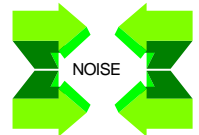
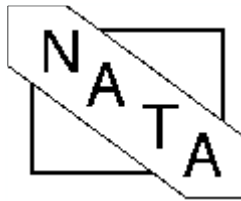


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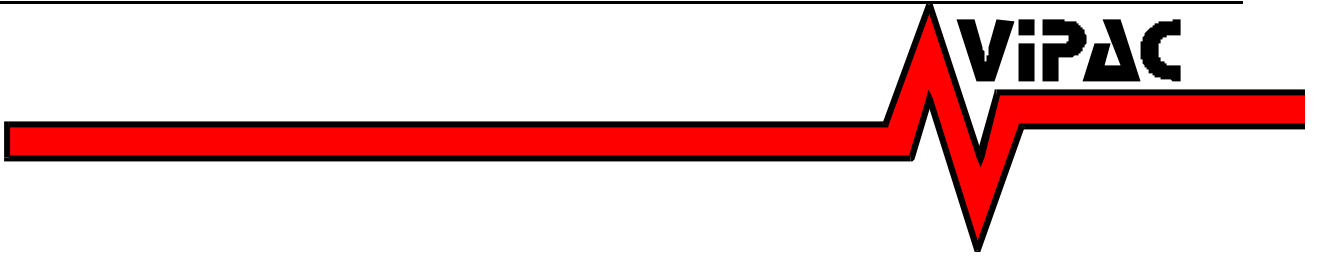
Measurement of Static Insertion Loss of Flexible Ducting

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The results reported herein have been determined in accordance with the terms of accreditation,
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N.A.T.A. Report No. 302343/1 (Issue 2)

Prepared by
Vipac Engineers & Scientists Ltd
March, 2001



DOCUMENT CONTROL FORM

Measurement of Static Insertion Loss of Flexible Ducting	
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REVIEWED BY: Norm Broner Date: N.A.T.A. Signatory													
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1.0 INTRODUCTION

This report presents the results of static insertion loss measurements carried out for the various flexible duct samples described in Table 1 below. Refer to Appendix A for photographs of each sample type.

This report is issued as a NATA certified report under the terms of Vipac's NATA registration No's 1163 and 1506.

Table 1:Flexible Duct Samples for Static Insertion Loss Testing, Nominal Length 3m

Sample #	Name	Description	Tested Sizes, Inner Diameter in mm
1	VFLEX	Foil inner and outer, glued duct, R1 insulation	150, 300
2	UNILOK FR1 R1	Black plastic inner and outer, interlocked spiral duct, R1 insulation	150, 300, 400
3	UNILOK S R1	Black plastic inner, foil outer, interlocked spiral duct, R1 insulation	150, 300
4	UNILOK FR1 R1 AI	Black plastic <u>perforated</u> inner, black plastic outer, interlocked spiral duct, R1 insulation	150, 300, 400
5	UNILOK S R1 AI	Black plastic <u>perforated</u> inner, foil outer, interlocked spiral duct, R1 insulation	150, 300
6	QSFLEX	Non-woven porous fabric inner, foil outer, interlocked spiral duct, R1 insulation	300

2.0 APPLICABLE STANDARDS

The set up and measurement procedure for determination of Insertion Loss was in general accordance with Air Diffusion Council Standard FD 72-R1: "Flexible Air Duct Test Code".

Measurements were performed in accordance with AS1277: "Acoustics-Measurement Procedures for Ducted Silencers".

3.0 TEST SET UP AND PROCEDURE

Vipac's Reverberation Test Room has a volume of 170m³ and has been qualified in accordance with the procedures in AS 1217.2-1985 for determination of sound pressure in octave bands with centre frequencies from 125 Hz to 8000 Hz.

The test set up utilised a speaker box with anechoic termination as a noise source. A solid duct spigot with transitions were fitted to the speaker box, to match the test sample inner sleeve. Similarly, a solid duct spigot with transitions sized to match the test sample inner sleeve penetrated the wall to Vipac's Reverberation Test Room. Refer to Appendix B for photographs of the test set-up.

Each test sample was in turn fitted between the two matching spigots, and with pink noise generated in the speaker box, Octave band sound pressure levels, from 125 Hz to 8000 Hz were recorded at five locations within the Reverberation Room (according to AS 1277 using the Diffuse Field Method). The measurements were repeated with a rigid solid duct installed in place of the flexible duct samples. The insertion loss was then calculated for each sample.

The input level at the loudspeakers was monitored using a microphone located in a fixed position inside the speaker box, to enable verification that identical input duct noise levels were produced for the test.

