Adviesbureau

PEUTZ & ASSOCIES - CONSULTANTS

ACOUSTICS - NOISE AND VIBRATION CONTROL - ELECTRO ACOUSTICS - BUILDING PHYSICS

Principal: Dutch Environment Corporation B.V.
Ir. Hanlostraat 20
NL 7547 RD Enschede
The Netherlands

Concerns: Laboratory sound measurements of

ACOUSTICALLY INSULATED FLEXIBLE DUCTING SONODEC 25

Report: AB323-1E

Date: february 3, 1992

Ref. TS/LVB-AB323-1

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1. INTRODUCTION

By autorisation of Dutch Environment Corporation B.V., laboratory measurements were conducted in order to determine some acoustical properties of

ACOUSTICALLY INSULATED FLEXIBLE DUCTING SONODEC 25

In this report the tested ducting is referred to as "flexible duct".

The measurements were carried out at the test facilities of

"Adviesbureau Peutz & Associés B.V."
at Nijmegen, The Netherlands

(see figure 1).

2. TESTED DUCTING

2.1. Construction of the insulated flexible duct

The following data are derived from the data given by the principal:

type:	SONODEC 25
innercore:	perforated, type 'Aludec 45/36', wrapped around by a polyesterfilm with a thickness of 12 μm, to prevent a diffusion of glassfibres into the ventilation system;
insulation:	fibreglass, with a thickness of 25 mm, having a density of 16 kg/m^3;
vapour barrier:	type 'Outerdec A02'

2.2. Conducted tests

27 Samples of the insulated flexible duct were tested: ducts with a diameter of: 82, 102, 127, 160, 203, 254, 315, 457 and 508 mm, each with an effective length of 1000, 2000 and 3000 mm. (between the measurement ducts);

3. MEASUREMENTS

The measurements were carried out according to:

ISO/DIS 7235 (1986): "Measurement procedures for ducted silencers"
and
DIN 45646 (1988): "Messungen an Schalldämpfern in Kanälen".

3.1. Test Set-Up

The flexible duct was mounted in a measurement set-up as outlined in figure 1 of this report.

The set-up consisted of:

a) a loudspeaker unit
b) a measuring duct of steel in front of the flexible duct
c) the flexible duct
d) a measuring duct of steel behind the flexible duct
e) a non-reflecting terminating duct

Parts a, b and c are situated in the reverberation room, parts d and e are in the neighbouring room.

The sound radiating from parts a and b was minimised by insulating these parts by an outer layer of glass fibre blankets covered by a lead layer and by situating these parts partially inside an insulated housing constructed of 18 mm chipwood panels with glasswool panels mounted on the inside.

3.2. Mounting of the flexible duct

The inner duct was attached to the measuring ducts using adhesive tape. The insulation and the outer duct were put over the inner duct covering the inner duct and the measuring ducts over a distance of at least 50 mm, and were also attached to the measuring ducts with adhesive tape.

3.3. Method of measurements

A continuous sound field is generated in the ducts by a loudspeaker radiating electronically generated noise (so called pink noise).

Sound pressure level measurements are then performed (by means of a sound level meter attached to a real time spectrum analyser):

a) at three positions in the measuring duct in front of the flexible duct;

b) at three positions in the measuring duct behind the flexible duct;

c) in the reverberation room, by means of a microphone which is connected to a sound level meter and mounted on a boom. This boom is rotated in order to ensure an accurate reading of the sound level of the so called reverberation field.

The reverberation time of this room is also measured to make it possible to calculate the sound power level radiated from the test set-up into this room.

Using all these measurements, the sound power level in the measuring duct at both sides of the flexible duct as well as the sound power level in the reverbeation room are calculated. From these results the following properties of the flexible duct are calculated:

a) The "sound reduction of the duct wall": the difference between the sound power level Lw1 (see figures 2 to 28) in the measuring duct in front of the flexible duct (averaged over three positions), and the radiated sound power level Lw2 in the reverberation room (time-average of measurement performed by means of the rotating microphone);

b) The "sound attenuation": the difference between the sound power level Lw1 (see figures 2 to 28) in the measuring duct in front of the flexible duct, and the sound power level Lw2 (see figures 2 to 28) in the measuring duct behind the flexible duct (each averaged over three positions).

3.4. Results

The results of the measurements are presented in the table Ia/Ib (length 1000 mm), IIa/IIb (length 2000 mm) end IIIa/IIIb (length 3000 mm) on page 7 to 12 and in the figures 2 to 28 of this report.

The accuracy of the test results at lower frequencies is ± 2 dB and at the higher frequencies ± 1 dB.

Nijmegen,

This report consists of:
6 pages
6 tables
28 figures

Table IIb: measuring results of SONODEC 25 ACOUSTICALLY INSULATED FLEXIBLE DUCTING, length 2000 mm

	SOUND ATTENUATION [dB]																	
diameter [mm]	82		102		127		160		203		254		315		457		508	
figure >	11		12		13		14		15		16		17		18		19	
Frequency (Hz)	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
100	18.3		16.1		14.9		27.0		16.7		22.1		26.4		22.3		23.0	
125	21.2	20.7	19.4	19.1	17.9	17.3	35.4	31.0	21.1	19.6	29.3	25.8	31.3	28.1	19.0	19.6	18.6	19.7
160	25.1		32.1		21.4		40.7		24.6		32.8		28.0		18.5		18.7	
200	33.2		30.9		26.8		43.3		32.4		32.1		27.8		18.1		19.1	
250	39.9	36.7	33.0	33.3	34.9	30.9	40.9	39.2	36.0	33.9	31.7	30.6	25.2	25.1	16.4	16.5	17.3	16.7
315	41.8		40.5		45.1		36.4		33.9		28.7		23.4		15.4		14.8	
400	44.1		48.5		47.9		35.2		33.4		28.0		22.7		14.9		15.2	
500	50.9	47.6	57.3	51.5	43.5	43.7	34.4	34.4	31.2	31.7	27.2	28.0	21.8	22.3	15.0	15.1	15.4	15.5
630	52.6		53.0		41.8		33.7		30.8		28.9		22.4		15.4		16.1	
800	50.3		51.4		43.1		35.9		32.5		30.4		24.1		15.9		16.1	
1000	54.1	52.9	53.3	52.9	44.9	44.5	38.7	37.9	36.2	34.9	33.4	32.5	29.9	27.1	16.1	16.2	18.9	16.6
1250	56.4		54.6		45.8		40.4		37.8		35.0		30.2		16.8		15.4	
1600	57.8		54.6		48.5		41.4		40.7		36.6		28.6		11.8		10.5	
2000	52.0	45.7	53.2	49.4	47.6	45.5	34.0	30.5	32.9	29.8	27.3	25.4	23.3	21.8	10.9	12.6	9.2	10.8
2500	41.4		45.8		42.8		26.6		25.9		21.8		18.6		17.6		13.9	
3150	36.8		38.3		34.1		23.4		21.0		16.2		15.3		12.8		13.0	
4000	28.0	28.7	32.7	35.5	23.9	25.5	18.8	19.7	22.3	22.0	19.8	18.4	13.4	14.6	10.1	11.5	9.2	10.5
5000	26.4		37.7		24.0		18.4		22.9		20.6		15.4		11.9		10.1	

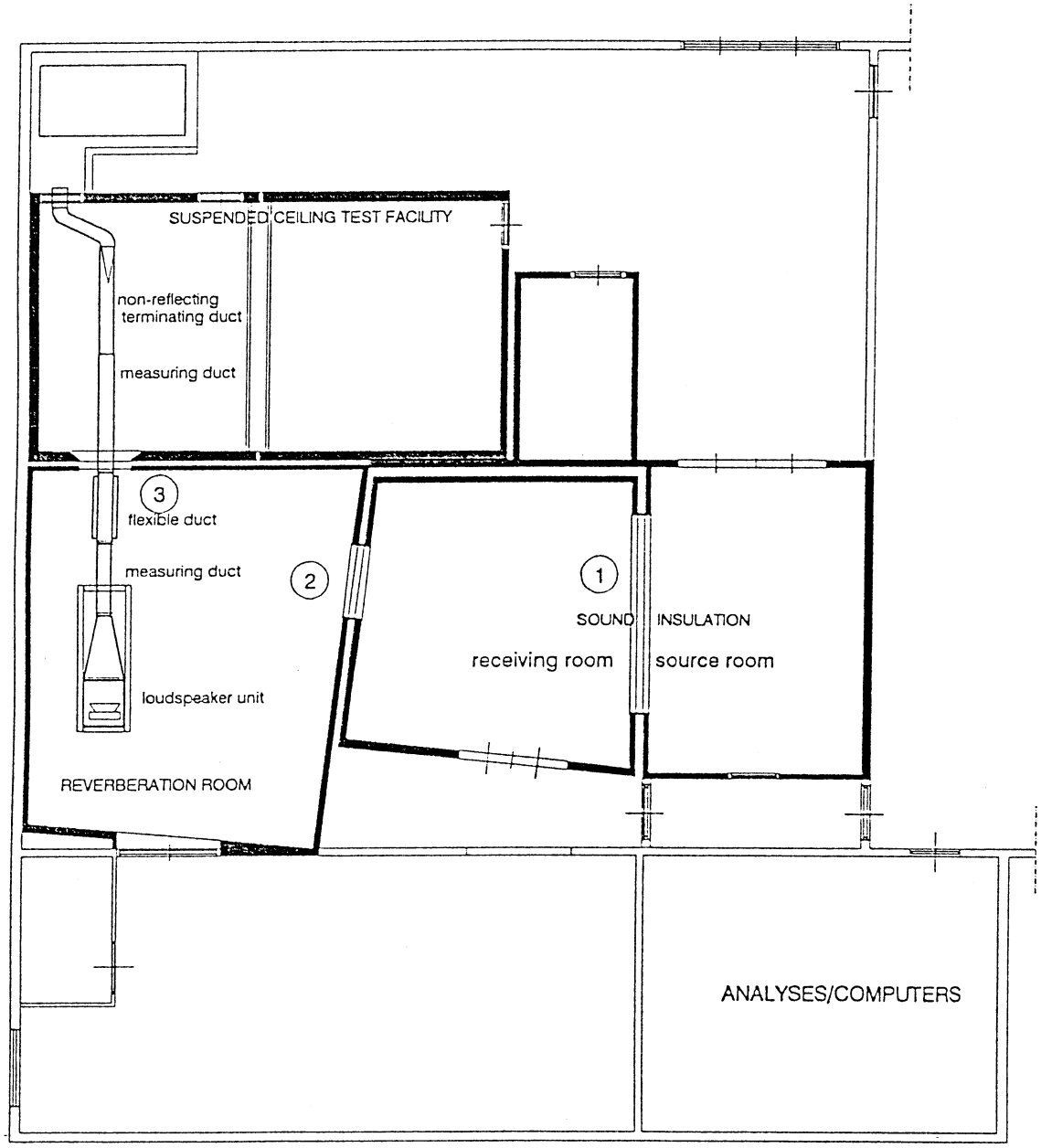
Table Ib: measuring results of SONODEC 25 ACOUSTICALLY INSULATED FLEXIBLE DUCTING, length 1000 mm

	SOUND ATTENUATION [dB]																	
diameter [mm]	82		102		127		160		203		254		315		457		508	
figure >	2		3		4		5		6		7		8		9		10	
Frequency (Hz)	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
100	14.9		6.5		10.4		14.7		5.0		14.0		10.0		12.5		6.7	
125	16.4	16.2	8.9	8.8	11.9	12.3	17.7	16.8	6.9	6.7	16.8	16.0	11.2	11.2	11.2	11.7	7.9	7.6
160	17.8		13.9		17.0		19.2		9.1		18.3		13.0		11.6		8.4	
200	21.8		17.0		18.9		20.4		14.2		17.0		13.5		10.6		8.2	
250	30.5	25.9	19.3	19.3	20.3	19.6	21.4	21.5	15.1	14.8	16.3	16.1	12.8	12.9	9.7	9.8	7.9	8.2
315	36.4		24.1		19.8		23.2		15.3		15.1		12.5		9.2		8.6	
400	32.4		28.4		20.5		22.8		16.9		15.5		12.4		8.3		8.2	
500	32.1	33.2	34.1	31.6	20.9	20.9	21.1	21.7	16.2	16.7	15.0	15.5	12.2	12.3	7.4	7.8	8.1	8.1
630	36.4		35.9		21.4		21.5		17.0		16.1		12.2		7.7		8.0	
800	35.7		35.7		23.2		24.4		18.5		16.1		12.0		7.6		8.7	
1000	38.6	38.3	37.9	37.1	25.3	24.8	28.0	26.6	20.1	19.7	14.7	15.5	14.1	13.8	7.4	7.8	8.5	8.8
1250	44.4		38.0		26.4		28.6		21.0		15.9		16.6		8.6		9.2	
1600	46.3		37.2		29.9		26.8		23.5		18.5		13.4		6.2		6.1	
2000	30.6	28.3	33.8	31.4	31.3	28.7	21.5	19.4	18.6	15.7	14.2	13.3	9.0	10.9	3.6	6.0	4.5	6.1
2500	24.5		28.1		26.4		16.0		12.0		10.6		11.4		10.9		8.8	
3150	19.7		22.5		19.3		13.9		9.9		10.0		7.5		8.5		8.2	
4000	15.7	17.1	19.0	21.2	15.7	16.5	12.9	13.5	14.1	12.7	9.3	10.0	5.8	6.8	6.8	7.5	5.8	7.1
5000	16.8		23.6		15.5		13.7		16.8		10.9		7.3		7.5		7.7	

Table IIIb: measuring results of SONODEC 25 ACOUSTICALLY INSULATED FLEXIBLE DUCTING, length 3000 mm

	SOUND ATTENUATION [dB]																	
diameter [mm]	82		102		127		160		203		254		315		457		508	
figure >	20		21		22		23		24		25		26		27		28	
Frequency (Hz)	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
100	25.9		22.1		19.0		24.9		15.2		29.8		24.2		26.4		24.9	
125	31.5	29.3	25.4	24.6	24.1	22.6	31.7	28.7	19.4	18.3	31.2	31.7	28.5	27.2	24.8	24.5	23.5	23.5
160	35.9		28.4		37.3		37.8		26.2		36.8		33.4		22.9		22.4	
200	43.1		34.4		43.6		43.0		37.5		35.3		32.7		23.1		23.4	
250	47.7	45.3	42.8	38.5	47.2	45.5	43.2	43.4	41.5	40.1	37.0	35.9	33.6	32.4	22.9	22.4	22.8	21.9
315	46.5		50.8		46.5		44.2		43.6		35.5		31.2		21.5		20.2	
400	47.7		49.7		45.7		42.4		39.8		33.3		29.6		19.8		19.5	
500	47.4	48.7	49.2	50.2	42.5	43.8	39.6	40.5	37.2	37.6	30.0	31.5	27.3	28.2	20.3	20.6	20.0	20.4
630	53.0		52.1		43.7		39.9		36.4		31.9		28.0		22.1		22.2	
800	53.1		52.3		46.5		46.0		40.2		35.8		30.7		24.5		25.7	
1000	53.1	53.8	51.0	52.0	46.7	46.9	45.9	46.1	40.6	41.4	36.2	37.0	35.8	33.7	25.8	24.7	29.6	25.1
1250	55.7		52.9		47.5		46.5		44.4		40.2		37.7		23.9		22.6	
1600	54.1		52.4		49.7		46.9		45.3		41.2		36.5		18.3		16.9	
2000	56.7	56.6	55.5	54.4	51.2	51.4	44.4	38.8	44.2	39.3	39.3	34.3	30.7	28.1	16.5	18.5	12.3	14.9
2500	62.2		56.2		54.4		34.7		35.4		30.3		24.5		23.0		17.5	
3150	54.5		48.9		49.6		32.1		28.9		24.7		20.7		18.1		17.0	
4000	38.1	38.4	37.2	40.2	32.6	34.2	24.6	26.9	30.4	30.2	26.6	26.6	16.7	18.8	15.1	16.2	12.9	13.7
5000	35.6		40.8		32.4		26.9		31.6		29.9		20.3		16.0		12.5	

TEST FACILITIES PEUTZ & ASSOCIATES.
Javastraat 68, Nijmegen, The Netherlands



test specimen:

(1) w x h = 3670 mm x 2670 mm

(2) w x h = 1500 mm x 1250 mm

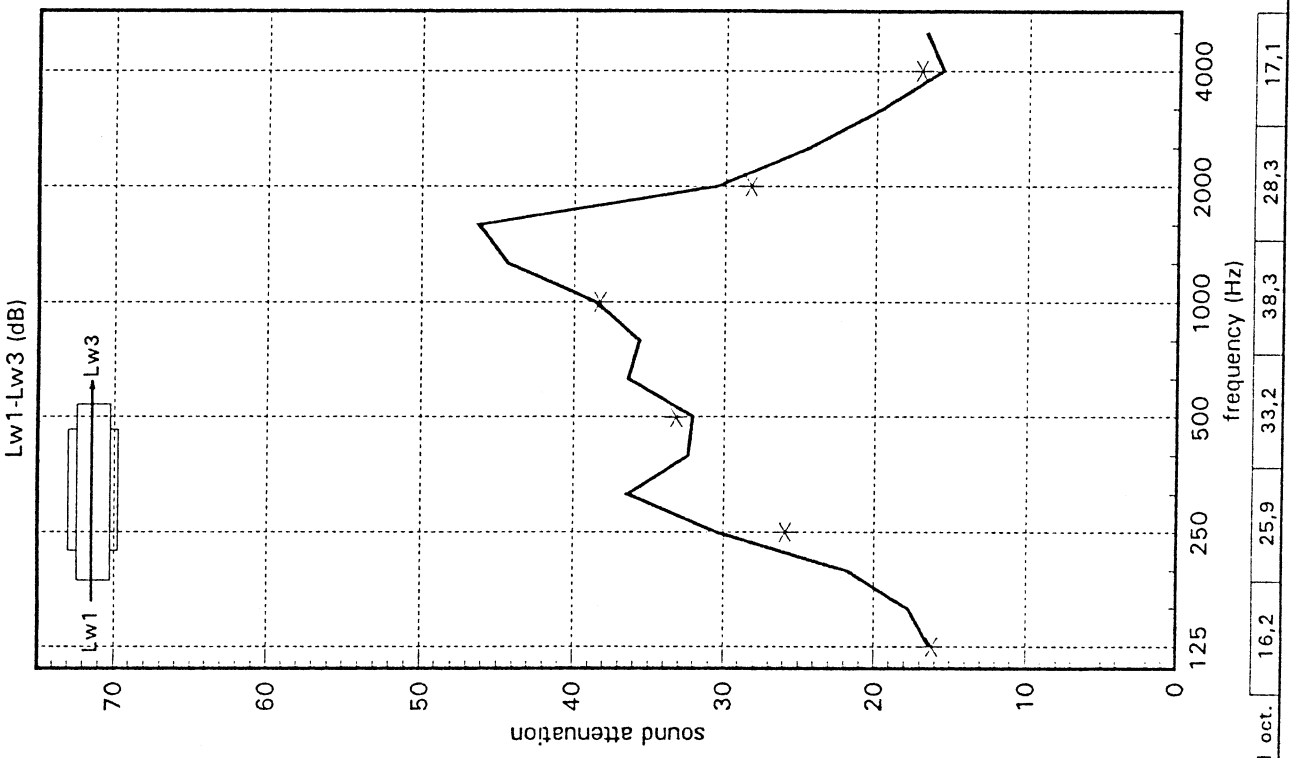
(3) w x h = 830 mm x 2010 mm

0 1 2 3 4 m

LABKE DRW

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



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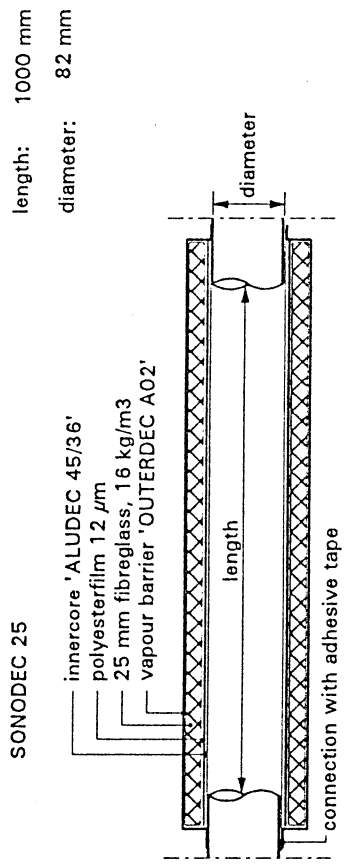
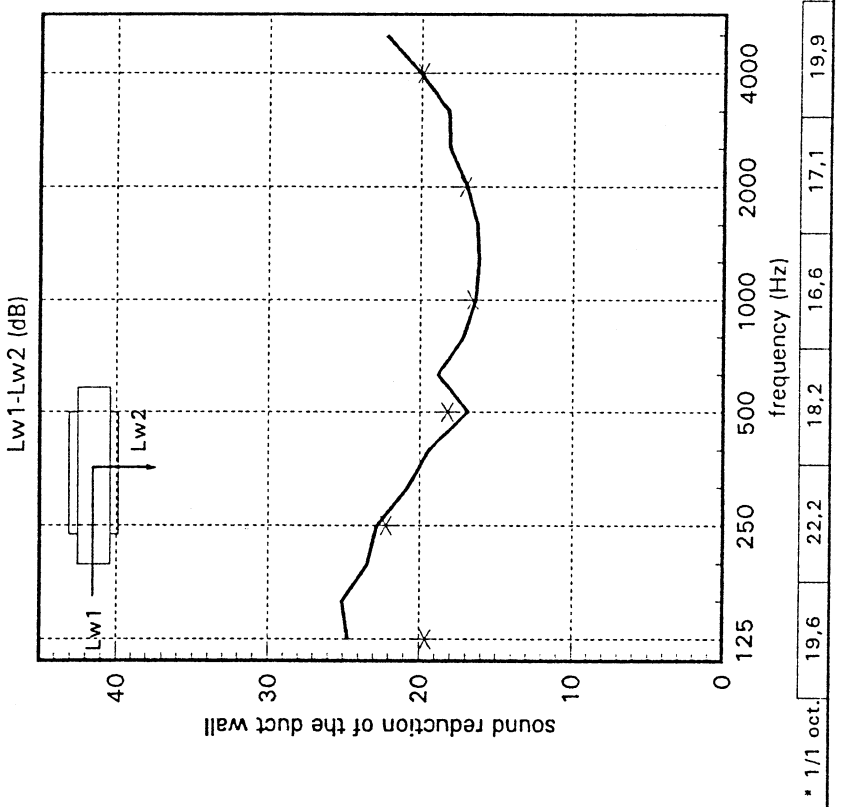




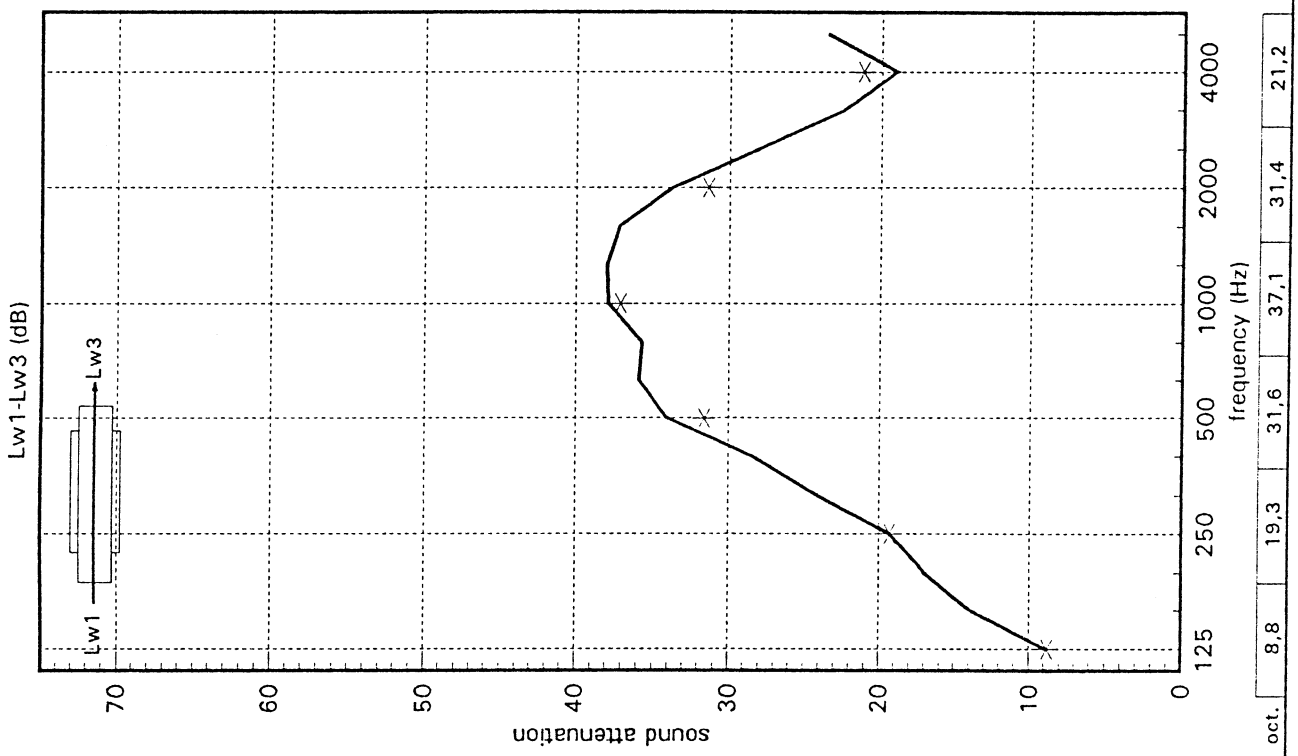
* 1/1 oct.	19,6	22,2	18,2	16,6	17,1	19,9

