were collected for each of the test specimens.

The testing was performed on straight lengths of the test specimens and then repeated with a 90° bend in the test specimens.

TEST EQUIPMENT:

1 specially built plywood box to hold the B&K sound source for the static sound testing and dynamic sound testing (airflow pass through)

10 inch airflow meter with electronic drive and calibrated orifice plate to set 500 FPM and 1,000 FPM test points

B&K 4204 sound source used to generate the constant sound level

National Instruments PXI-4461 and PXI-4462 sound measuring instrumentation with PCB Class I microphones

Miscellaneous metal ducts and 90° elbows

TEST AUTHORIZATION:

Written authorization was provided by Neil Silverman, Director Sales & Marketing, Flexmaster USA, Inc.

TEST RESULTS:

For the purpose of this test, the only comparison made is test specimens to hard metal duct. Please see attached sheets for test data.

Report submitted by:
ENERGISTICS LABORATORY



Steve Treckman

November 10, 2011

EXPERIMENT NUMBER 1200
 TEST NUMBER 022821

90 Degree Bend RSS + 500 FPM Air Flow

Size	Model #	dBA	125	250	500	1K	2K	4K	8K
16	1M-R6	14.4	3.6	18.0	20.8	26.5	18.0	9.2	6.5
14	1M-R6	16.1	4.6	17.9	25.1	28.7	19.5	10.8	8.1
12	1M-R6	18.1	3.2	26.6	29.1	30.5	23.0	11.8	8.6
10	1M-R6	19.2	2.7	19.3	31.4	34.9	25.6	13.0	9.1
8	1M-R6	21.7	1.3	19.0	34.5	35.5	25.6	16.5	13.1
6	1M-R6	22.1	4.2	10.4	28.1	40.0	35.4	21.9	16.0
16	6M-R6	26.0	20.3	27.2	24.6	26.6	25.3	29.3	28.0
14	6M-R6	27.8	22.2	29.1	26.9	28.4	27.5	28.0	26.5
12	6M-R6	30.1	17.5	28.1	27.0	30.9	31.2	29.4	25.4
10	6M-R6	31.4	20.8	28.2	29.1	33.3	33.2	29.9	24.0
8	6M-R6	34.0	20.3	28.6	32.7	34.8	35.4	33.3	29.4
6	6M-R6	28.0	18.2	24.8	28.0	30.2	30.4	25.2	17.6
16	8M-R6	14.0	0.0	8.6	22.1	27.3	18.0	8.7	6.8
14	8M-R6	13.9	3.5	13.3	20.4	23.9	15.6	8.3	8.1
12	8M-R6	16.6	4.5	12.2	24.1	30.1	23.0	10.2	8.2
10	8M-R6	18.7	4.5	13.2	28.0	31.6	24.4	12.7	12.0
8	8M-R6	21.6	6.8	16.8	33.8	36.5	29.3	14.4	11.6
6	8M-R6	23.1	5.8	11.9	27.8	30.5	29.2	17.4	15.0
16	MGA TLM R6	15.5	5.5	15.8	22.4	25.0	17.0	10.2	11.7
14	MGA TLM R6	16.1	5.7	11.8	17.1	25.0	19.4	10.2	11.1
12	MGA TLM R6	17.8	9.5	17.1	19.4	26.4	23.0	11.2	12.9
10	MGA TLM R6	17.5	6.5	17.1	24.2	27.5	20.2	11.5	14.7
8	MGA TLM R6	15.7	15.9	29.8	29.7	25.6	16.6	9.2	10.2
6	MGA TLM R6	27.5	11.7	24.7	29.3	31.4	30.4	22.4	19.1

90 Degree Bend RSS + 1000 FPM Air Flow

Size	Model #	dBA	125	250	500	1K	2K	4K	8K
16	1M-R6	14.4	2.3	17.2	20.0	26.4	18.1	9.1	6.5
14	1M-R6	16.2	3.6	17.3	24.3	28.7	19.6	10.8	8.0
12	1M-R6	17.9	3.3	25.1	27.4	30.1	23.0	11.8	8.5
10	1M-R6	19.3	3.5	18.2	29.9	34.6	25.6	13.1	9.0
8	1M-R6	21.8	2.7	17.5	31.9	35.0	25.5	16.5	13.2
6	1M-R6	22.0	4.3	10.6	27.3	39.5	35.5	22.0	16.2
16	6M-R6	25.9	19.0	27.4	24.7	26.5	25.1	27.0	27.7
14	6M-R6	27.8	21.9	28.5	26.6	28.5	27.4	28.2	26.5
12	6M-R6	30.3	17.4	28.4	27.7	31.1	31.3	29.7	25.5
10	6M-R6	31.2	20.7	27.8	28.9	33.2	33.1	29.9	23.9
8	6M-R6	33.9	20.9	28.7	31.6	34.3	35.4	33.6	29.6
6	6M-R6	28.1	17.4	24.3	28.2	30.2	30.6	25.2	17.4
16	8M-R6	14.1	0.5	8.2	21.7	27.0	18.1	8.6	6.5
14	8M-R6	13.9	3.3	12.4	19.9	23.9	15.4	8.5	7.9
12	8M-R6	16.7	4.4	12.4	24.1	30.3	23.0	10.3	8.2
10	8M-R6	18.6	4.5	12.2	27.0	31.5	24.6	12.6	11.8
8	8M-R6	21.6	7.2	16.4	31.7	35.9	29.4	14.6	11.7
6	8M-R6	23.0	4.2	10.8	27.8	30.4	29.4	17.5	14.7
16	MGA TLM R6	15.6	6.9	15.7	22.3	24.6	16.9	10.2	11.6
14	MGA TLM R6	16.0	6.8	10.9	16.7	24.9	19.3	10.2	10.7
12	MGA TLM R6	17.8	9.4	16.5	19.0	26.2	23.0	11.2	12.8
10	MGA TLM R6	17.5	6.7	16.7	23.7	27.6	20.2	11.3	14.4
8	MGA TLM R6	15.9	16.3	29.0	28.4	25.6	17.2	9.3	10.4
6	MGA TLM R6	27.6	10.5	23.9	29.0	31.2	30.7	22.6	18.9