The environmental test conditions in the Reverberation Room did not vary during the test by greater than the following variations:

Temperature	± 5.0 °C
Relative Humidity	$\pm 5\%$

4.0 INSTRUMENTATION

INSTRUMENT	MAKE	MODEL	CALIBRATION	SERIAL NO
Analyser/Sound Level Meter	Larson Davis	2900	Vipac	2900A0316
Acoustic Calibrator	B&K	4230	Vipac	860700
1/2" Microphone	Larson Davis	-	Vipac	7046I/8984
Pink Noise Source	Sansui	CD-210	-	-
Amplifier	Pioneer	SA900	-	QC20117

5.0 ORDERS OF ACCURACY

<u>Sound Pressure Level:</u>	Octave Band Centre Frequency (Hz)	Standard Deviation (dB)
	63	± 5.0
	125	± 3.0
	250	± 2.0
	500 to 4000	± 1.5
	8000	± 3.0

6.0 RESULTS

The results obtained are shown in the attached Test Certificate.

Vipac's NATA accreditation applies to the frequency range 125Hz – 8000Hz. Data for the 63Hz octave band centre frequency is included in this report.

Report Prepared by:
VIPAC ENGINEERS AND SCIENTISTS LTD.

.....
GREG THEODORIDIS
PROJECT ENGINEER

.....
NORM BRONER
N.A.T.A. SIGNATORY

TEST CERTIFICATE

MEASUREMENT OF STATIC INSERTION LOSS OF FLEXIBLE DUCTS

SUPPLIED BY: WESTAFLEX AUSTRALIA PTY. LTD.
TESTED BY: VIPAC ENGINEERS & SCIENTISTS LTD
TEST DATE: October 2000
CLIENT: WESTAFLEX AUSTRALIA PTY. LTD.
SAMPLE LENGTH: 3 METRES (NOMINAL)
STANDARD: AIR DIFFUSION COUNCIL FLEXIBLE AIR DUCT CODE FD 72-R1

INSERTION LOSS, dB								
OCTAVE BAND CENTRE FREQUENCY								
Sample	63*	125	250	500	1000	2000	4000	8000
150mm VFLEX	7.7	9.5	14.5	23.3	36.3	38.3	39.0	32.0
300mm VFLEX	2.0	3.0	5.7	18.3	29.9	33.0	18.3	18.5
150mm UNILOK FR1 R1	7.5	16.0	24.8	32.5	34.6	36.3	30.0	25.0
300mm UNILOK FR1 R1	8.5	21.3	32.6	25.8	29.7	24.1	19.6	18.3
400mm UNILOK FR1 R1	9.0	25.8	27.8	22.4	27.3	21.7	16.3	14.4
150mm UNILOK S R1	7.0	15.5	25.0	31.5	32.4	37.0	31.2	25.2
300mm UNILOK S R1	8.1	22.0	33.5	25.5	31.0	25.9	20.5	17.4
150mm UNILOK FR1 R1 AI	23.3	38.4	42.8	33.5	33.8	35.9	33.5	35.0
300mm UNILOK FR1 R1 AI	17.5	31.6	31.8	25.0	28.1	27.5	25.0	24.0
400mm UNILOK FR1 R1 AI	16.0	28.1	26.1	23.0	26.7	22.5	15.0	13.0
150mm UNILOK S R1 AI	21.8	37.9	43.1	36.5	35.3	38.1	35.0	34.0
300mm UNILOK S R1 AI	15.0	30.9	33.1	27.5	31.6	30.0	23.2	23.0
300mm QSFLEX	15.0	31.2	31.2	26.0	29.6	32.0	31.0	33.0

* NATA accreditation excluded

 Greg Theodoridis
 PROJECT ENGINEER

 Norm Broner
 N.A.T.A. SIGNATORY

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APPENDIX A

PHOTOGRAPHS OF EACH SAMPLE TYPE

(Note photographs are of the 300mm size)