Nijmegen, january 2, 1992

AB323E.DRW

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



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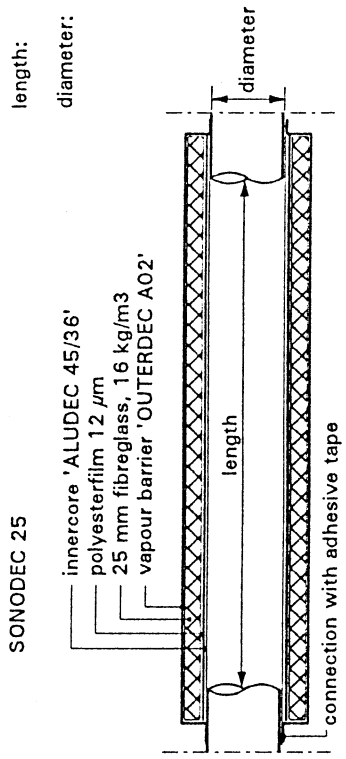
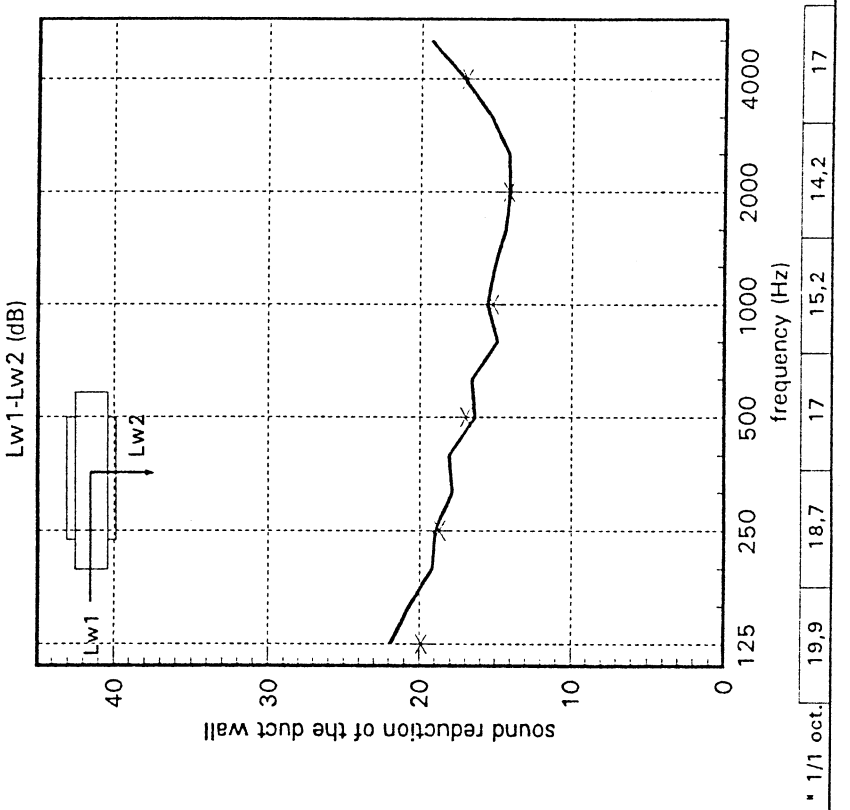
diameter: 102 mm





Nijmegen, january 2, 1992

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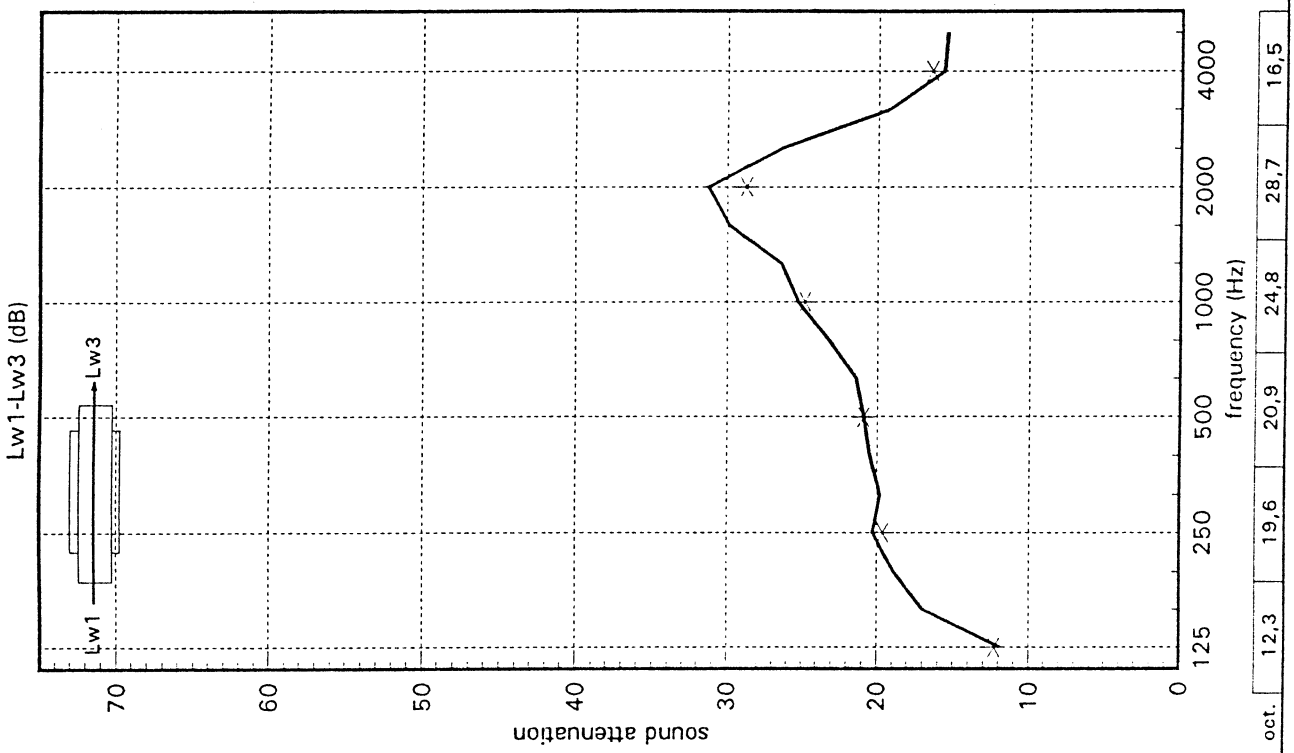
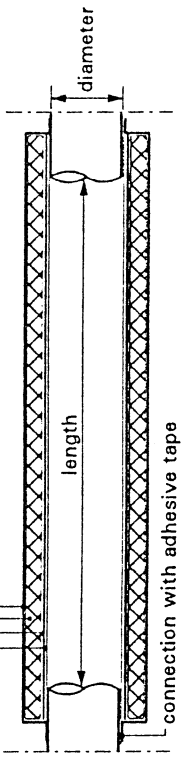
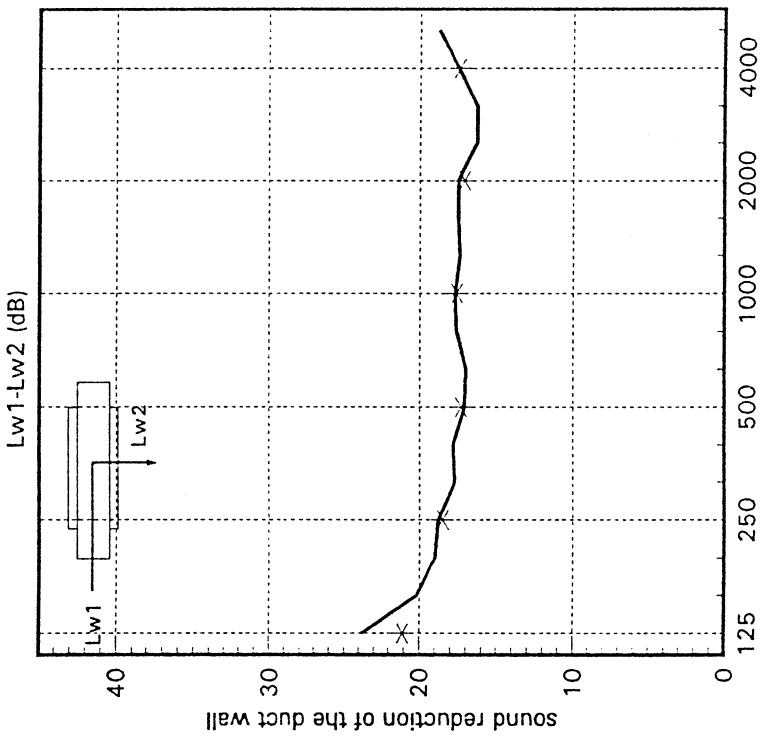


* 1/1 oct.	12,3	19,6	20,9	24,8	28,7	16,5

length: 1000 mm
diameter: 127 mm

SONODEC 25
- innercore 'ALUDEC 45/36'
- polyesterfilm 12 µm
- 25 mm fibreglass, 16 kg/m3
- vapour barrier 'OUTERDEC A02'





* 1/1 oct.	21,1	18,5	17,3	17,6	17,1	17,4

Nijmegen, January 2, 1992

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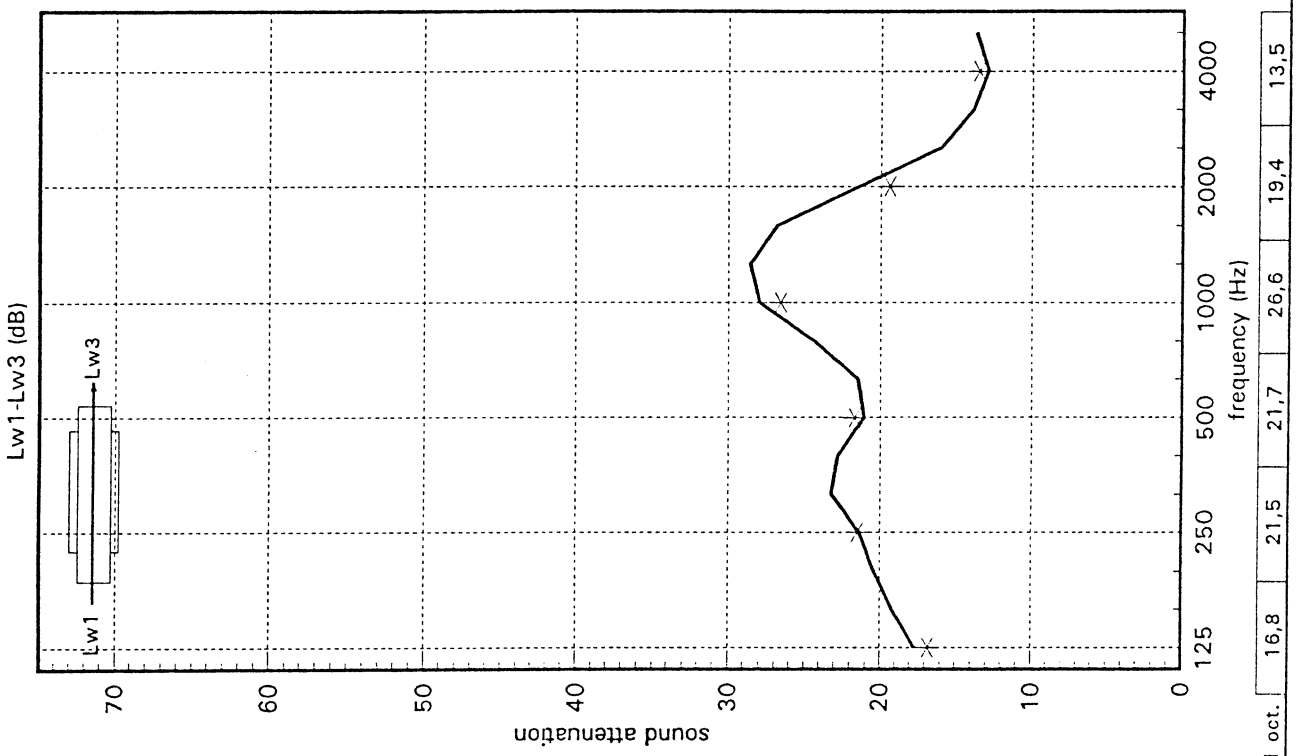
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



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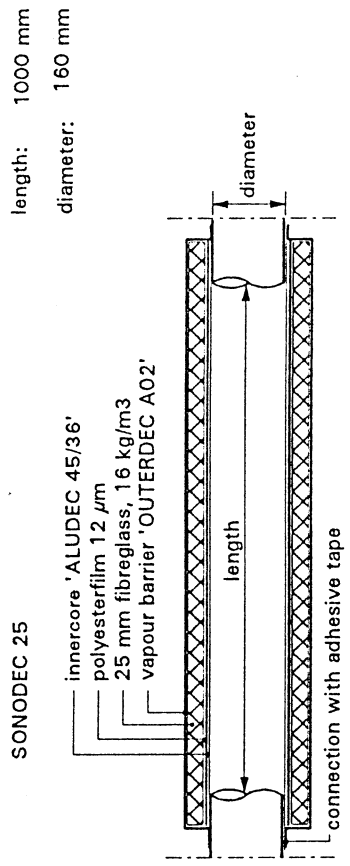
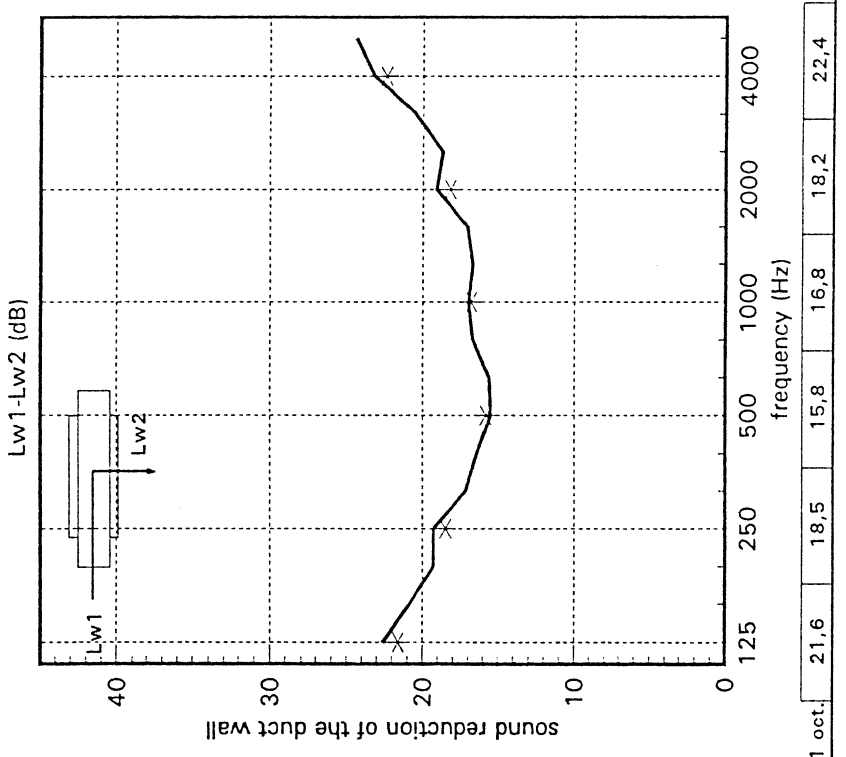




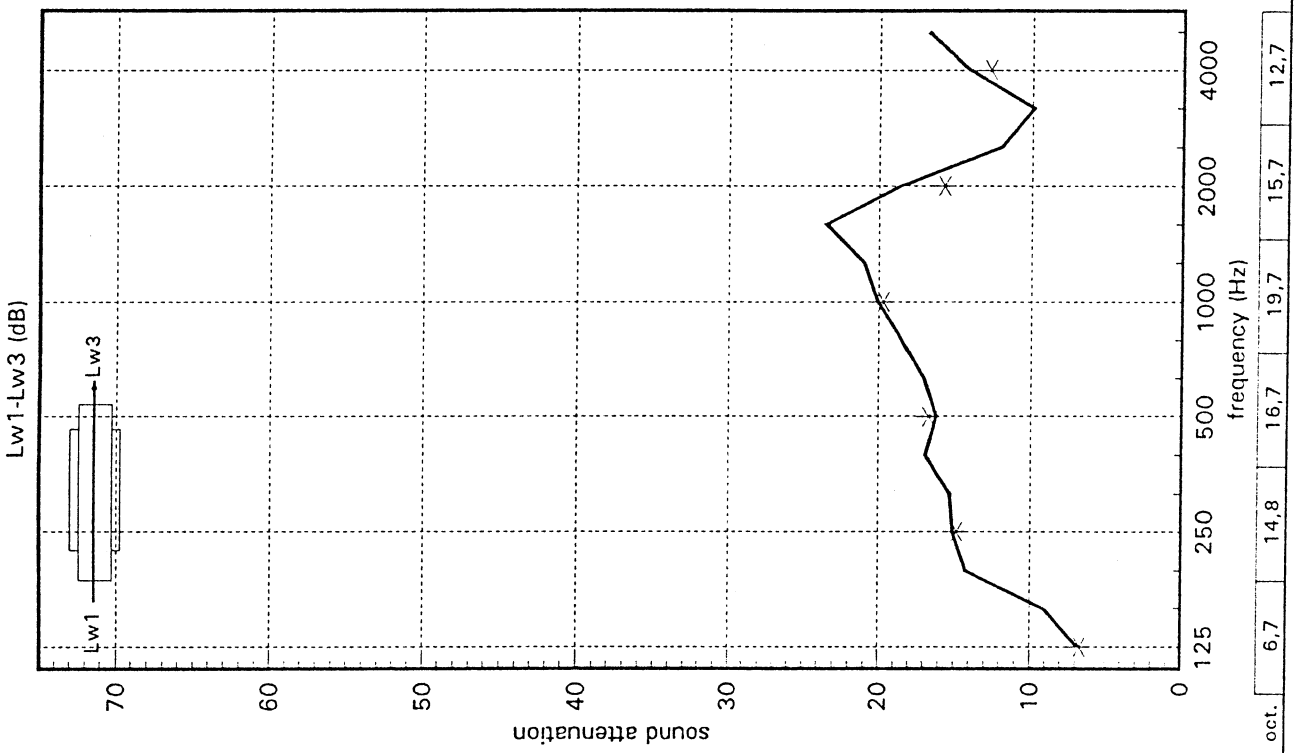
* 1/1 oct.	21,6	18,5	15,8	16,8	18,2	22,4

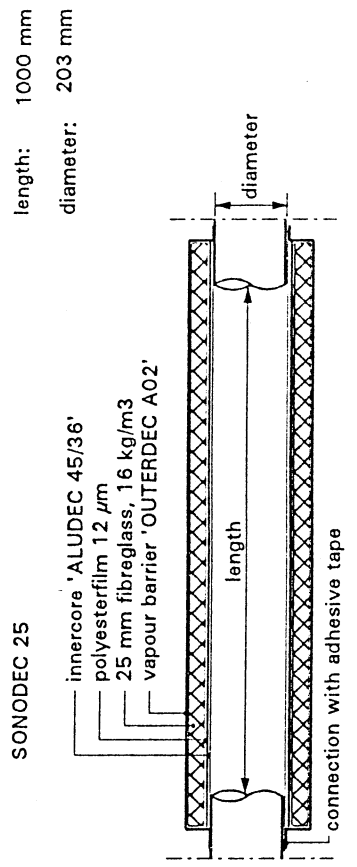
AB323E.DRW

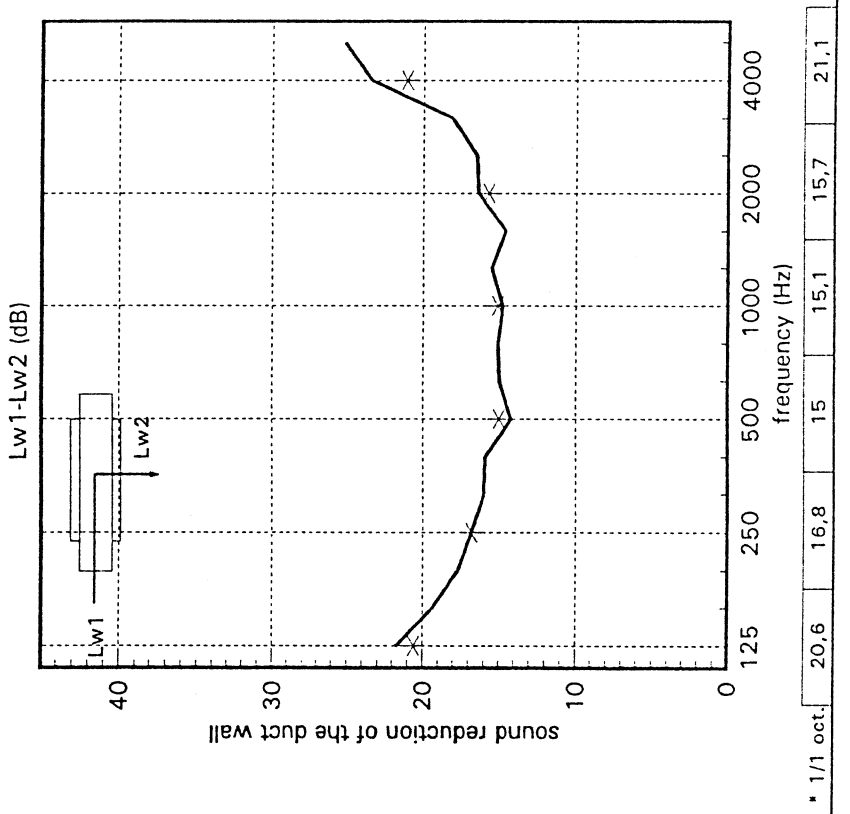
Nijmegen, january 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands







Nijmegen, january 2, 1992

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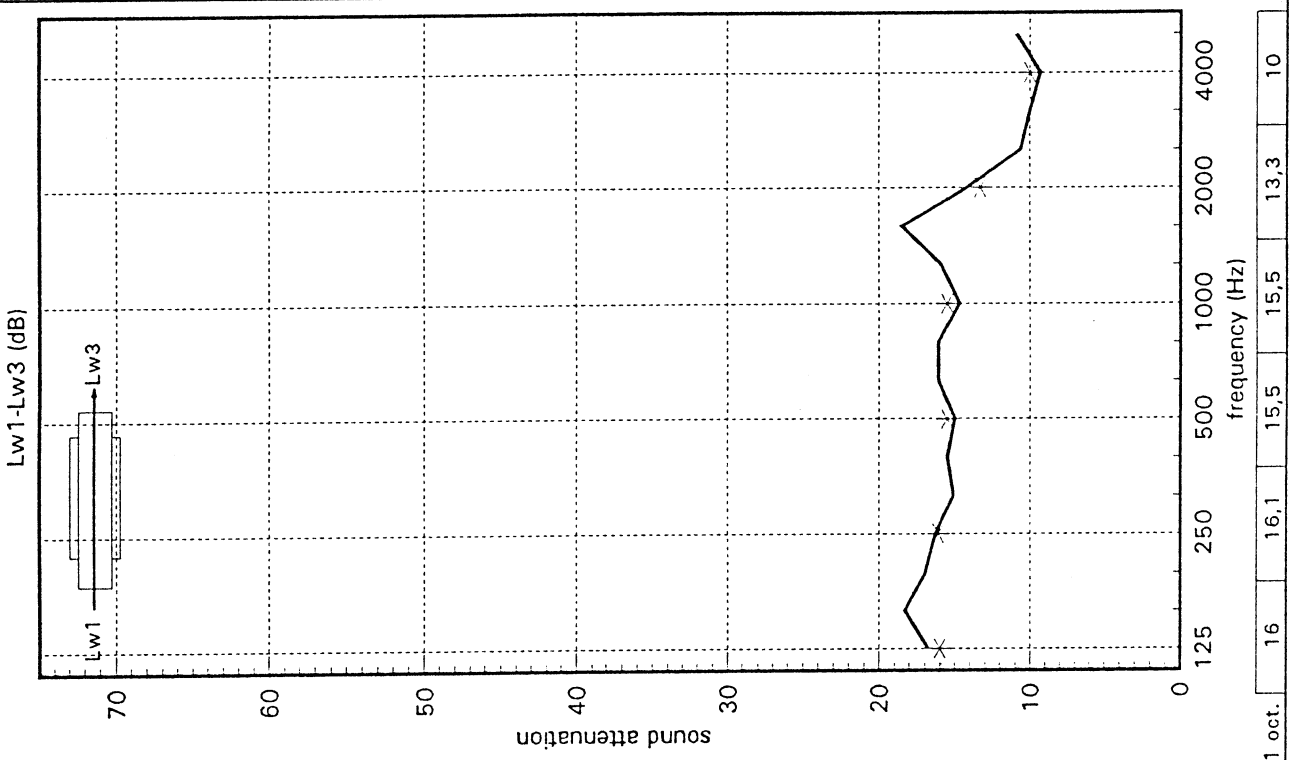
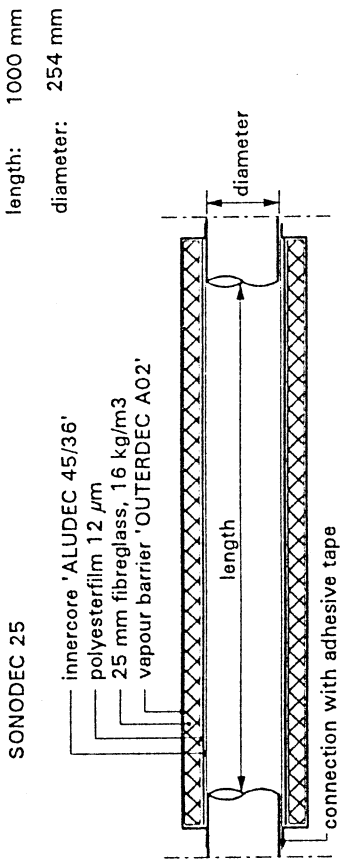
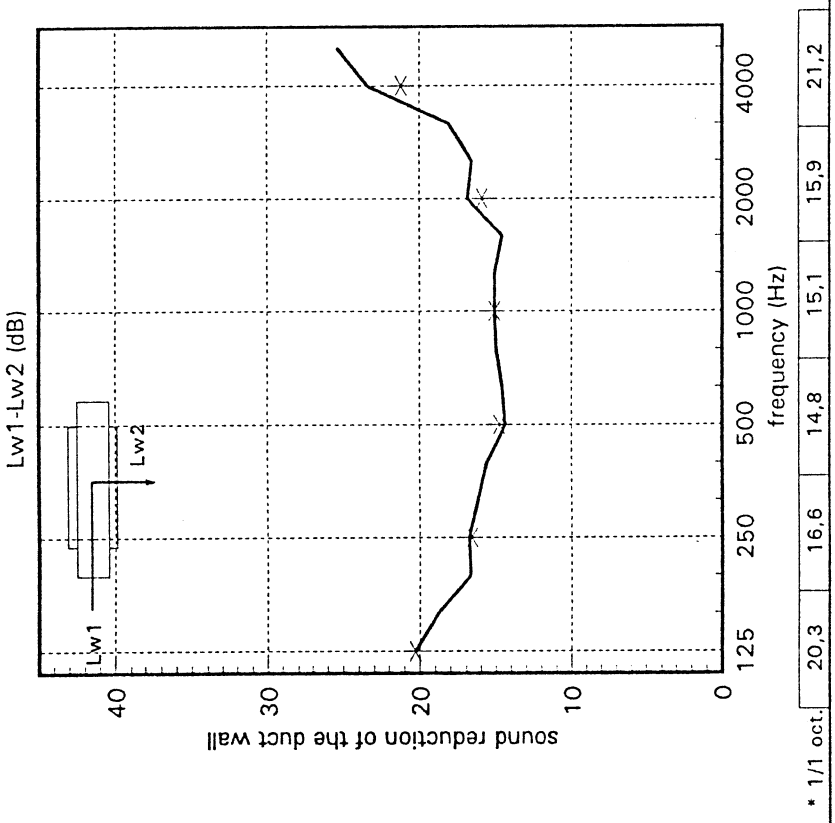
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands





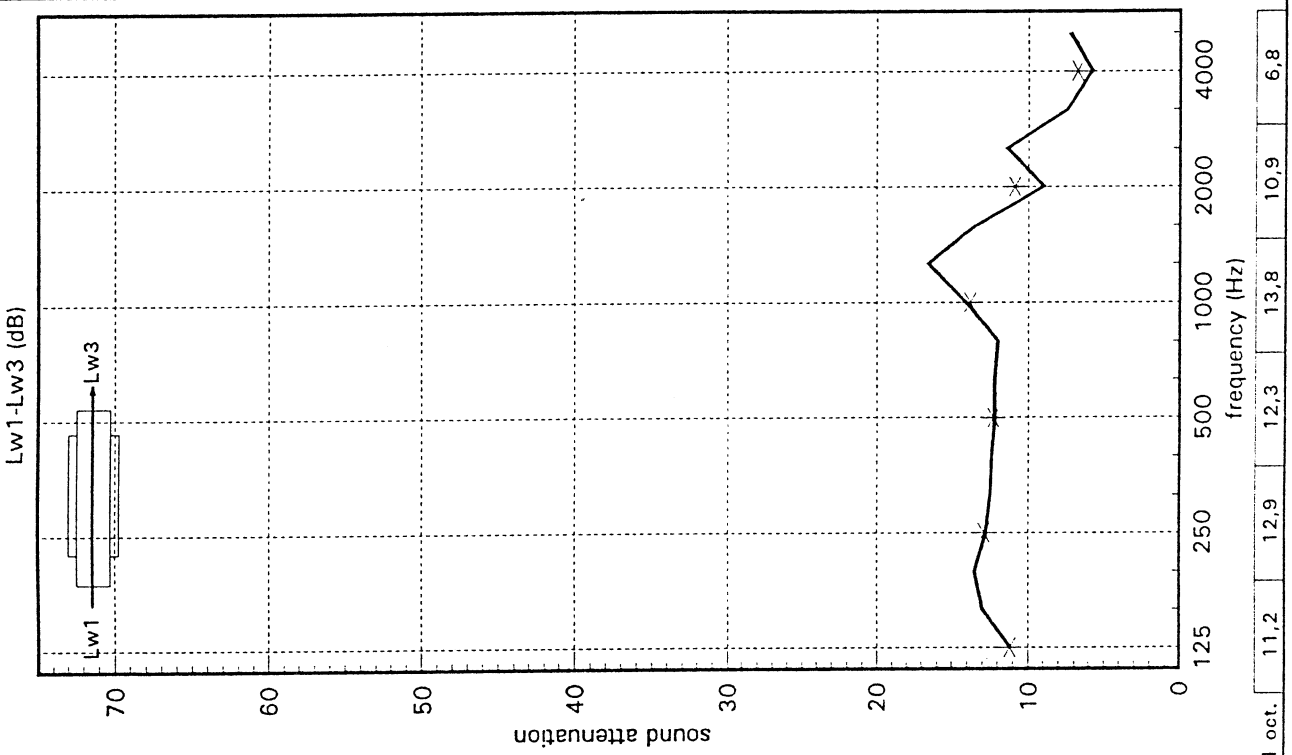


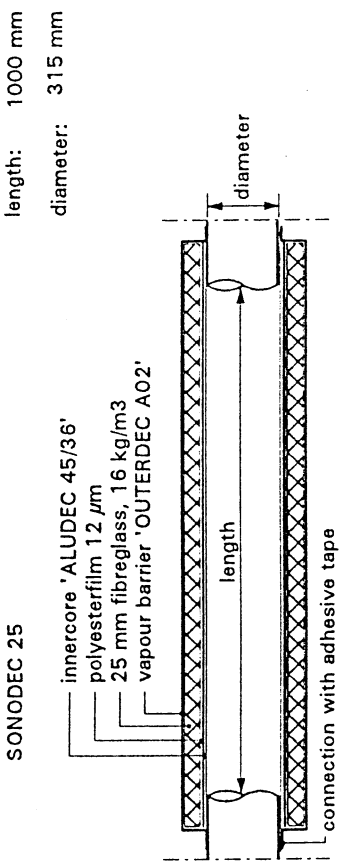
Nijmegen, January 2, 1992

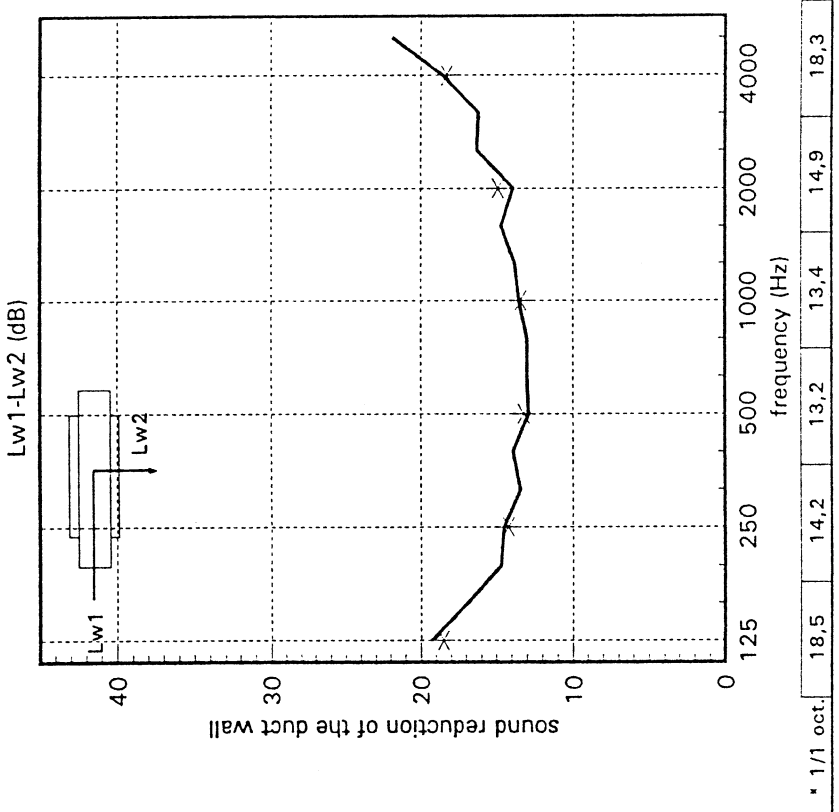
AB323E.DRW

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands





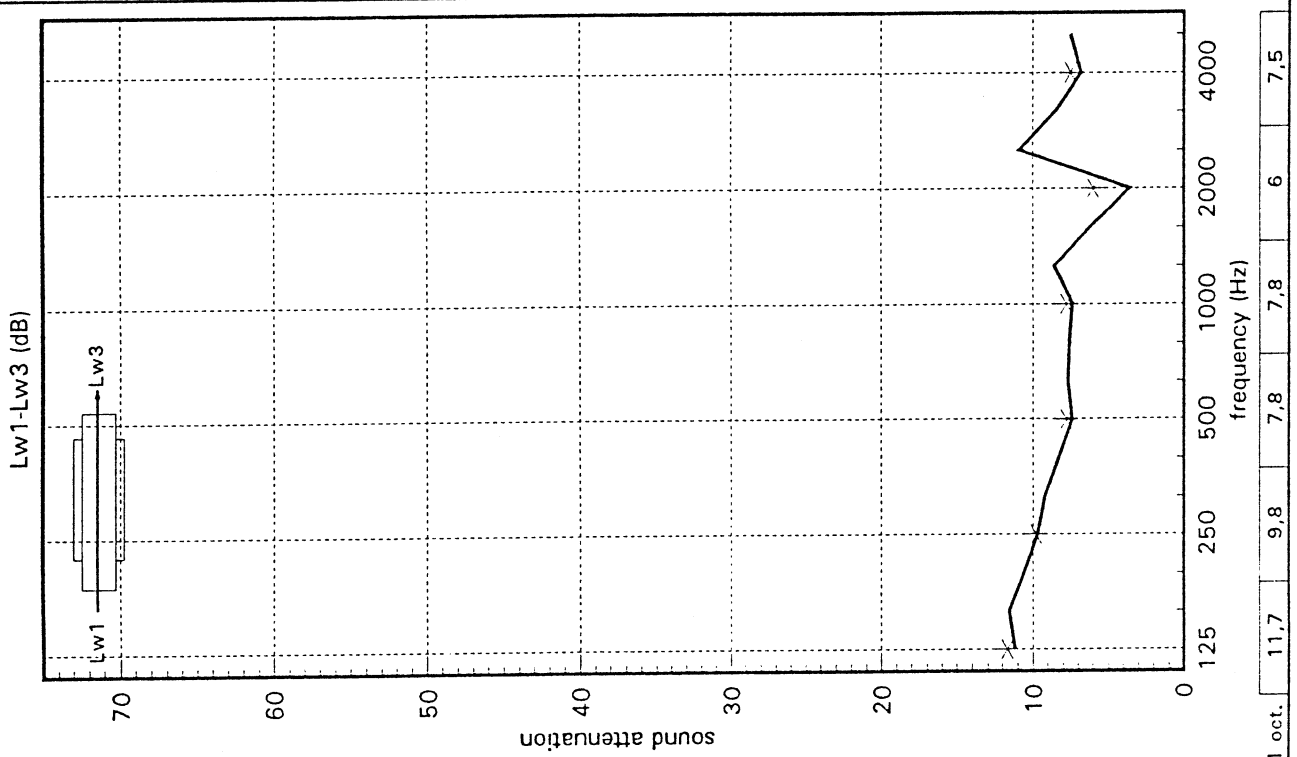


Nijmegen, january 2, 1992

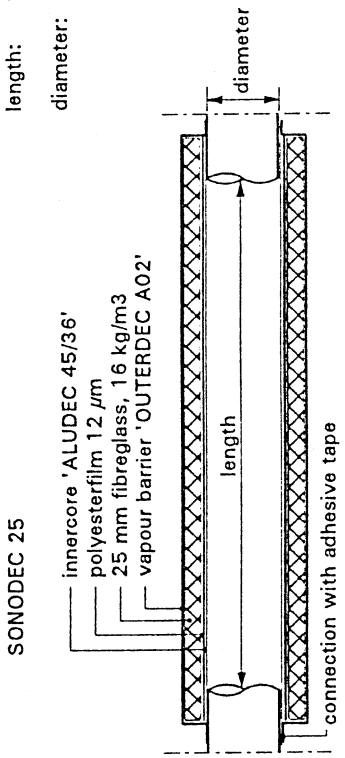
AB323E.DRW

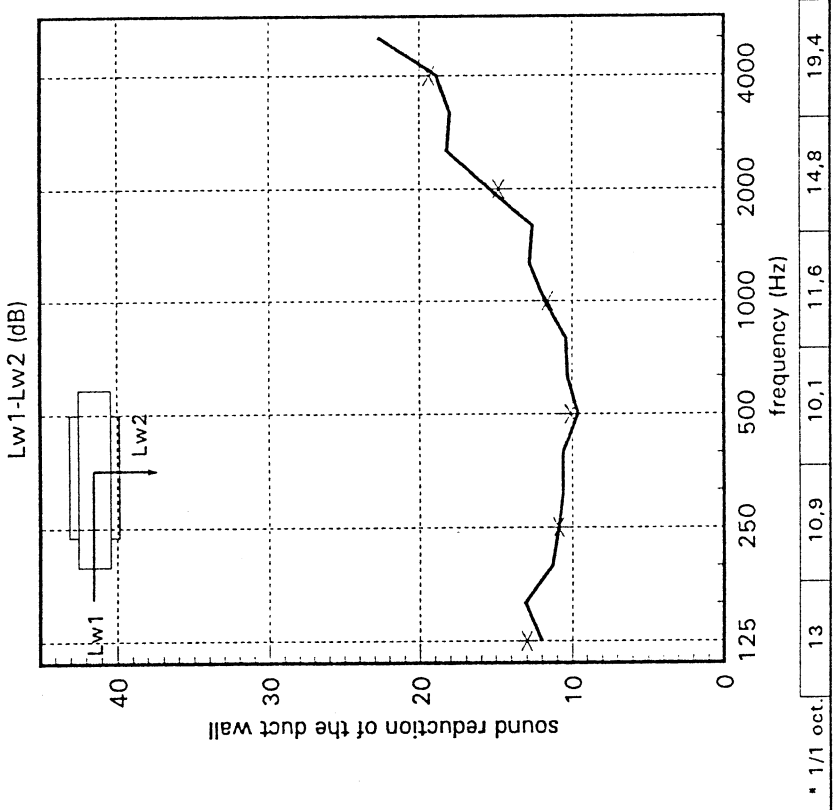
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



length: 1000 mm
diameter: 457 mm



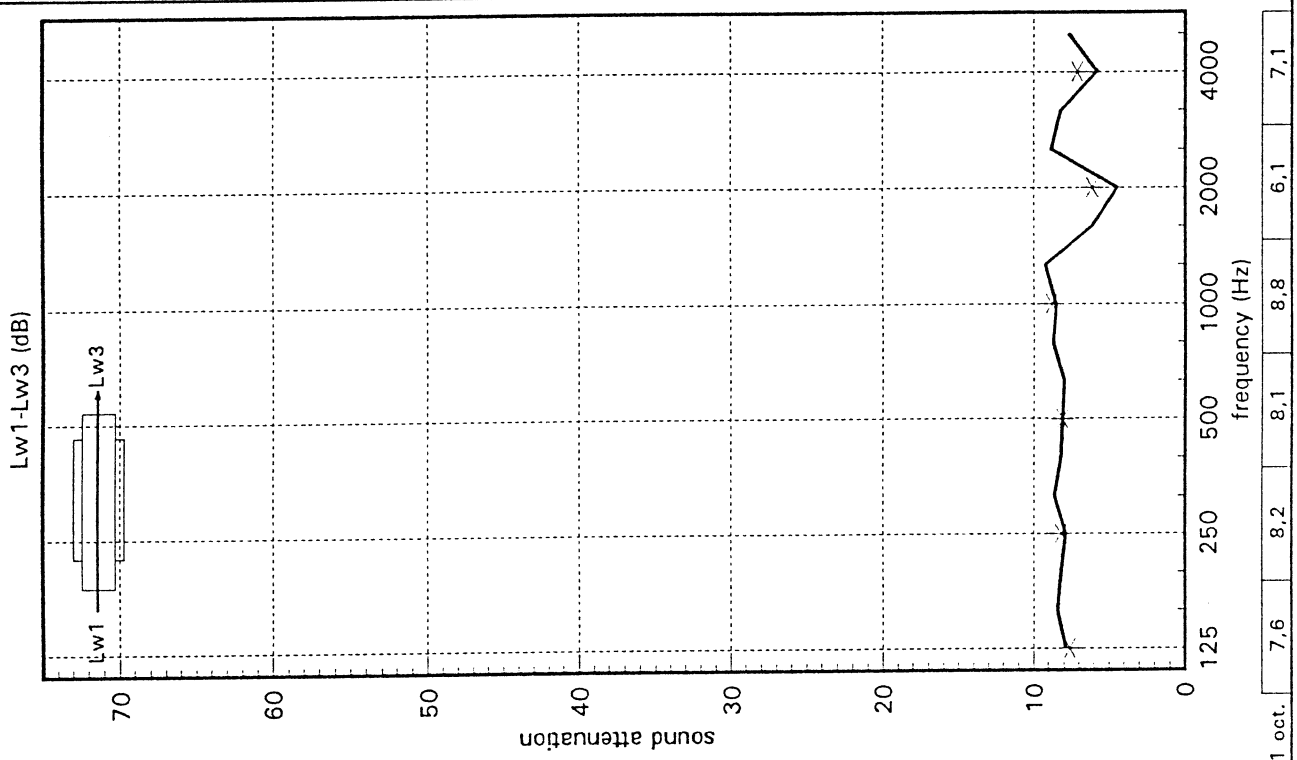


AB323E.DRW

Nijmegen, january 2, 1992

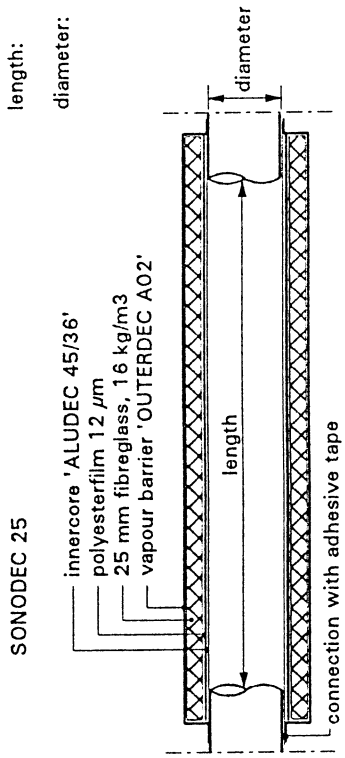
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