Straight RSS + 500 FPM Air Flow

Size	Model #	dBA	125	250	500	1K	2K	4K	8K
16	1M-R6	12.6	5.7	22.9	20.9	24.1	15.2	7.9	6.0
14	1M-R6	14.6	4.1	25.9	23.0	26.1	16.6	10.0	7.6
12	1M-R6	16.2	6.6	27.8	22.8	29.0	18.7	10.9	8.2
10	1M-R6	17.5	4.4	27.7	25.7	32.0	21.3	12.4	8.8
8	1M-R6	19.0	5.6	10.6	23.9	34.0	22.5	17.0	11.9
6	1M-R6	24.0	7.4	15.2	31.3	40.4	33.5	20.7	16.8
16	6M-R6	25.1	21.4	23.2	23.2	31.5	26.6	21.2	22.3
14	6M-R6	25.7	23.5	26.7	22.5	31.5	28.1	20.9	21.2
12	6M-R6	26.0	24.2	28.0	24.0	31.5	31.0	20.8	20.8
10	6M-R6	29.1	21.1	28.4	26.0	32.9	38.9	23.6	22.8
8	6M-R6	30.0	28.3	27.6	28.1	31.7	32.7	27.1	21.6
6	6M-R6	28.9	18.7	25.5	28.2	30.0	31.5	26.3	20.3
16	8M-R6	11.4	8.0	18.5	20.6	24.1	15.2	6.6	4.6
14	8M-R6	12.3	8.1	21.0	20.0	24.4	14.5	6.8	4.7
12	8M-R6	14.8	10.0	19.0	22.9	30.4	18.8	9.3	7.1
10	8M-R6	18.6	8.7	14.4	24.9	31.6	23.9	12.7	11.1
8	8M-R6	18.5	16.1	19.9	27.1	31.5	26.9	12.2	7.5
6	8M-R6	21.1	8.2	16.6	27.9	30.0	28.7	14.8	10.8
16	MGA TLM R6	13.8	17.8	21.3	19.6	23.2	14.6	9.4	12.8
14	MGA TLM R6	15.6	12.2	18.4	18.1	24.3	17.2	10.2	10.9
12	MGA TLM R6	17.0	21.3	25.2	21.6	27.6	19.5	11.1	15.3
10	MGA TLM R6	16.1	16.4	25.8	25.7	27.9	18.2	10.0	15.7
8	MGA TLM R6	14.7	25.8	26.5	27.9	24.5	14.8	9.3	10.4
6	MGA TLM R6	26.2	16.5	25.9	27.3	29.8	29.5	20.8	19.5

Straight RSS + 1000 FPM Air Flow

Size	Model #	dBA	125	250	500	1K	2K	4K	8K
16	1M-R6	12.5	5.7	22.3	21.0	24.0	15.1	7.8	6.0
14	1M-R6	14.8	3.8	25.9	22.9	25.9	16.8	10.2	7.7
12	1M-R6	16.2	6.6	27.9	22.9	28.9	18.7	11.0	8.2
10	1M-R6	17.6	4.0	26.7	25.3	32.2	21.5	12.6	8.5
8	1M-R6	19.0	5.7	10.2	22.9	34.0	22.5	17.3	12.2
6	1M-R6	23.8	7.5	14.7	30.9	40.0	33.4	20.8	17.1
16	6M-R6	24.9	20.1	23.3	23.1	31.4	26.9	20.8	21.8
14	6M-R6	25.6	23.9	26.5	22.3	31.2	28.2	20.9	21.0
12	6M-R6	26.0	22.8	26.9	24.1	31.5	31.2	20.7	21.0
10	6M-R6	29.4	21.1	27.8	25.4	32.8	39.0	24.1	23.4
8	6M-R6	30.0	26.4	27.3	27.9	31.4	32.9	27.1	21.7
6	6M-R6	28.9	19.7	25.4	28.1	30.0	31.6	26.1	20.1
16	8M-R6	11.3	8.2	18.3	20.2	24.0	15.2	6.3	4.6
14	8M-R6	12.1	7.8	20.0	20.2	24.3	14.3	6.6	4.4
12	8M-R6	14.8	10.1	17.9	23.2	30.4	18.7	9.2	7.1
10	8M-R6	18.7	8.9	13.6	24.7	31.7	24.0	12.7	11.2
8	8M-R6	18.7	11.5	20.0	27.2	31.5	26.9	12.5	7.8
6	8M-R6	21.0	8.4	16.0	27.8	30.0	28.7	14.8	10.8
16	MGA TLM R6	13.7	18.3	20.7	19.9	23.1	14.5	9.2	12.7
14	MGA TLM R6	15.5	12.2	18.0	18.2	24.4	16.9	10.2	10.7
12	MGA TLM R6	16.8	21.4	24.9	22.3	27.7	19.0	10.9	15.2
10	MGA TLM R6	16.1	15.8	24.6	25.8	27.9	18.2	10.0	15.6
8	MGA TLM R6	14.9	26.2	26.3	27.6	24.4	15.3	9.3	10.3
6	MGA TLM R6	26.2	17.7	25.9	27.9	30.3	29.4	20.7	19.4