Photo A1: VFLEX



Photo A2: UNILOK FR1 R1



Photo A3: UNILOK S R1



Photo A4: UNILOK FR1 R1 AI



Photo A5: UNILOK S R1 AI



Photo A6: QSFLEX

APPENDIX B

PHOTOGRAPHS OF TEST SET UP

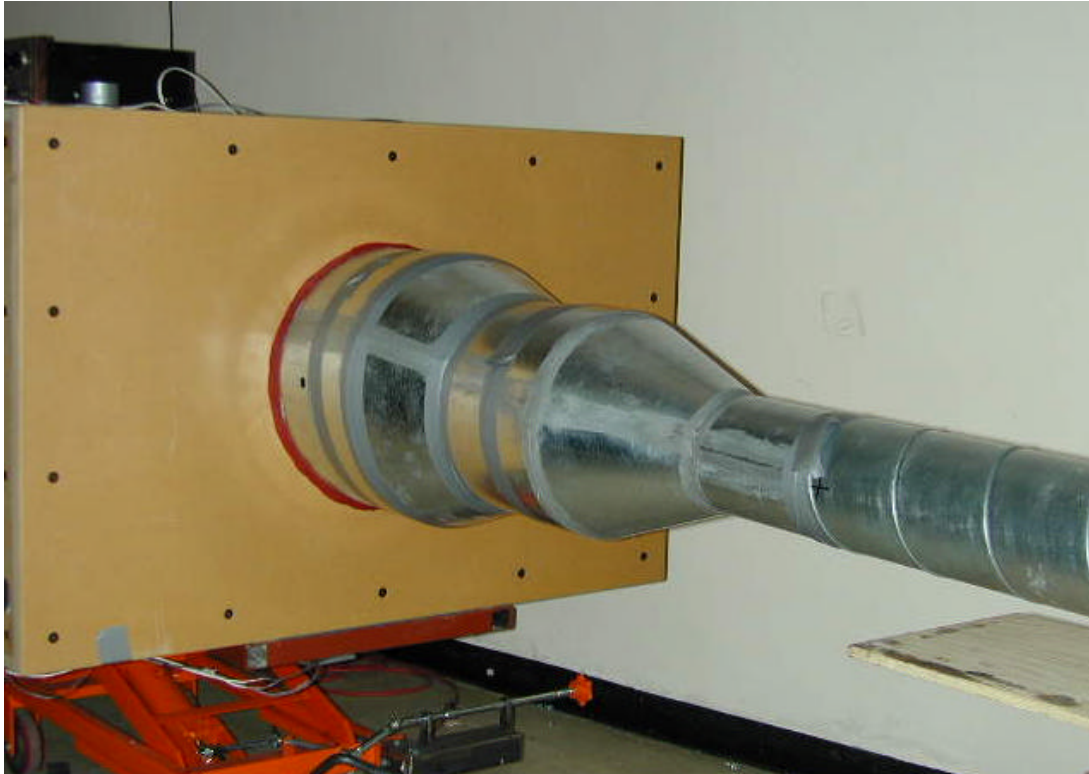


Photo B1: Speaker Box with Rigid Duct Fitted

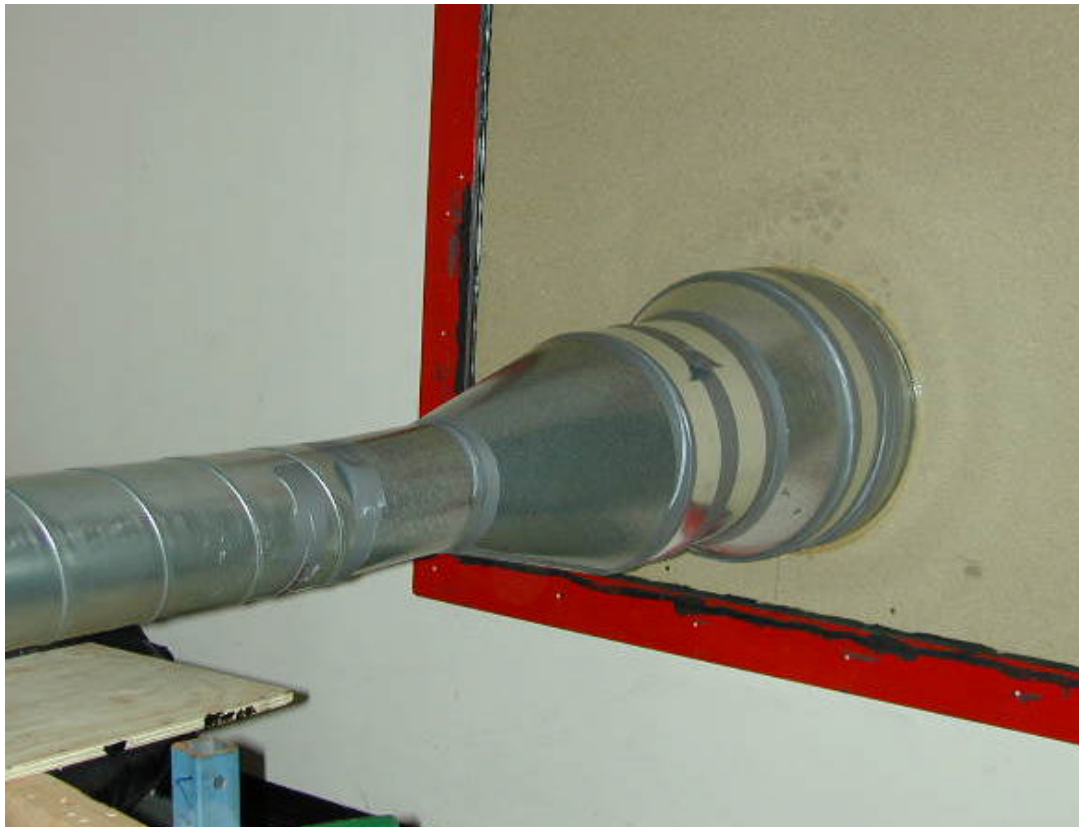


Photo B2: Rigid Duct Fitted to Transition / Spigot which Penetrates in to the Reverberation Test Chamber



Photo B3: Outlet to Reverberation Test Chamber