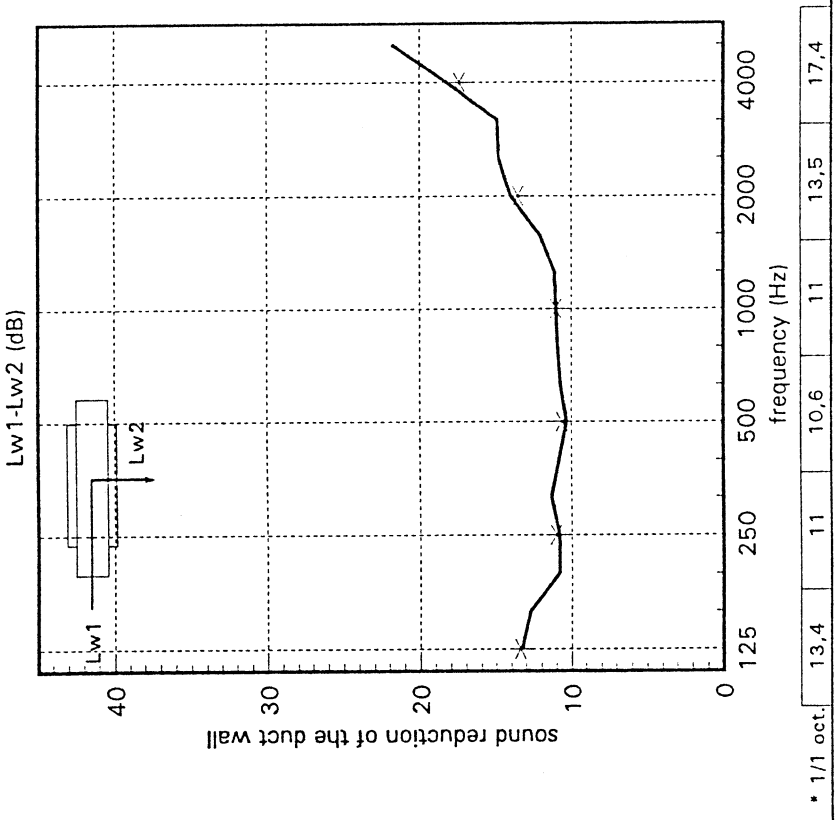
Principal: Dutch Environment Corporation B.V., The Netherlands



length: 1000 mm
diameter: 508 mm

SONODEC 25



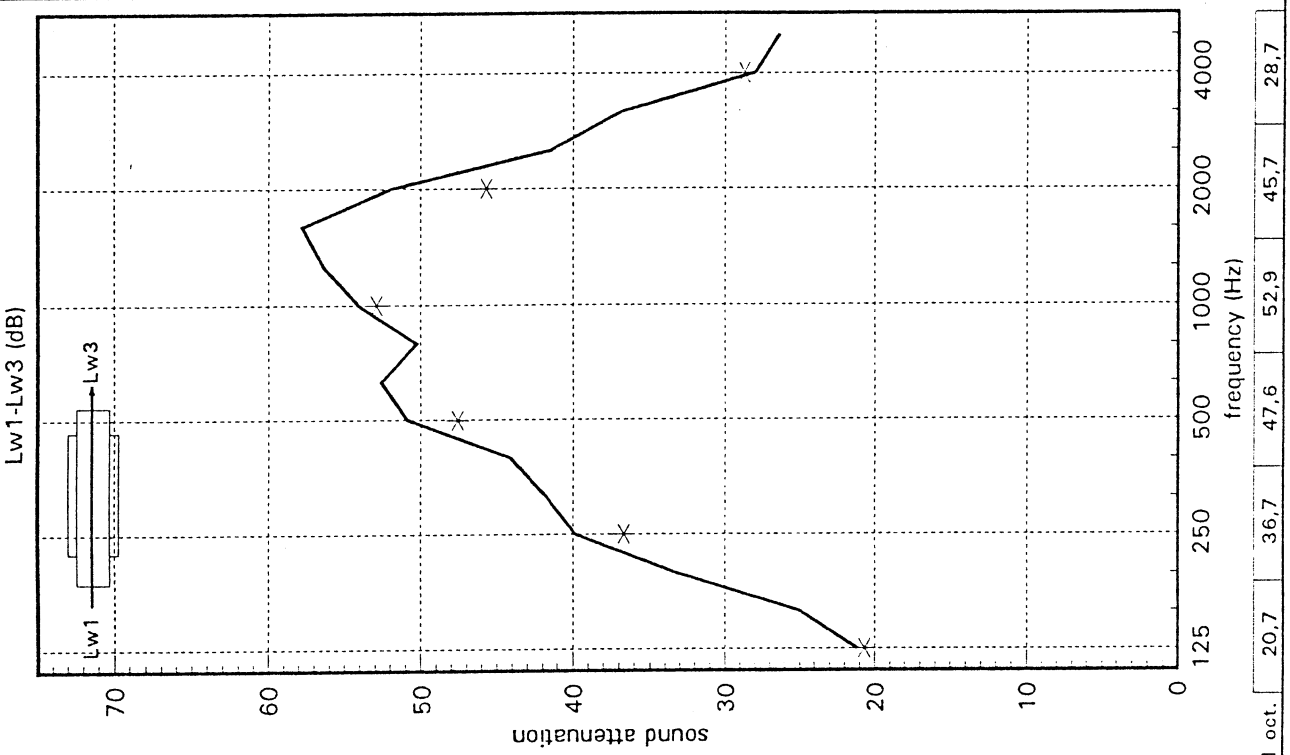


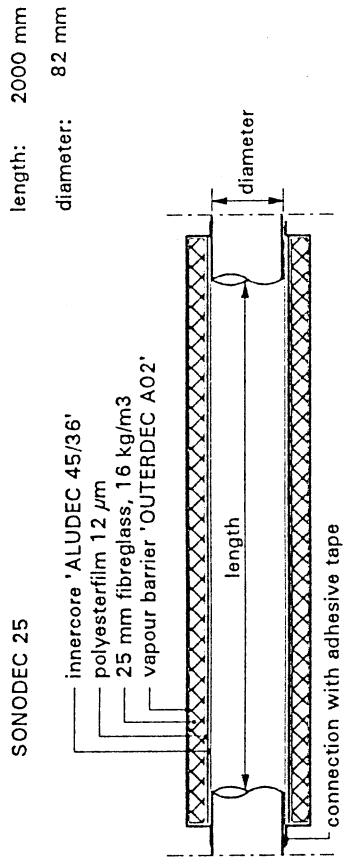
AB323E.DRW

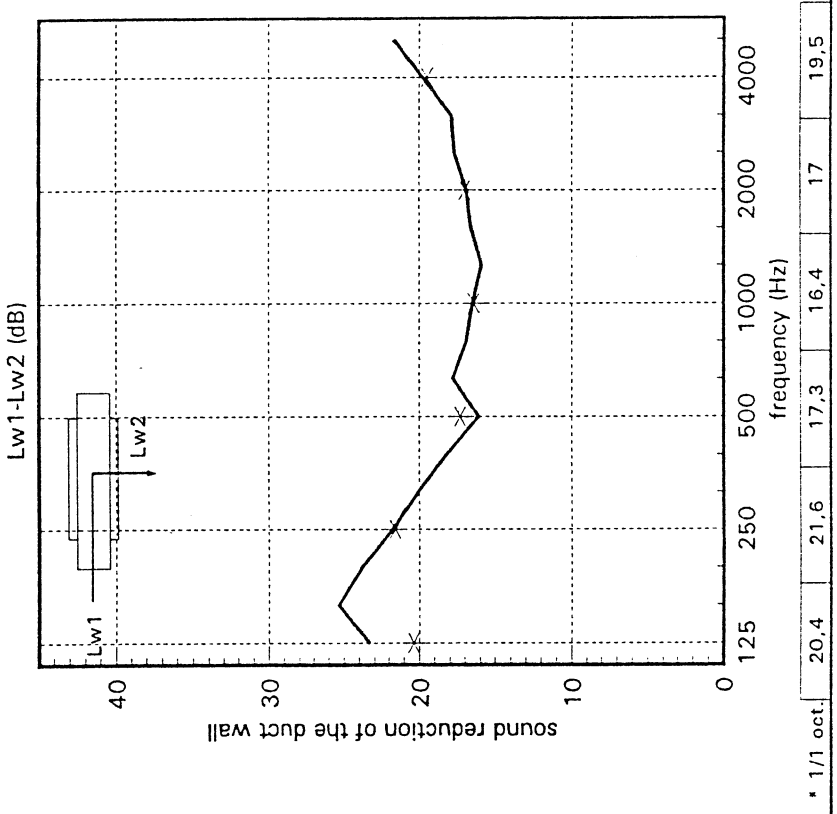
Nijmegen, january 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands





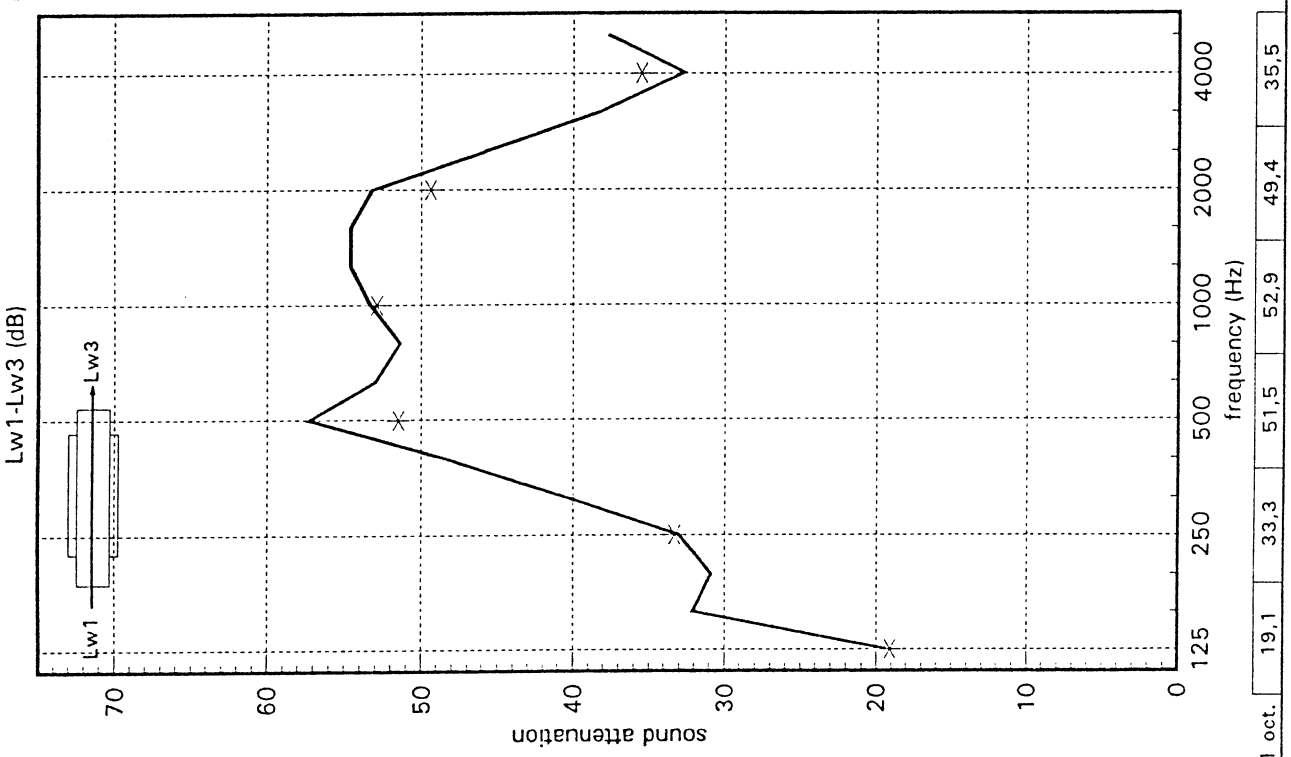


AB323E.DRW

Nijmegen, January 2, 1992

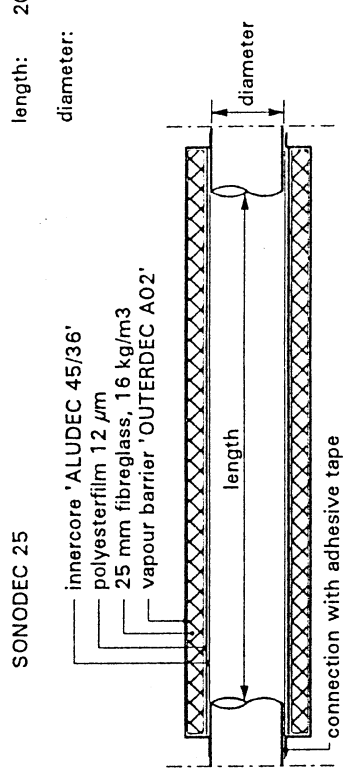
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

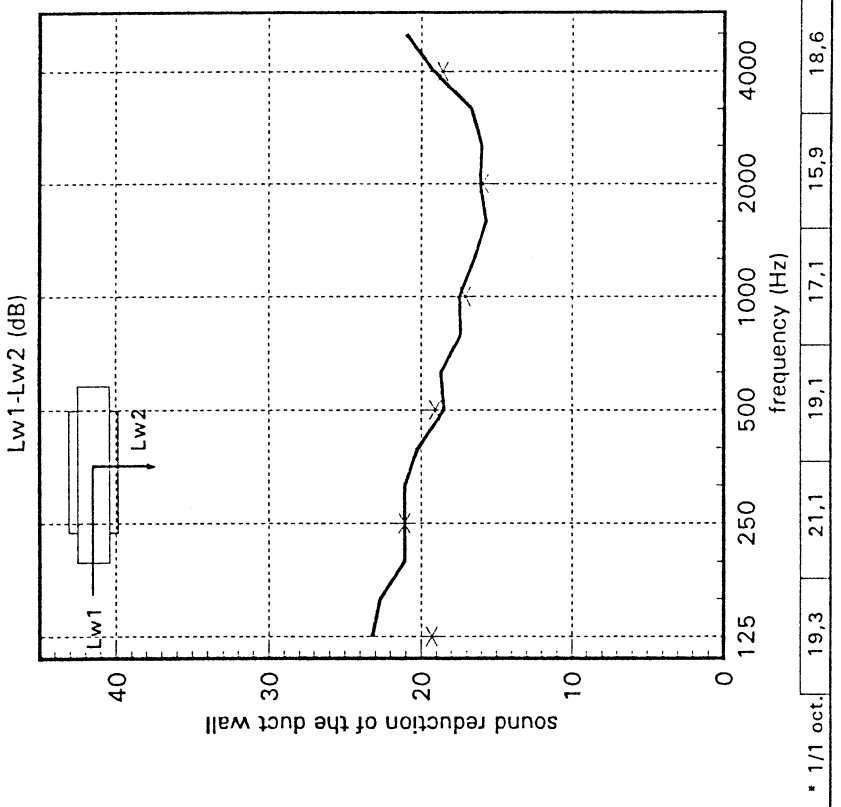
Principal: Dutch Environment Corporation B.V., The Netherlands



* 1/1 oct.	19,1	33,3	51,5	52,9	49,4	35,5

length: 2000 mm
diameter: 102 mm





* 1/1 oct.	19,3	21,1	19,1	17,1	15,9	18,6

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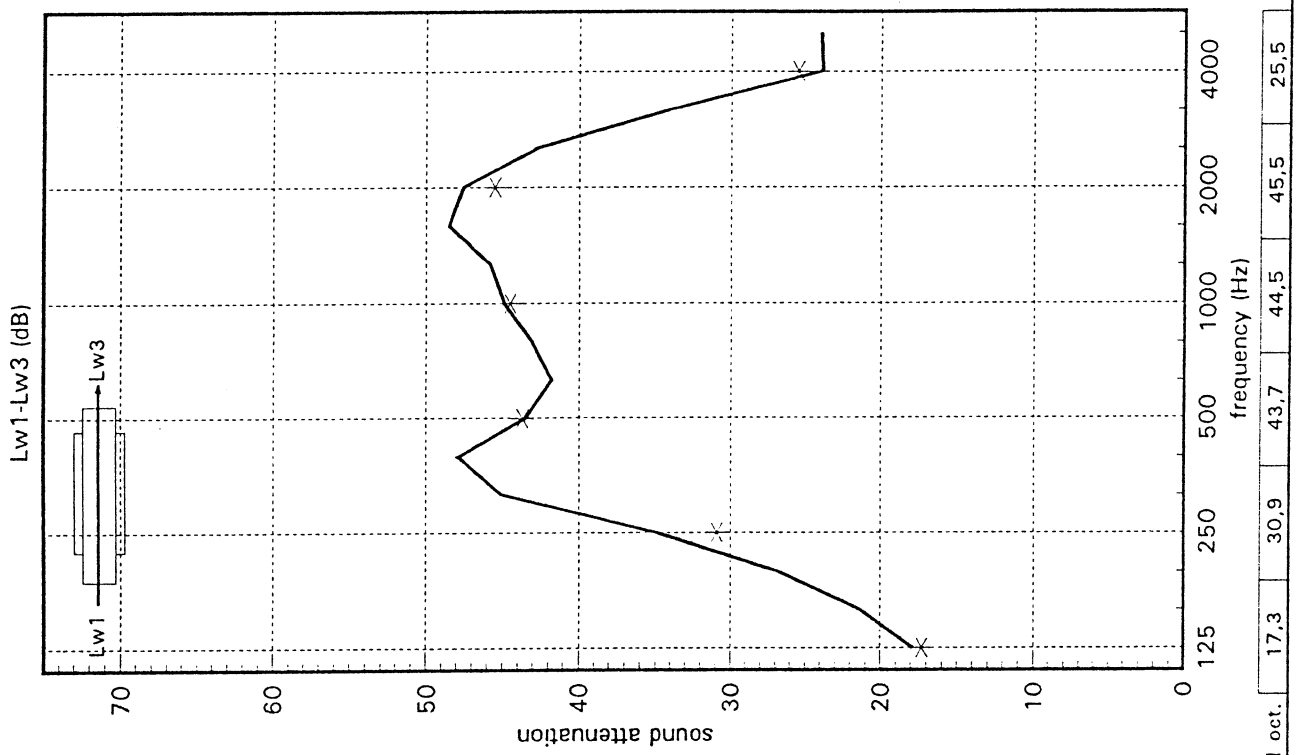
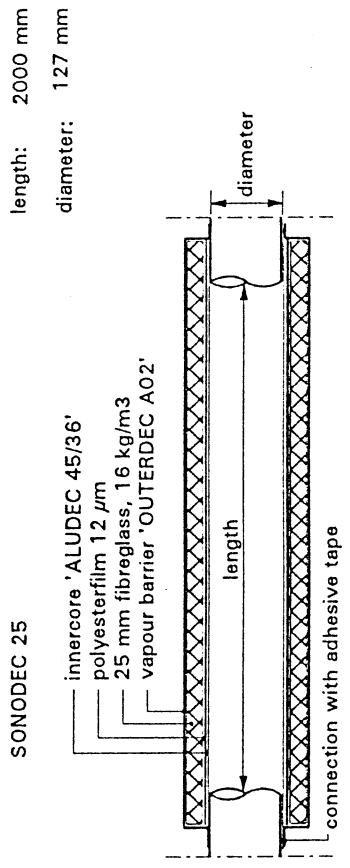
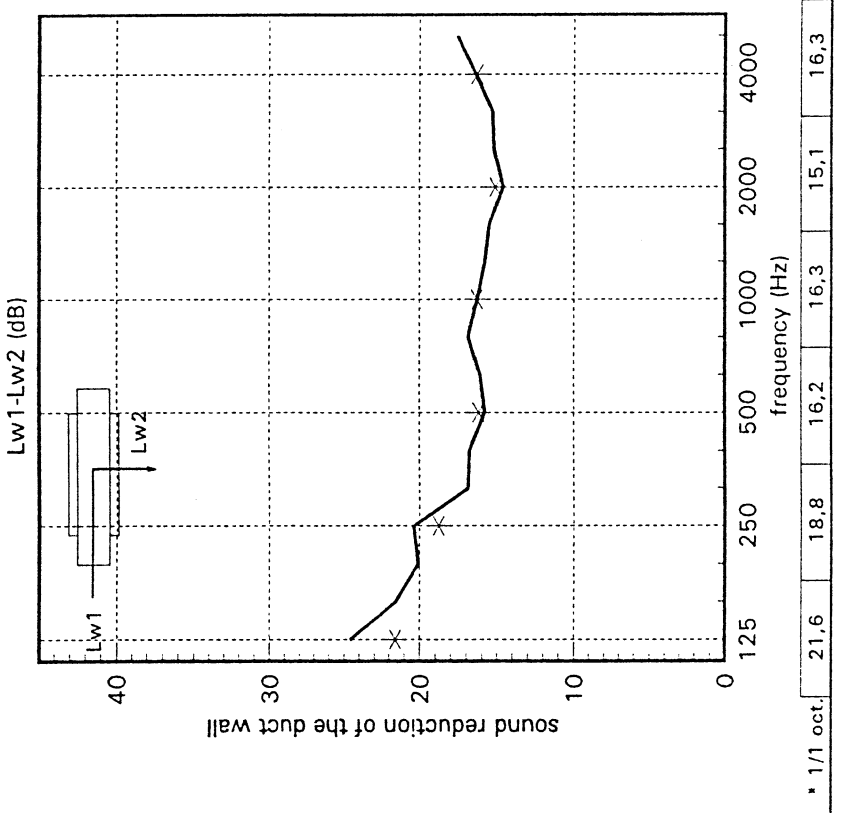
Nijmegen, january 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



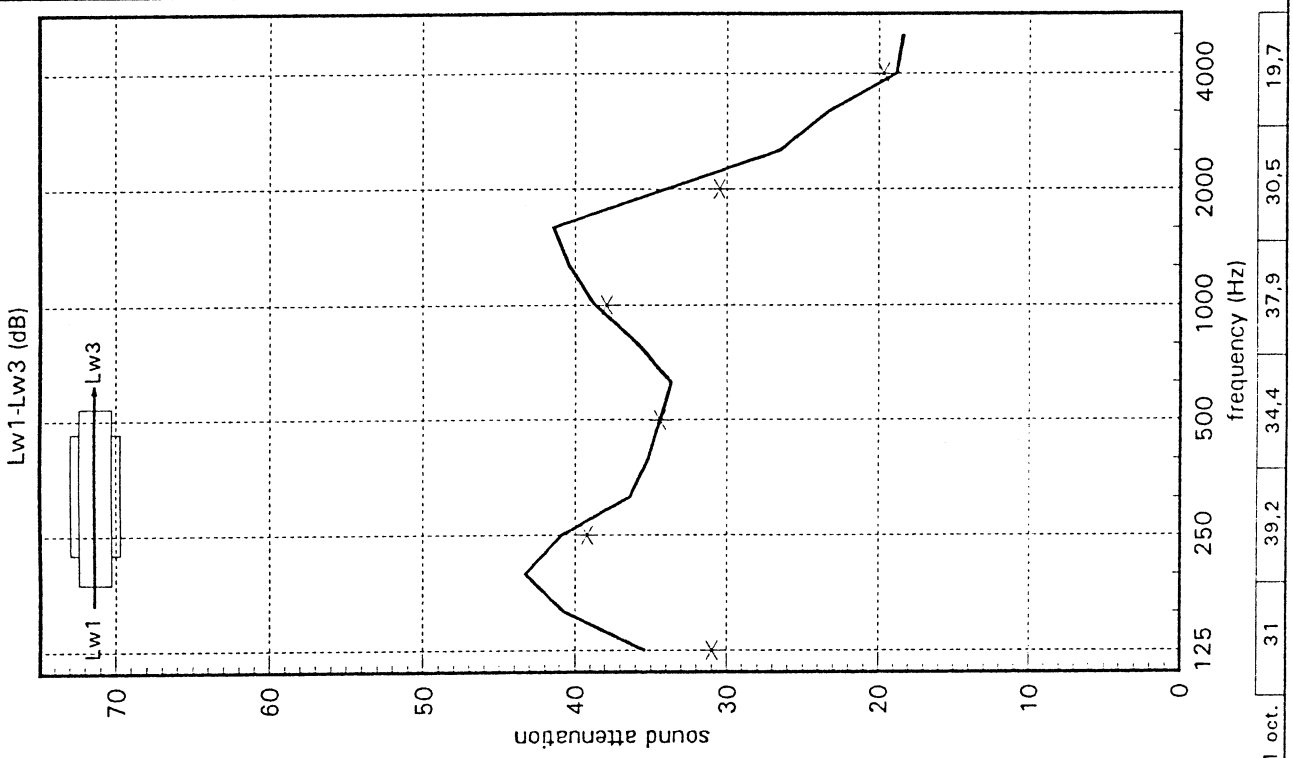


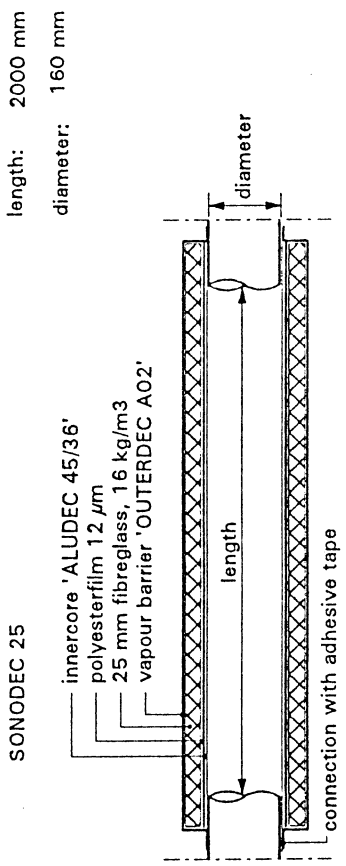


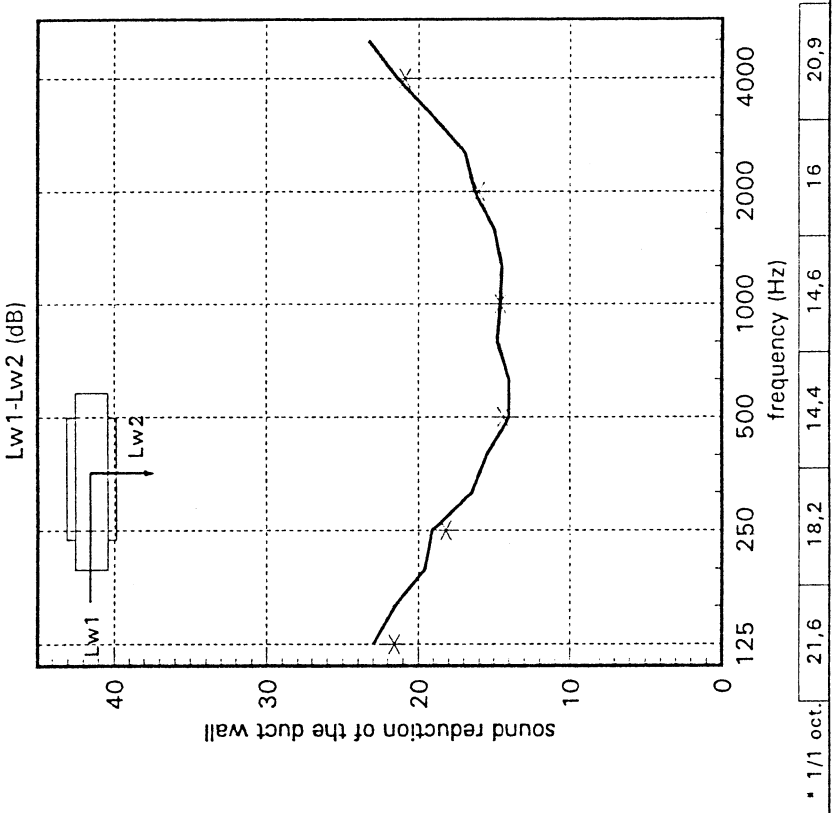
Nijmegen, january 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands







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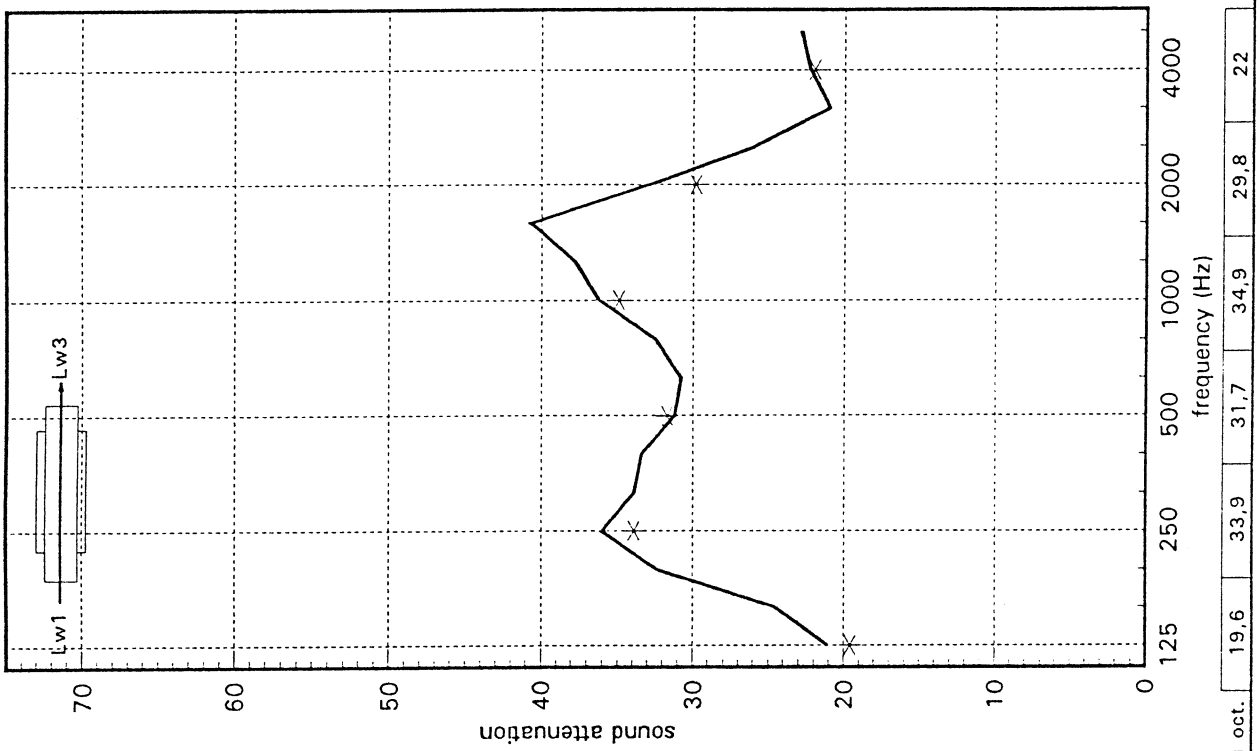
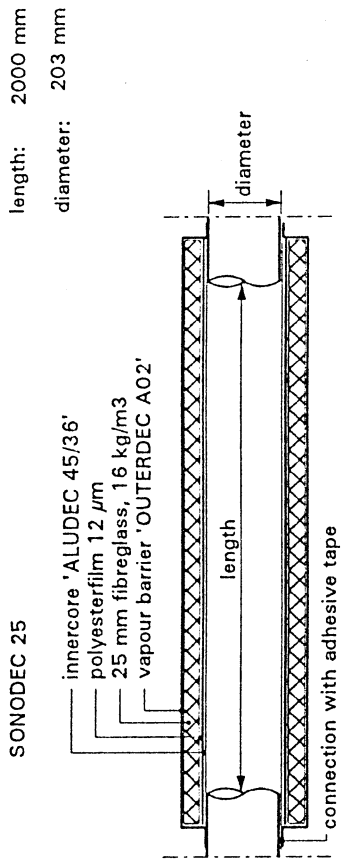
Nijmegen, january 2, 1992

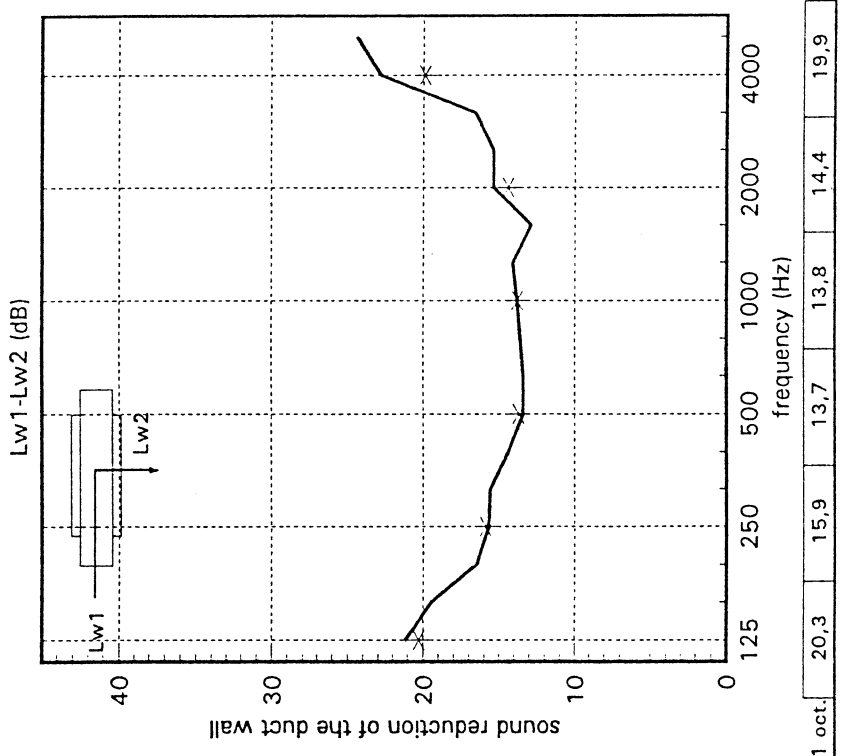
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



* 1/1 oct.	19,6	33,9	31,7	34,9	29,8	22





* 1/1 oct.	20,3	15,9	13,7	13,8	14,4	19,9

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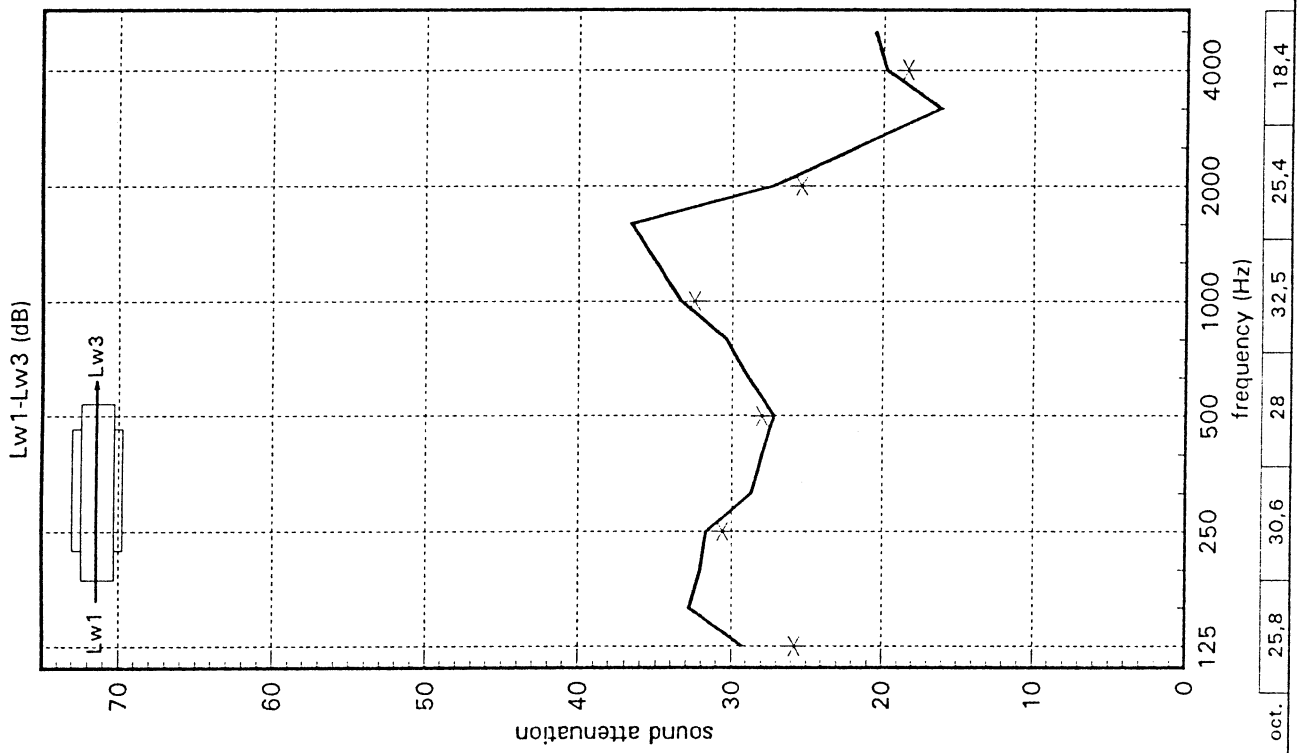
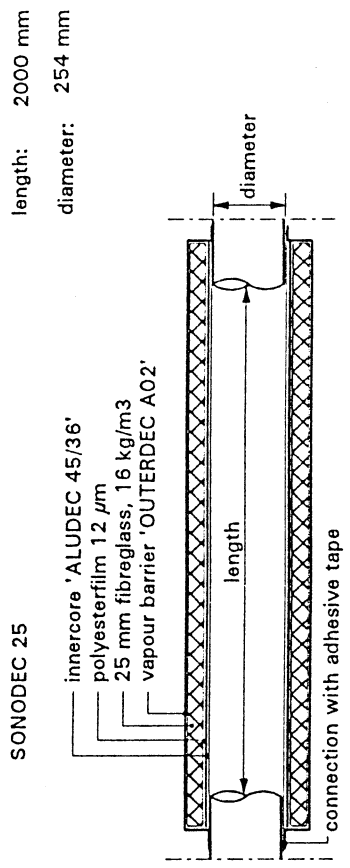
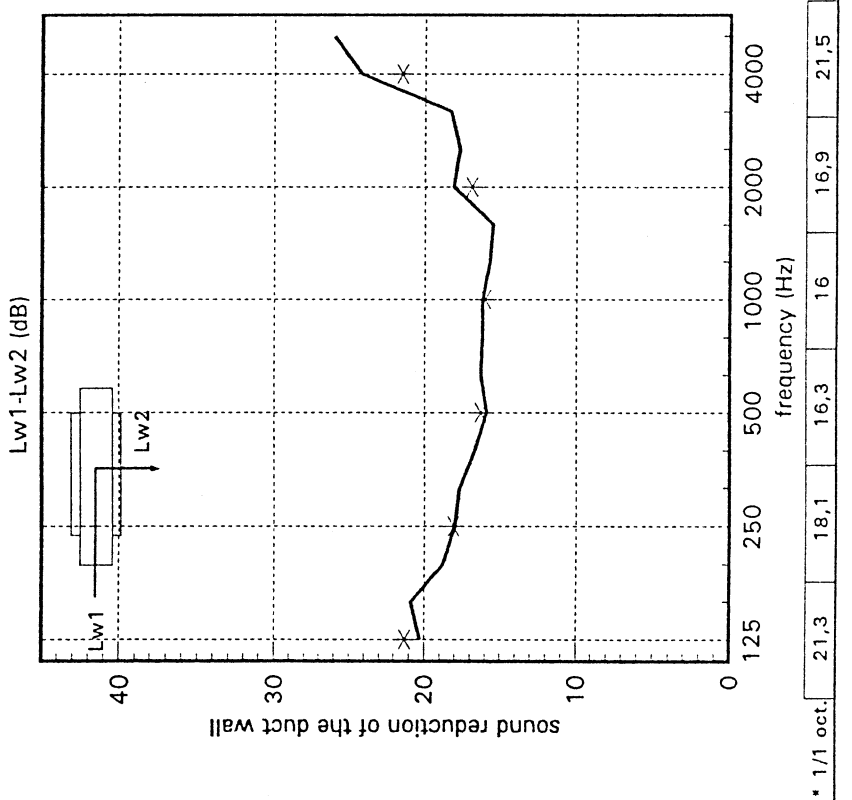
Nijmegen, january 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands





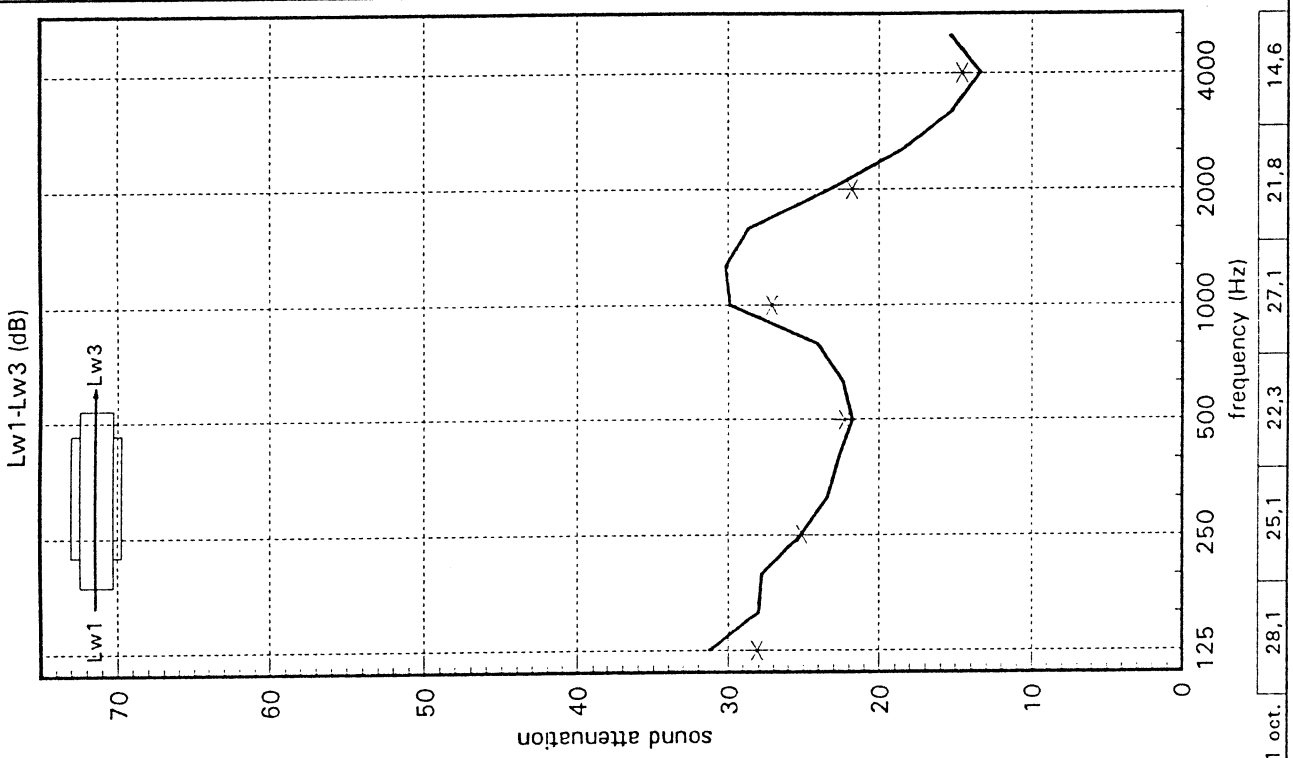


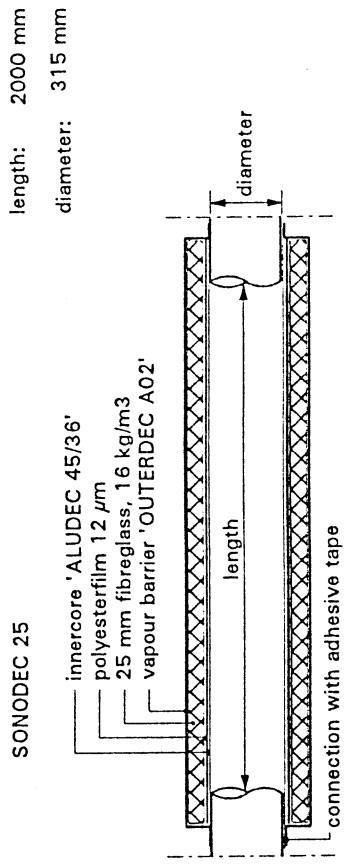
Nijmegen, january 2, 1992

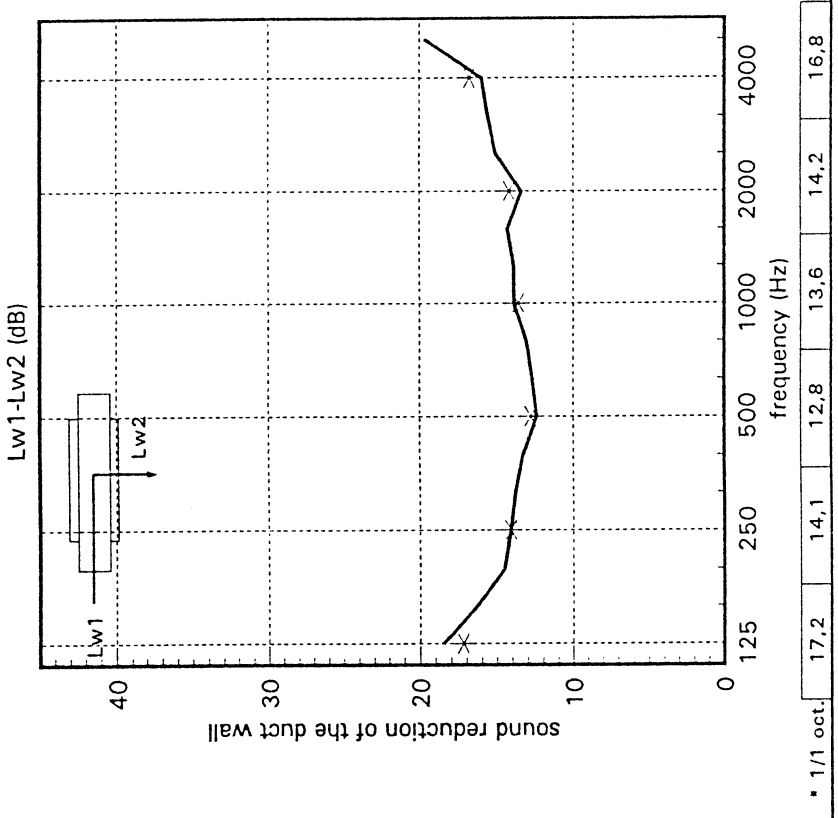
AB323E.DRW

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



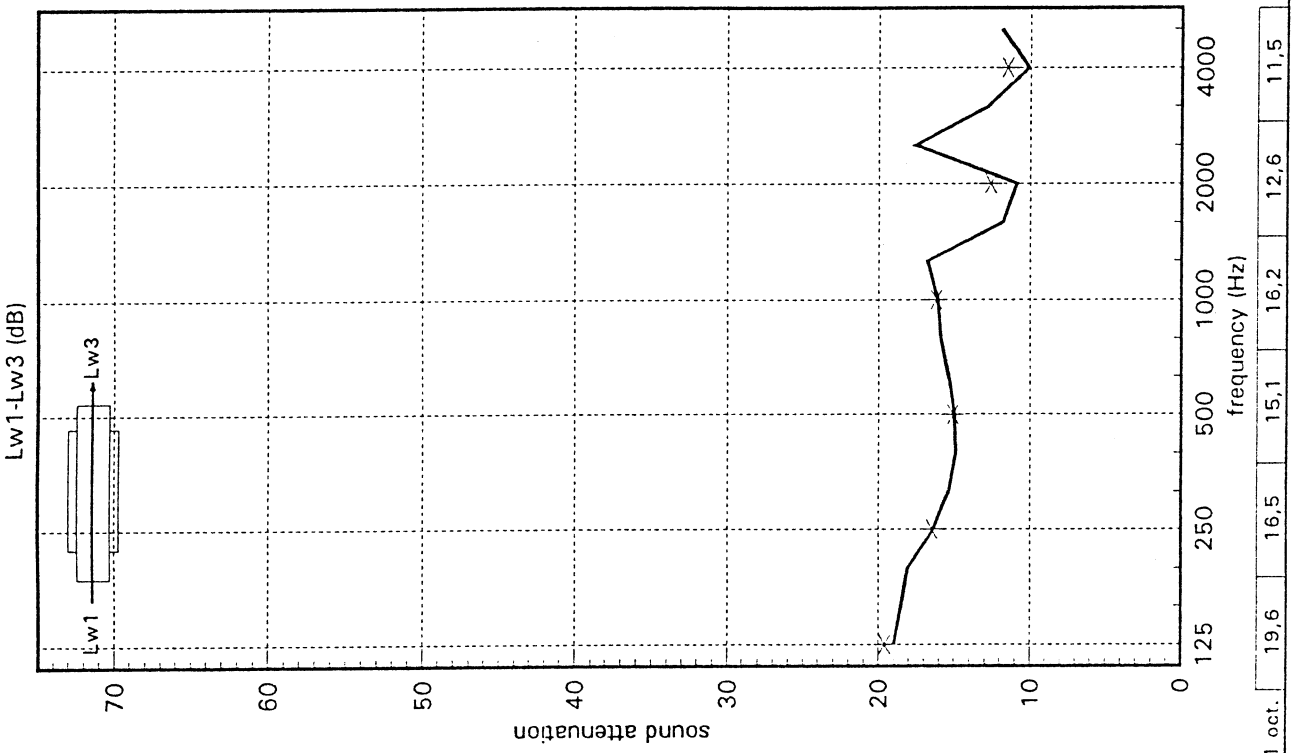




Nijmegen, january 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



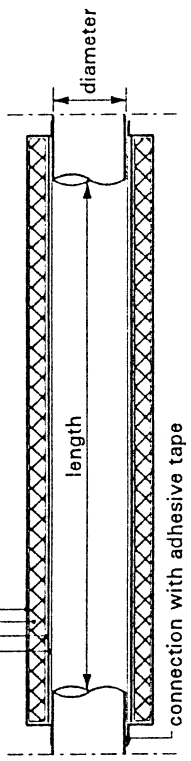
* 1/1 oct.	19,6	16,5	15,1	16,2	12,6	11,5

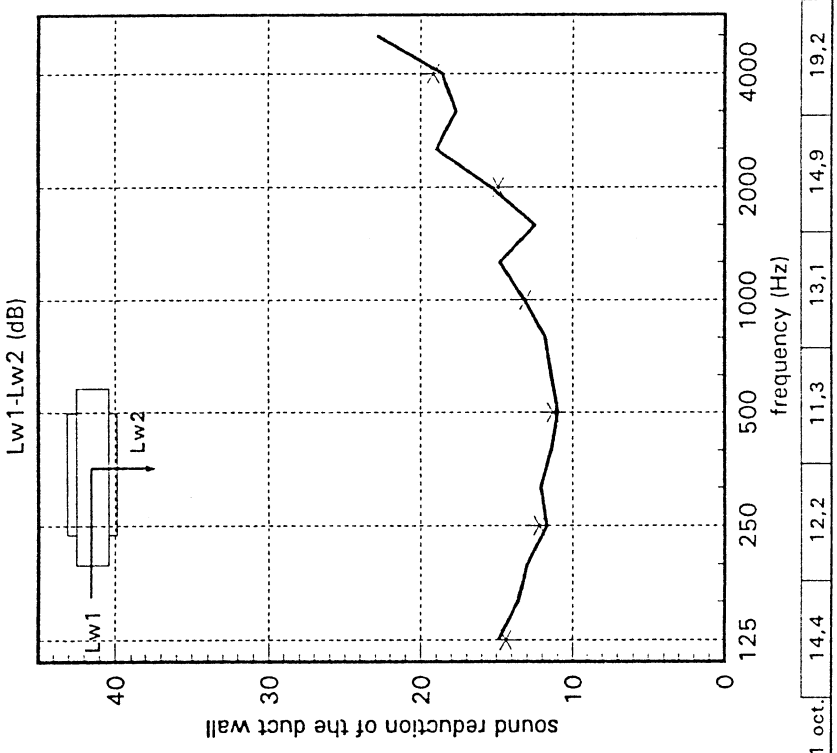
SONODEC 25

length: 2000 mm

diameter: 457 mm

- innercore 'ALUDEC 45/36'
- polyesterfilm 12 µm
- 25 mm fibreglass, 16 kg/m3
- vapour barrier 'OUTERDEC A02'





* 1/1 oct.	14,4	12,2	11,3	13,1	14,9	19,2

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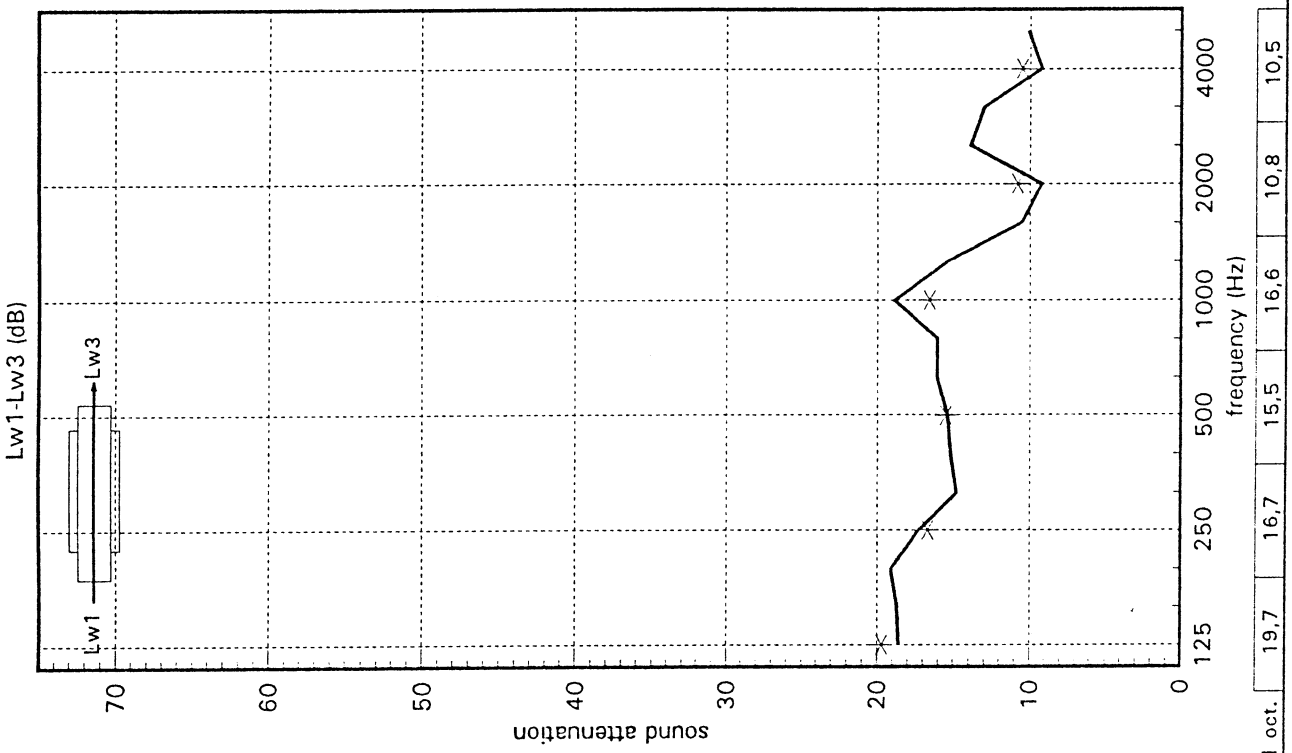
Nijmegen, January 2, 1992

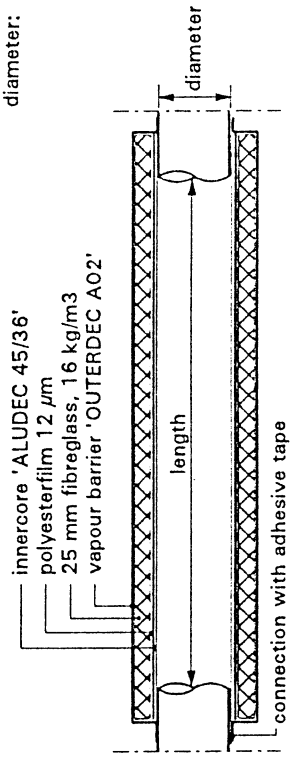
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

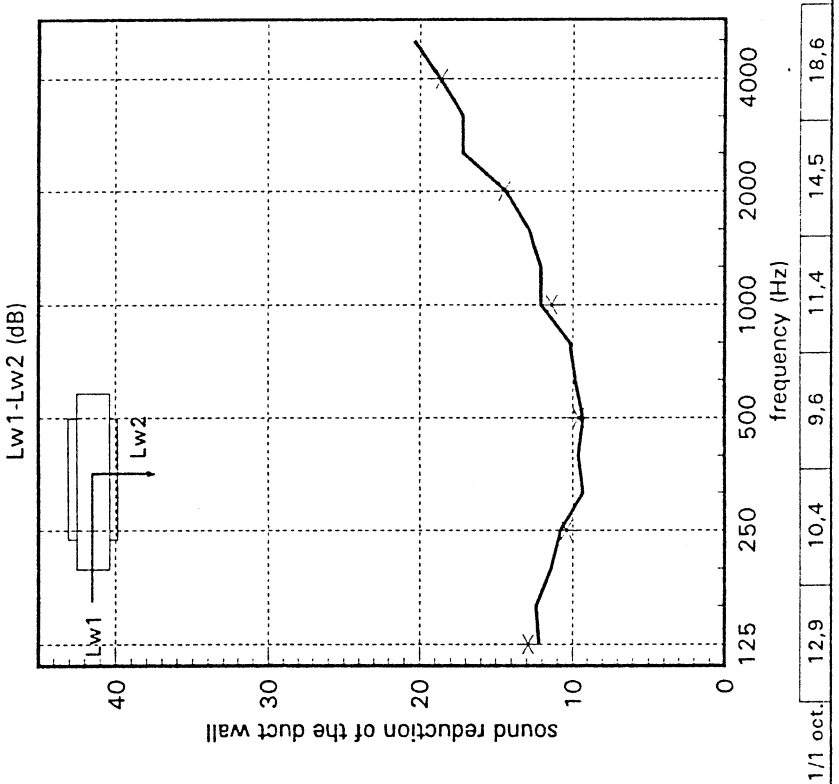
Principal: Dutch Environment Corporation B.V., The Netherlands



length: 2000 mm
diameter: 508 mm

SONODEC 25



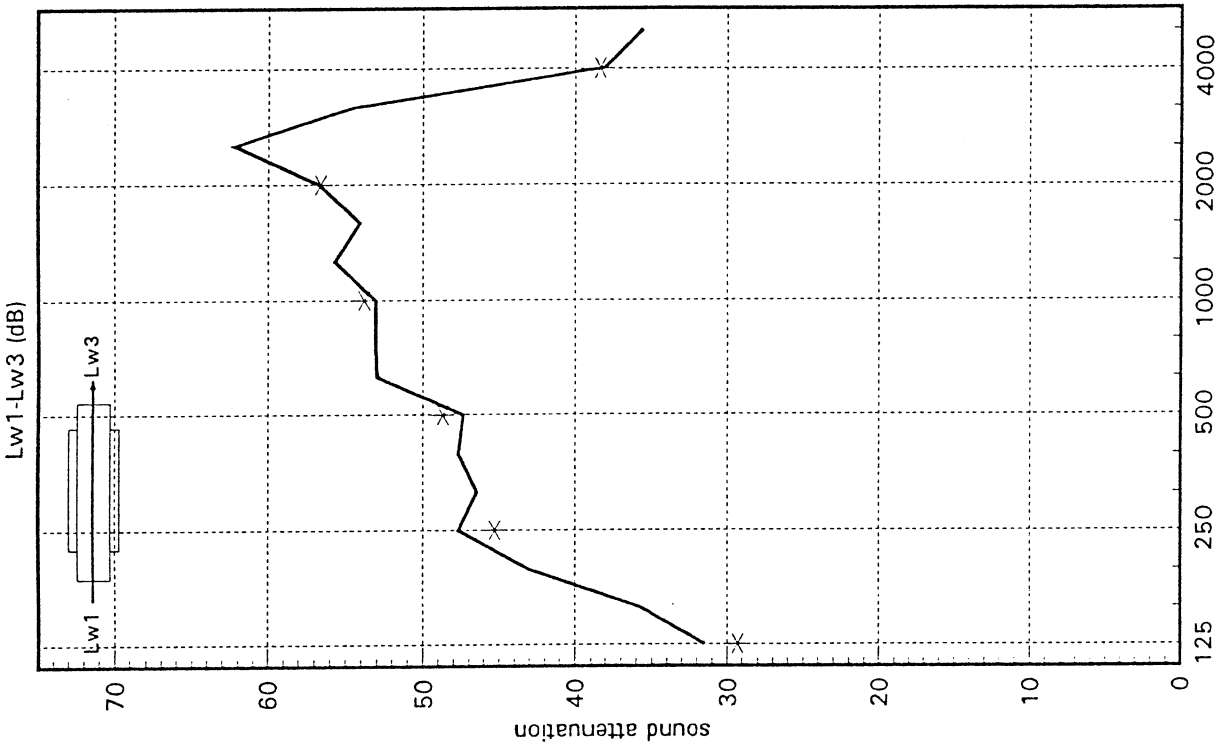


AB323E.DRW

Nijmegen, january 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

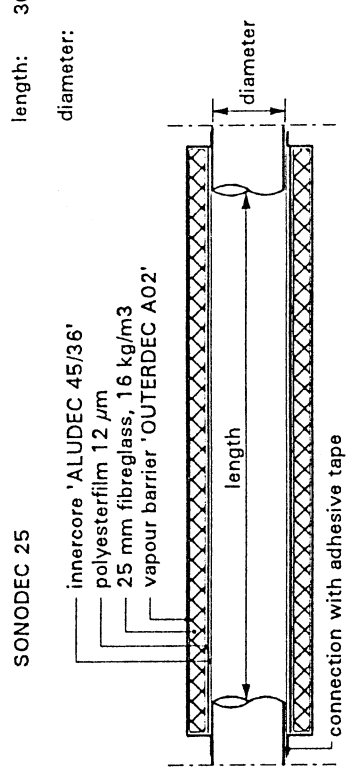
Principal: Dutch Environment Corporation B.V., The Netherlands

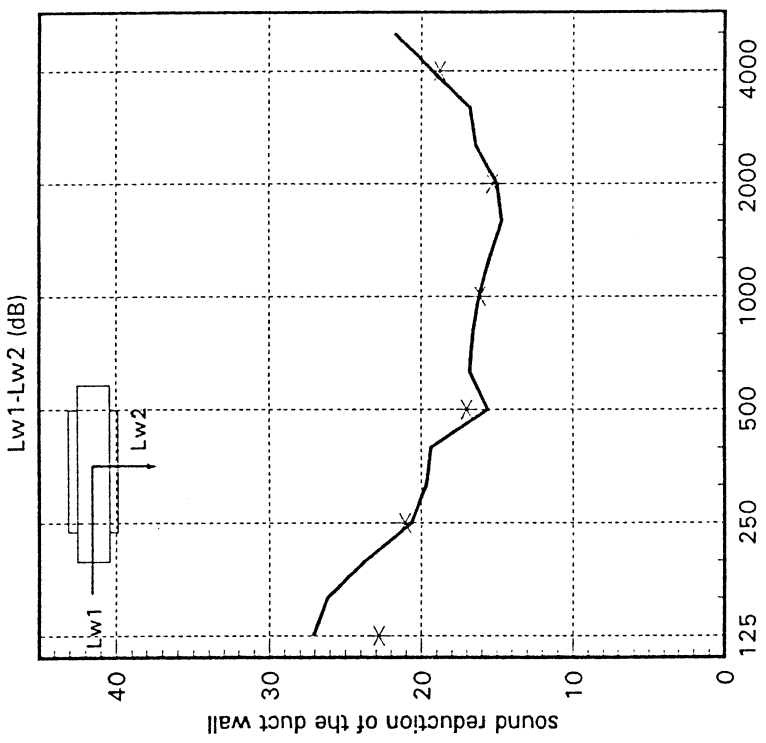


* 1/1 oct.	29,3	45,3	48,7	53,8	56,6	38,4

length: 3000 mm
diameter: 82 mm

SONODEC 25





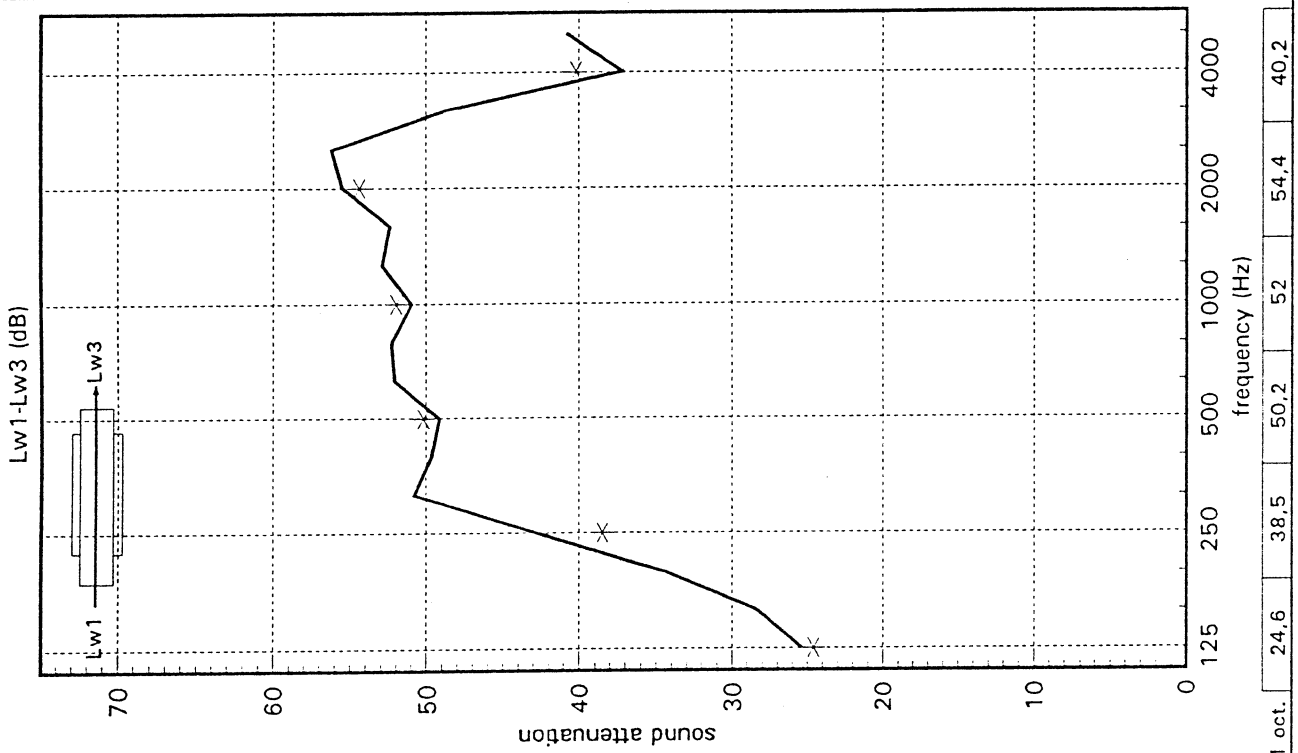
* 1/1 oct.	22,8	21,1	17	16,1	15,3	18,8

AB323E.DRW

Nijmegen, January 2, 1992

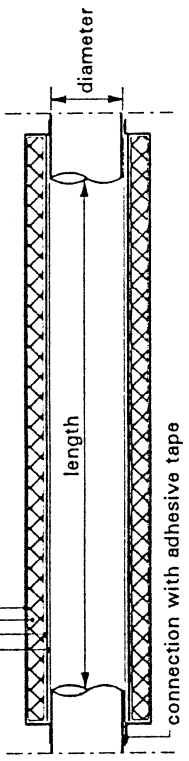
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7234 (1986)

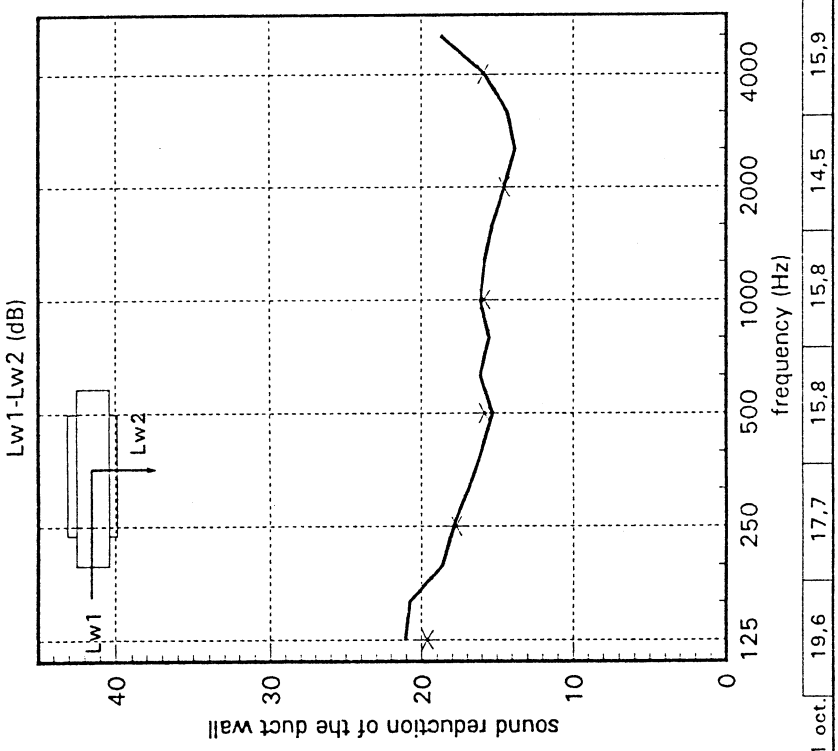
Principal: Dutch Environment Corporation B.V., The Netherlands



length: 3000 mm
diameter: 102 mm

SONODEC 25
innercore 'ALUDEC 45/36'
polyesterfilm 12 µm
25 mm fibreglass, 16 kg/m3
vapour barrier 'OUTERDEC A02'

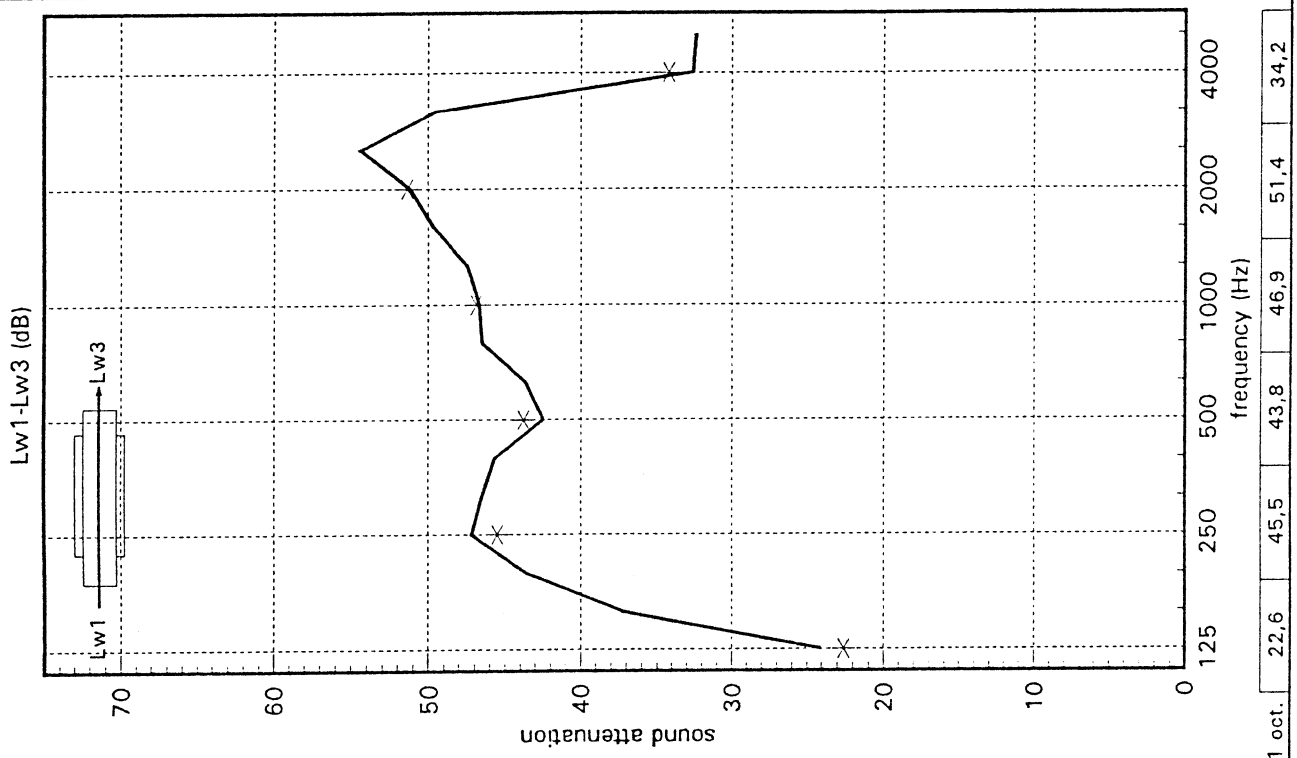




Nijmegen, January 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands

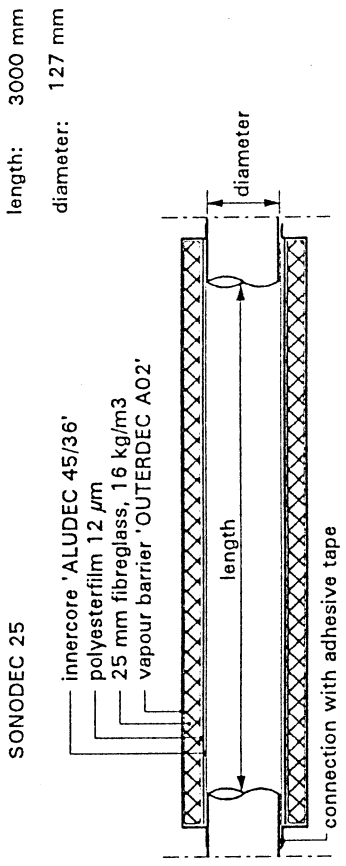


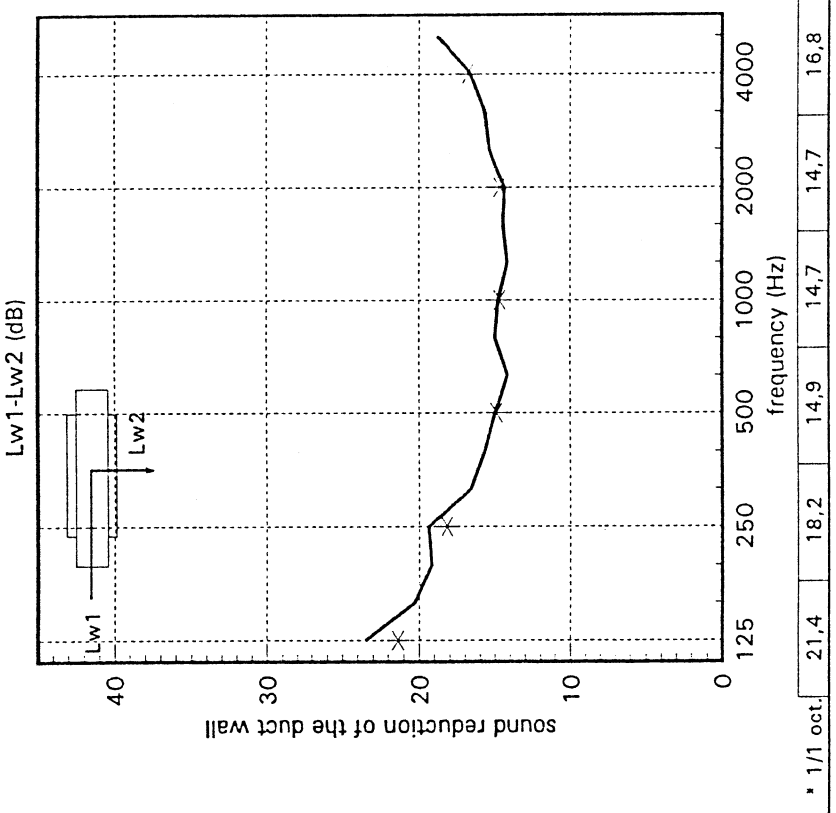
* 1/1 oct.	22,6	45,5	43,8	46,9	51,4	34,2

SONODEC 25

length: 3000 mm

diameter: 127 mm





* 1/1 oct.	21,4	18,2	14,9	14,7	14,7	16,8

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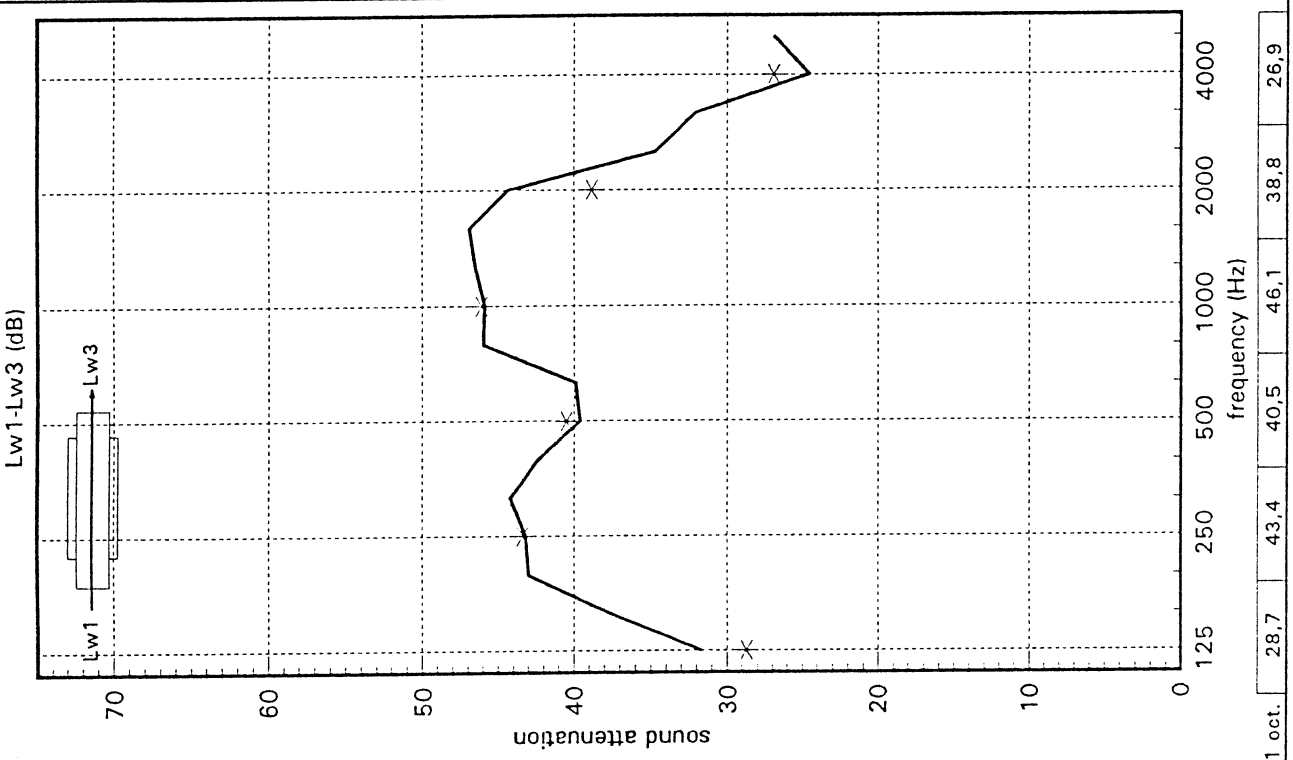
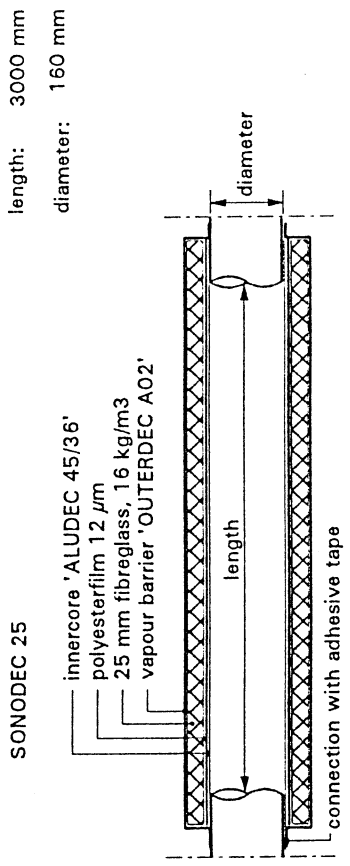
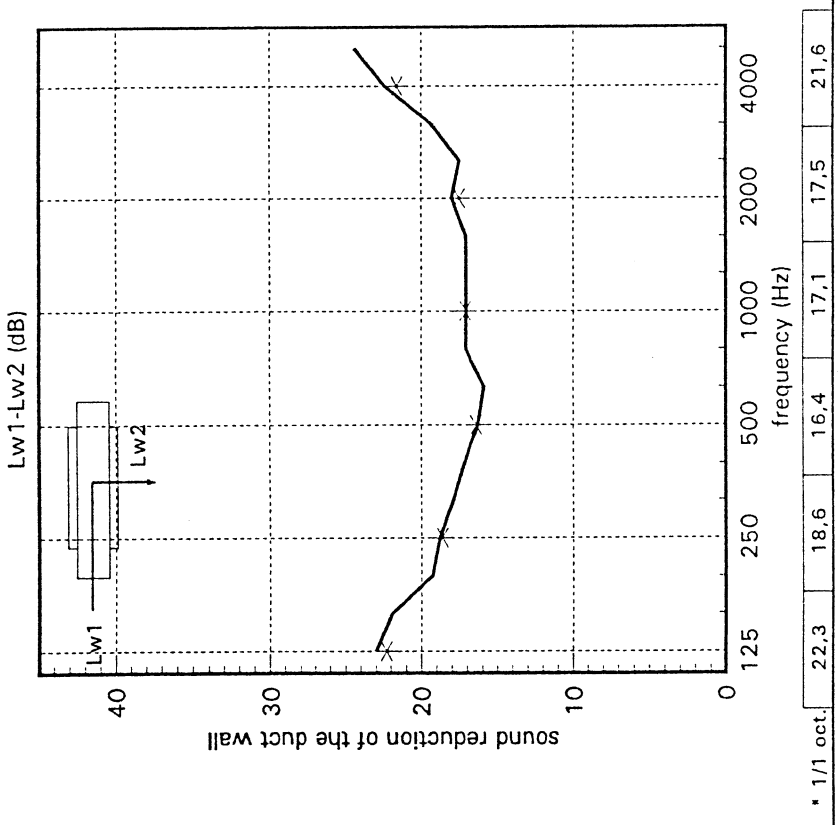
Nijmegen, january 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands





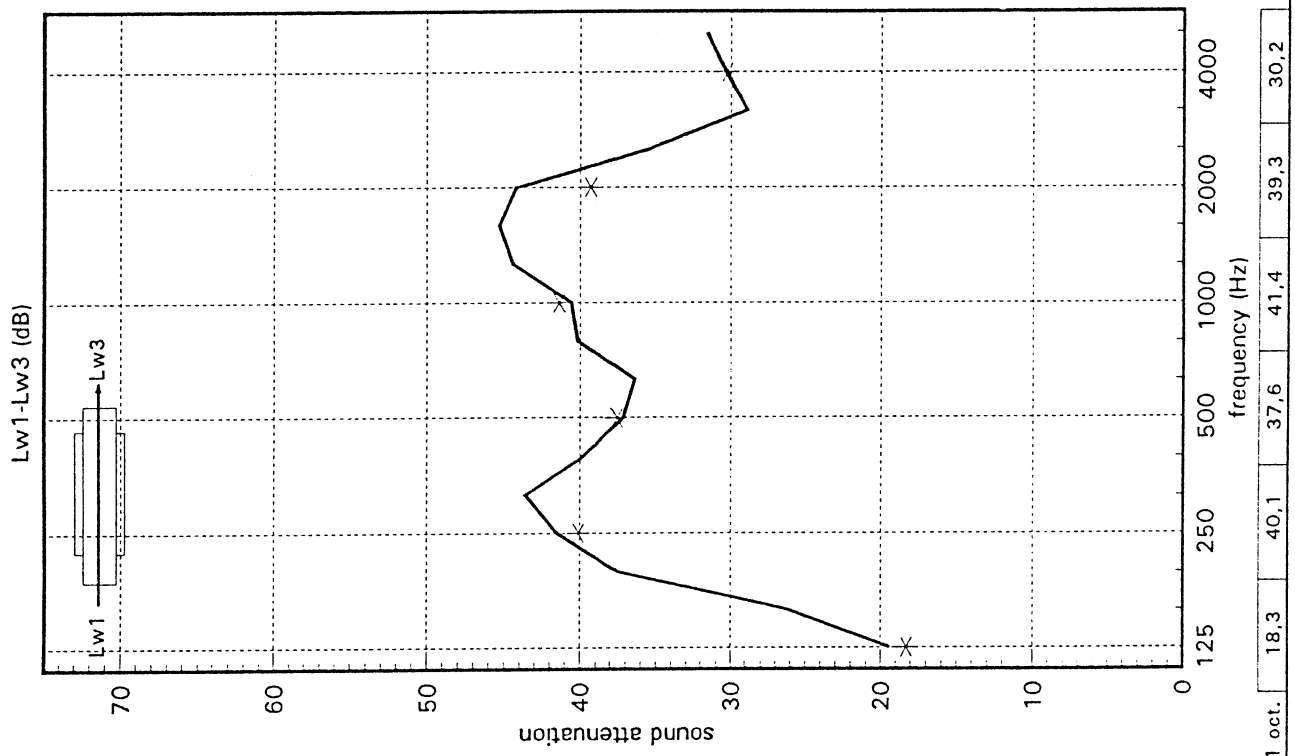


Nijmegen, January 2, 1992

AB323E.DRW

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

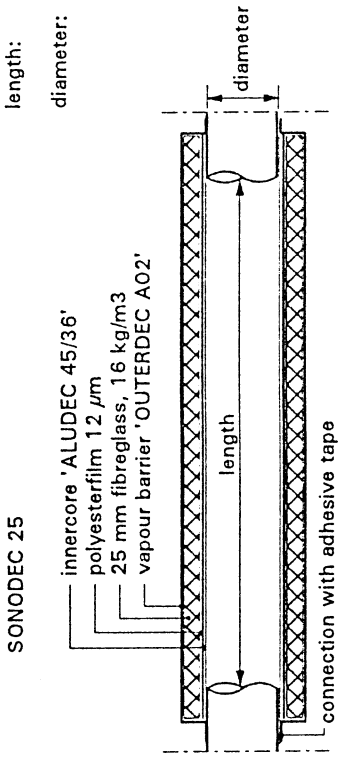
Principal: Dutch Environment Corporation B.V., The Netherlands

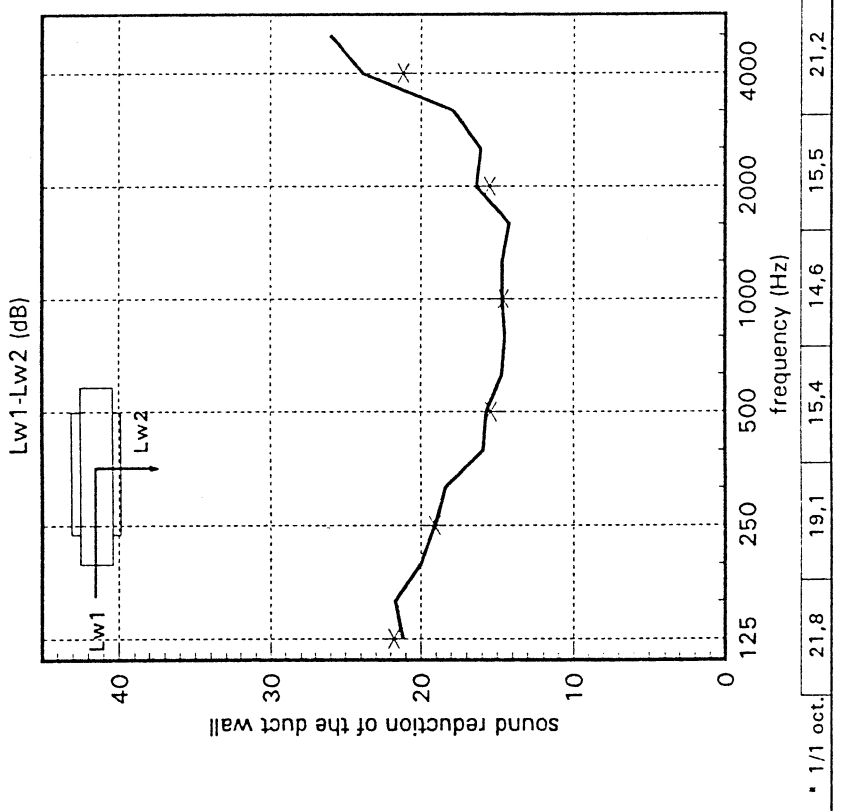


1/1 oct.	18,3	40,1	37,6	41,4	39,3	30,2

length: 3000 mm
diameter: 203 mm

SONODEC 25





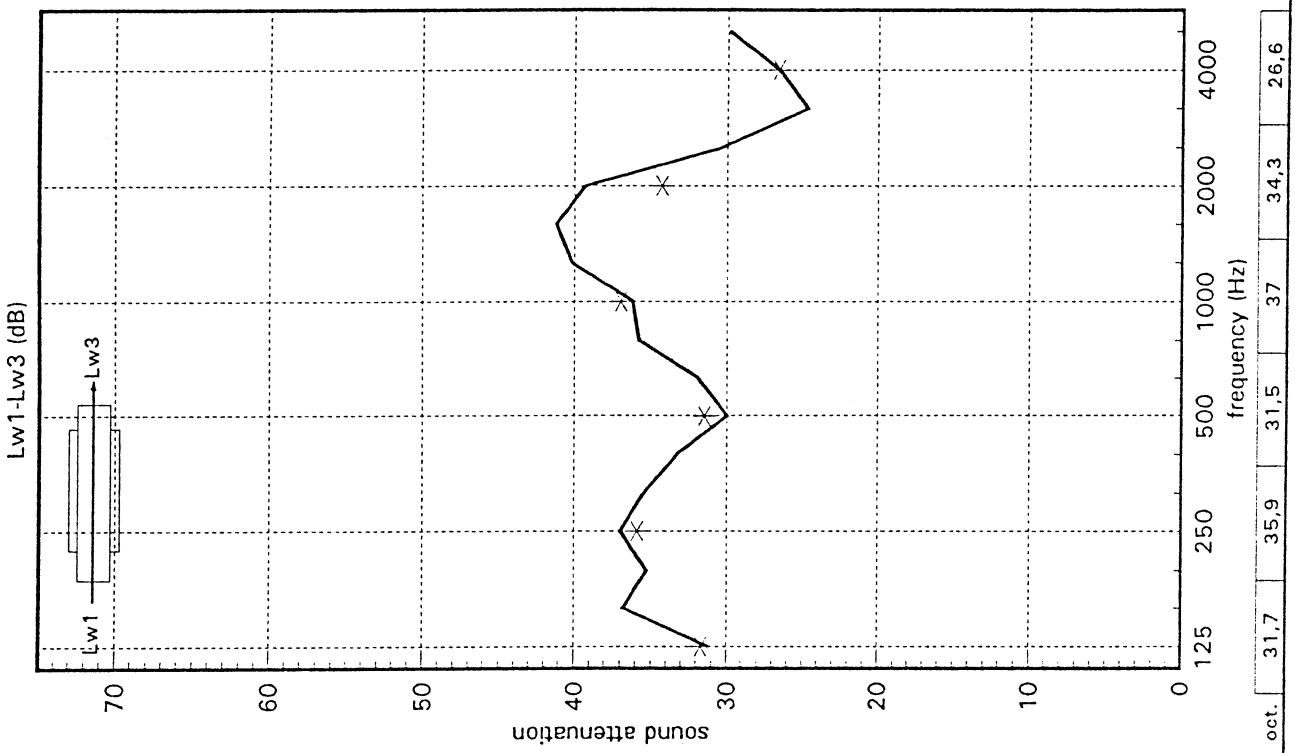
1/1 oct.	21,8	19,1	15,4	14,6	15,5	21,2

AB323E.DRW

Nijmegen, january 2, 1992

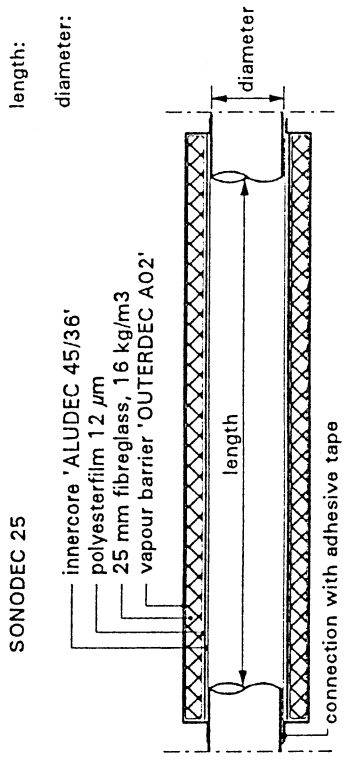
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

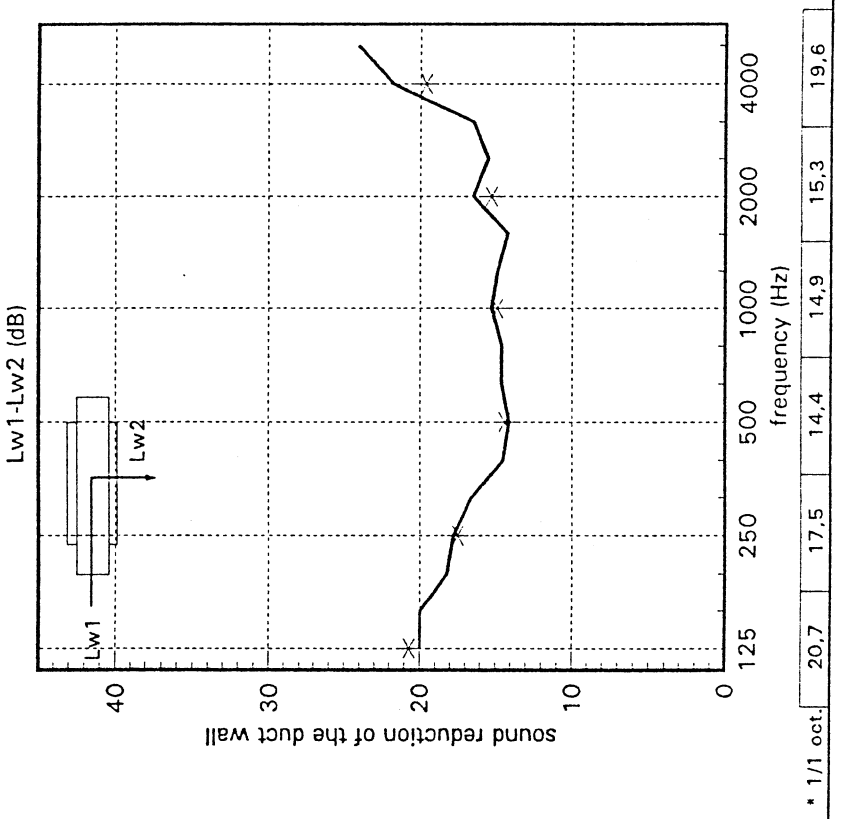
Principal: Dutch Environment Corporation B.V., The Netherlands



length: 3000 mm
diameter: 254 mm

SONODEC 25



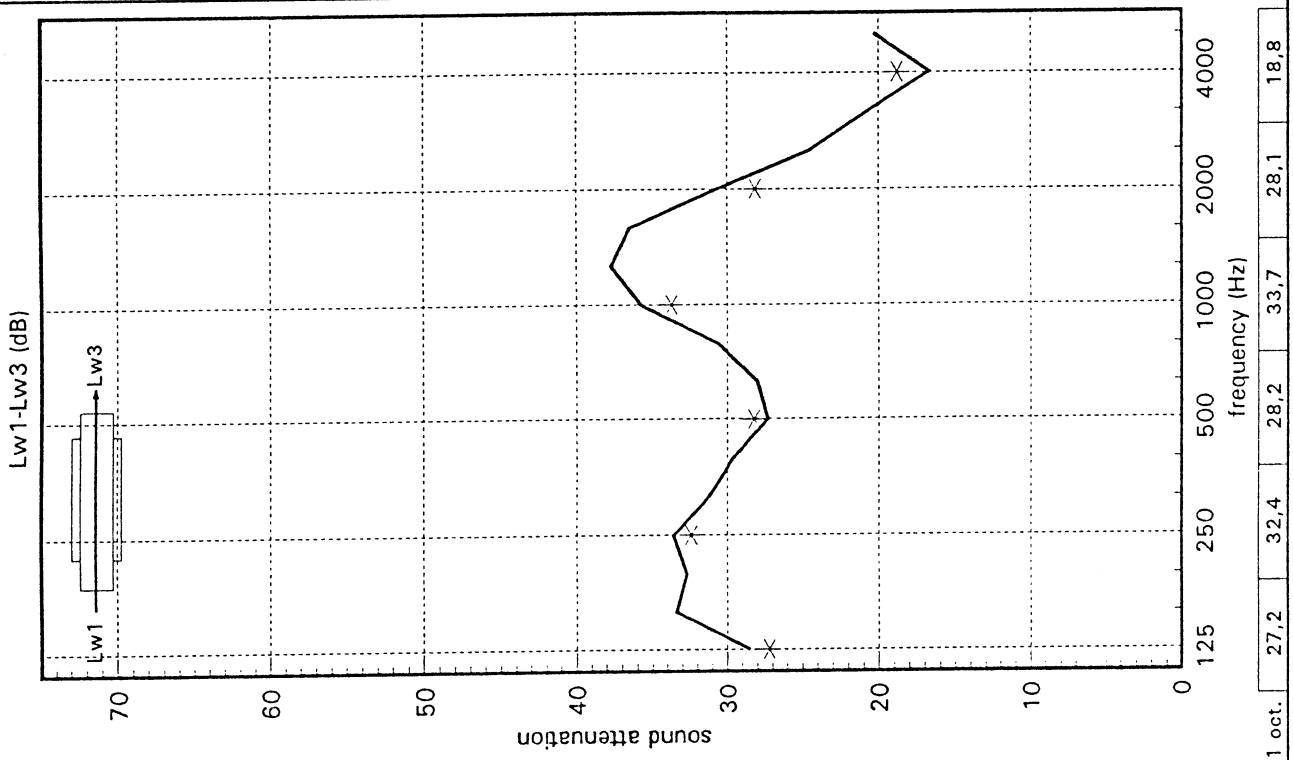


Nijmegen, january 2, 1992

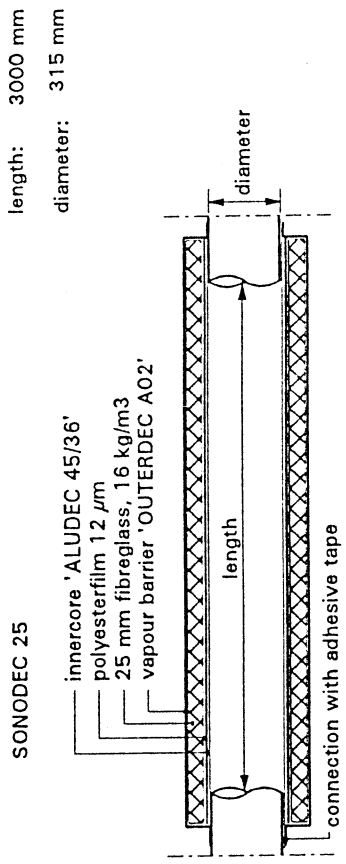
AB323E.DRW

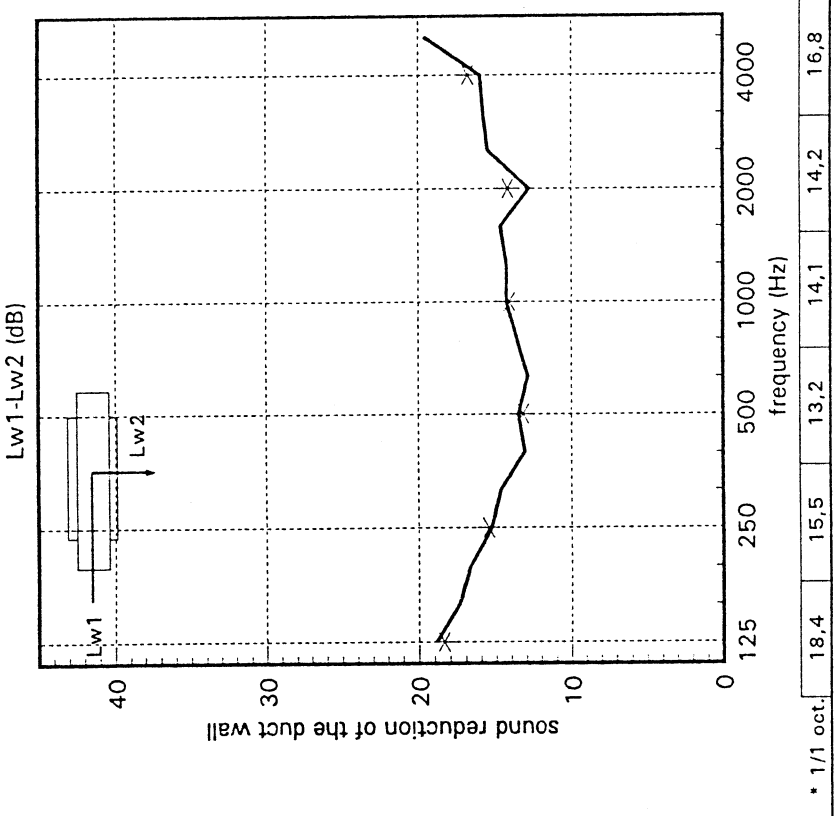
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



* 1/1 oct.	27,2	32,4	28,2	33,7	28,1	18,8



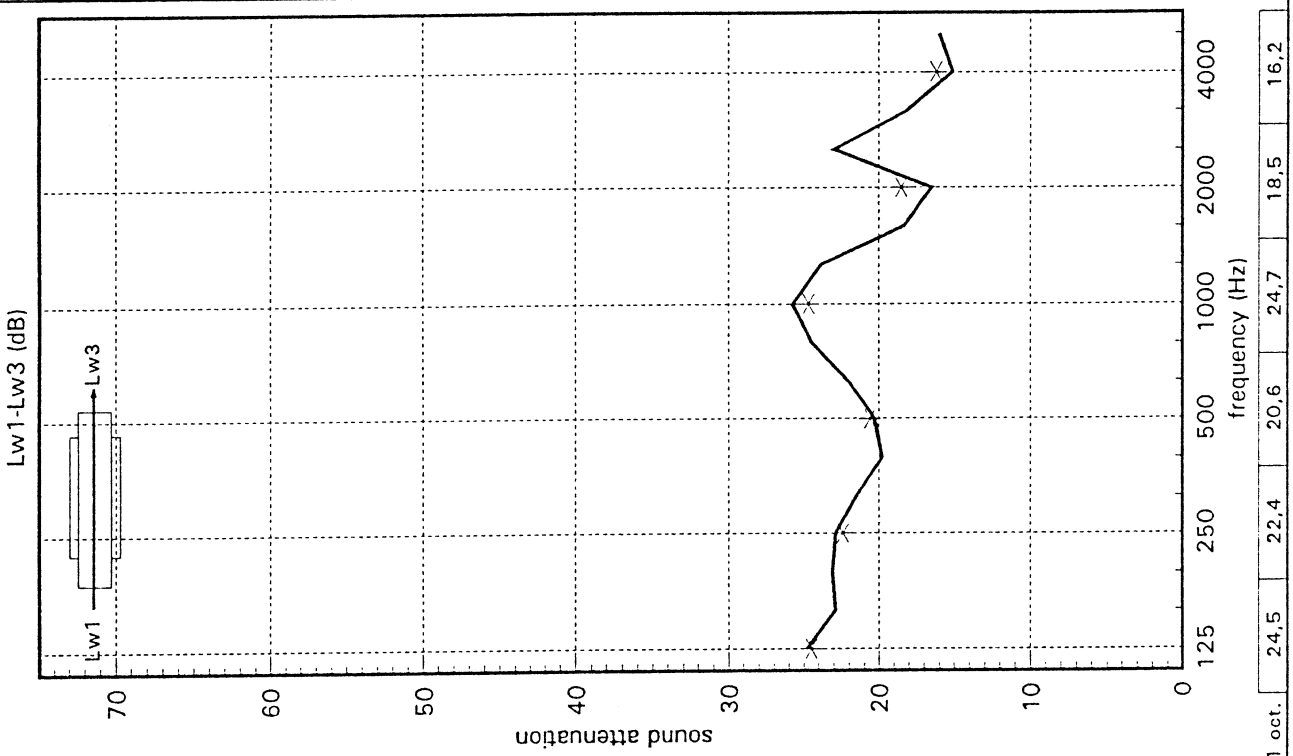


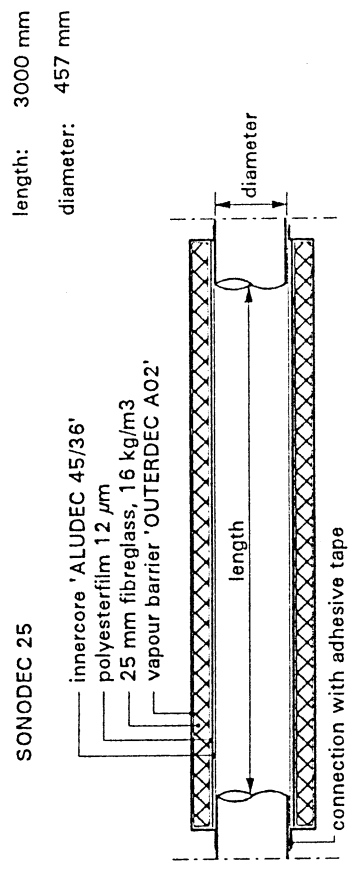
* 1/1 oct.	18,4	15,5	13,2	14,1	14,2	16,8

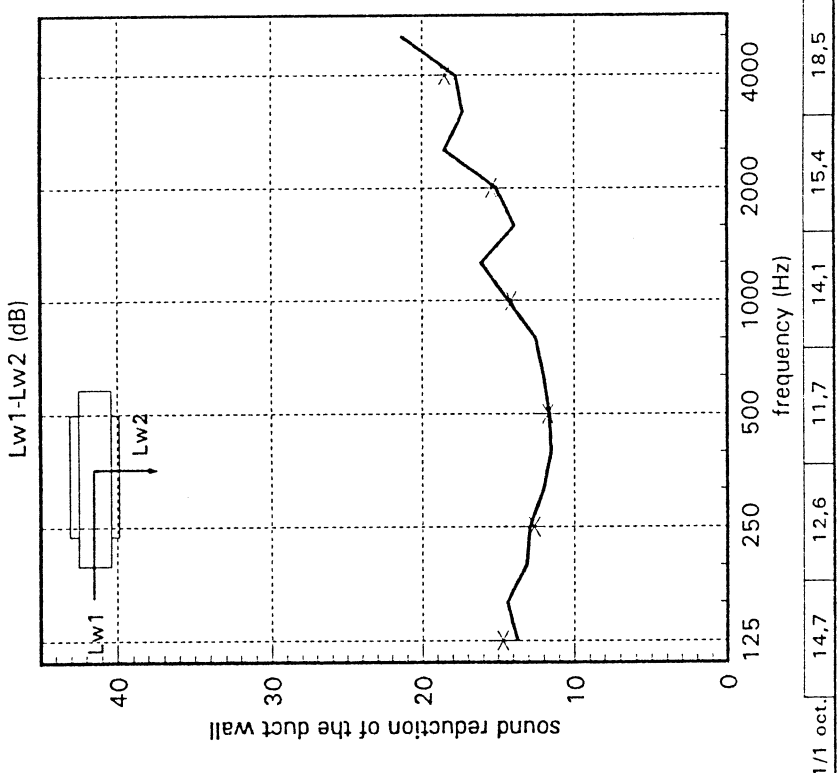
Nijmegen, January 2, 1992

SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands





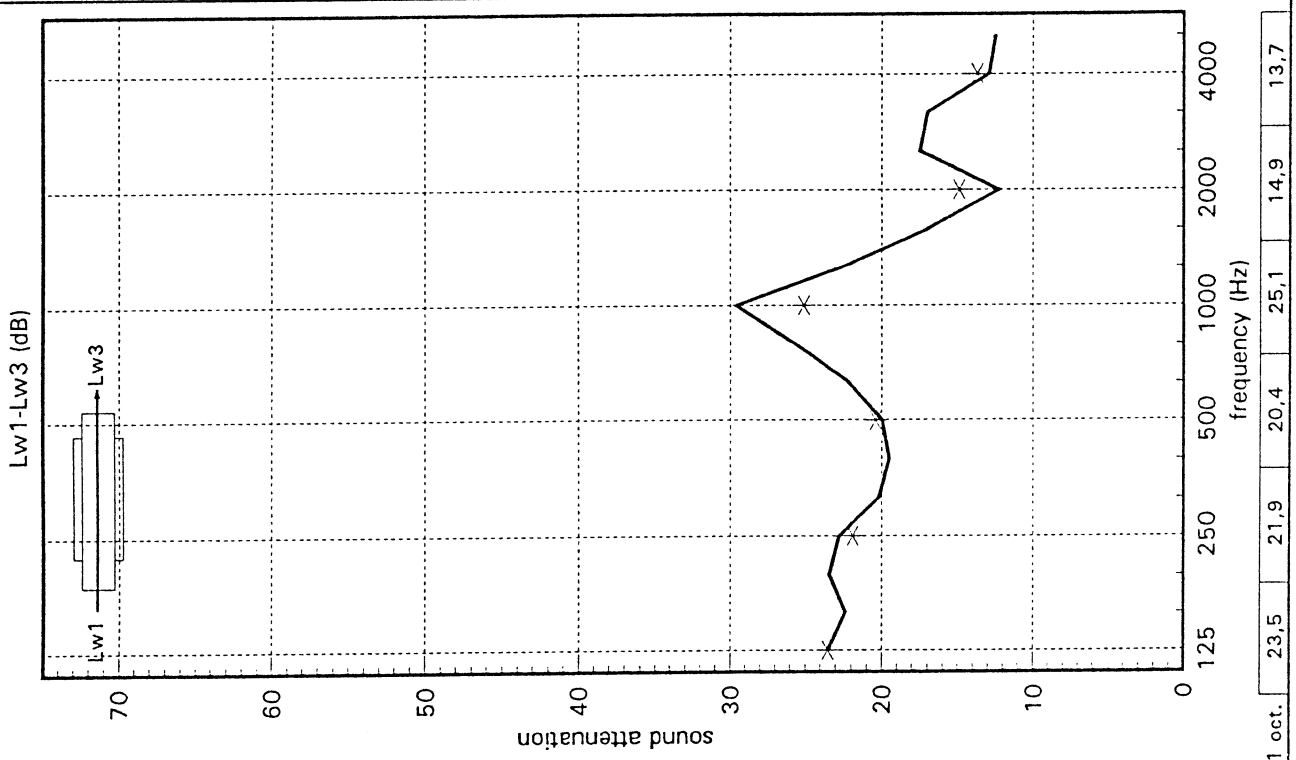


Nijmegen, January 2, 1992

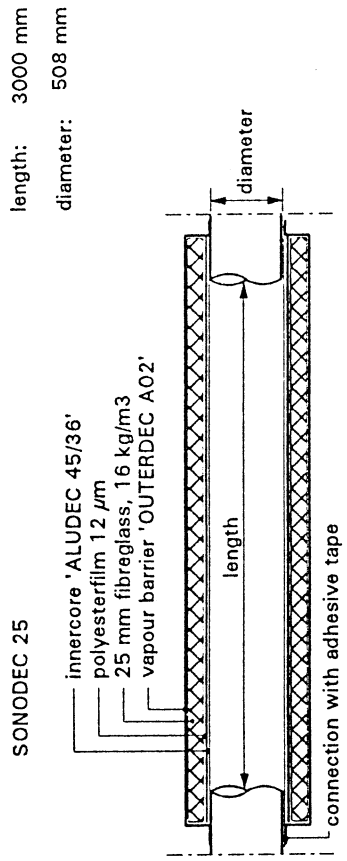
AB323E.DRW

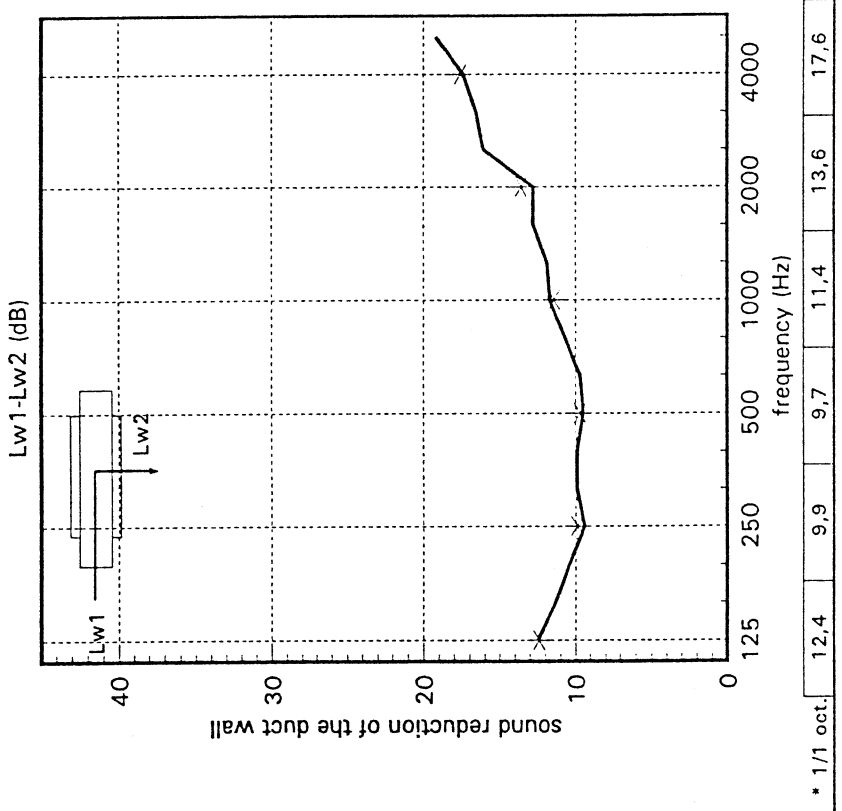
SOUND MEASUREMENTS OF INSULATED AIR DUCTING according to ISO/DIS 7235 (1986)

Principal: Dutch Environment Corporation B.V., The Netherlands



* 1/1 oct.	23,5	21,9	20,4	25,1	14,9	13,7





* 1/1 oct.	12,4	9,9	9,7	11,4	13,6	17,6

Nijmegen, january 2, 1992

AB323E.DRW

Table IIa: measuring results of SONODEC 25 ACOUSTICALLY INSULATED FLEXIBLE DUCTING, length 2000 mm

	SOUND REDUCTION OF THE DUCT WALL [dB]																	
diameter [mm]	82		102		127		160		203		254		315		457		508	
figure >	11		12		13		14		15		16		17		18		19	
Frequency (Hz)	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
100	17.1		16.0		19.8		20.6		20.5		23.1		17.1		14.9		14.5	
125	23.3	20.4	23.2	19.3	24.6	21.6	23.0	21.6	21.2	20.3	20.3	21.3	18.5	17.2	14.9	14.4	12.2	12.9
160	25.4		22.7		21.6		21.6		19.5		20.9		16.3		13.6		12.4	
200	23.8		21.1		20.1		19.6		16.5		18.8		14.5		13.0		11.4	
250	21.8	21.6	21.1	21.1	20.4	18.8	19.1	18.2	15.7	15.9	18.0	18.1	14.1	14.1	11.7	12.2	10.8	10.4
315	20.1		21.1		16.9		16.5		15.6		17.7		13.8		12.1		9.3	
400	18.2		20.2		16.8		15.5		14.4		16.7		13.3		11.4		9.6	
500	16.1	17.3	18.5	19.1	15.8	16.2	14.0	14.4	13.4	13.7	15.9	16.3	12.4	12.8	11.0	11.3	9.3	9.6
630	17.8		18.7		16.1		14.0		13.4		16.3		12.7		11.4		9.8	
800	16.9		17.4		16.9		14.8		13.6		16.2		13.1		11.8		10.2	
1000	16.5	16.4	17.5	17.1	16.3	16.3	14.6	14.6	13.8	13.8	16.2	16.0	13.9	13.6	13.2	13.1	12.1	11.4
1250	15.9		16.5		15.8		14.5		14.1		15.7		13.9		14.8		12.1	
1600	16.6		15.7		15.5		15.0		12.9		15.5		14.3		12.5		12.9	
2000	16.9	17.0	16.1	15.9	14.6	15.1	16.3	16.0	15.4	14.4	18.1	16.9	13.4	14.2	15.4	14.9	14.4	14.5
2500	17.7		16.0		15.2		16.9		15.4		17.7		15.1		19.0		17.2	
3150	17.9		16.7		15.3		19.1		16.6		18.3		15.6		17.7		17.2	
4000	19.8	19.5	19.2	18.6	16.4	16.3	21.4	20.9	22.8	19.9	24.2	21.5	16.0	16.8	18.6	19.2	18.7	18.6
5000	21.7		21.0		17.6		23.3		24.4		26.0		19.7		22.9		20.4	

Table IIIa: measuring results of SONODEC 25 ACOUSTICALLY INSULATED FLEXIBLE DUCTING, length 3000 mm

	SOUND REDUCTION OF THE DUCT WALL [dB]																	
diameter [mm]	82		102		127		160		203		254		315		457		508	
figure >	20		21		22		23		24		25		26		27		28	
Frequency (Hz)	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
100	19.4		17.7		21.1		22.2		22.6		22.7		19.0		16.6		13.9	
125	27.1	22.8	21.1	19.6	23.5	21.4	23.0	22.3	21.2	21.8	20.0	20.7	18.9	18.4	13.7	14.7	12.5	12.4
160	26.2		20.8		20.3		21.9		21.7		20.0		17.4		14.4		11.3	
200	23.7		18.6		19.2		19.3		20.0		18.2		16.7		13.1		10.4	
250	20.7	21.1	17.9	17.7	19.4	18.2	18.8	18.6	19.1	19.1	17.8	17.5	15.3	15.5	12.9	12.6	9.4	9.9
315	19.7		16.9		16.6		17.9		18.4		16.6		14.7		12.0		9.9	
400	19.4		16.0		15.7		17.2		15.9		14.5		13.1		11.5		9.9	
500	15.6	17.0	15.3	15.8	15.0	14.9	16.3	16.4	15.7	15.4	14.1	14.4	13.5	13.2	11.6	11.7	9.5	9.7
630	16.8		16.1		14.2		15.9		14.7		14.6		12.9		12.0		9.7	
800	16.6		15.5		15.0		17.1		14.5		14.6		13.6		12.5		10.7	
1000	16.2	16.1	16.1	15.8	14.8	14.7	17.1	17.1	14.7	14.6	15.3	14.9	14.3	14.1	14.3	14.1	11.7	11.4
1250	15.5		15.8		14.2		17.1		14.7		14.9		14.3		16.1		11.9	
1600	14.7		15.3		14.5		17.1		14.2		14.2		14.7		13.9		12.8	
2000	15.0	15.3	14.5	14.5	14.4	14.7	18.0	17.5	16.4	15.5	16.5	15.3	12.8	14.2	15.1	15.4	12.8	13.6
2500	16.4		13.8		15.4		17.5		16.1		15.5		15.5		18.5		16.1	
3150	16.8		14.3		15.7		19.4		17.9		16.5		15.8		17.3		16.6	
4000	19.3	18.8	15.8	15.9	16.6	16.8	22.4	21.6	23.9	21.2	21.8	19.6	16.0	16.8	17.8	18.5	17.4	17.6
5000	21.8		18.7		18.8		24.4		26.0		24.1		19.6		21.4		19.2	

Table Ia: measuring results of SONODEC 25 ACOUSTICALLY INSULATED FLEXIBLE DUCTING, length 1000 mm

	SOUND REDUCTION OF THE DUCT WALL [dB]																	
diameter [mm]	82		102		127		160		203		254		315		457		508	
figure >	2		3		4		5		6		7		8		9		10	
Frequency (Hz)	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.	1/3 oct.	1/1 oct.
100	15.8		18.0		20.3		21.6		20.8		22.8		20.0		14.0		14.2	
125	24.7	19.6	21.9	19.9	23.8	21.1	22.6	21.6	21.8	20.6	20.3	20.3	19.3	18.5	12.0	13.0	13.3	13.4
160	25.1		20.7		20.2		20.9		19.4		18.8		16.9		13.1		12.7	
200	23.4		19.2		19.0		19.3		17.7		16.7		14.7		11.3		10.8	
250	22.8	22.2	19.0	18.7	18.8	18.5	19.3	18.5	16.8	16.8	16.8	16.6	14.5	14.2	10.9	10.9	10.8	11.0
315	20.8		17.9		17.7		17.2		16.0		16.2		13.4		10.6		11.3	
400	19.4		18.1		17.8		16.4		15.9		15.6		13.9		10.6		10.8	
500	16.9	18.2	16.4	17.0	17.1	17.3	15.5	15.8	14.2	15.0	14.4	14.8	12.9	13.2	9.6	10.1	10.3	10.6
630	18.8		16.6		17.0		15.6		15.0		14.6		13.0		10.3		10.7	
800	17.2		14.9		17.6		16.7		15.1		15.0		13.0		10.4		10.9	
1000	16.4	16.6	15.6	15.2	17.7	17.6	17.0	16.8	14.8	15.1	15.1	15.1	13.5	13.4	11.8	11.6	11.0	11.0
1250	16.2		15.1		17.4		16.7		15.5		15.1		13.8		12.8		11.1	
1600	16.3		14.4		17.5		17.1		14.6		14.6		14.7		12.6		12.1	
2000	17.0	17.1	14.1	14.2	17.5	17.1	19.1	18.2	16.4	15.7	16.9	15.9	13.9	14.9	15.4	14.8	14.0	13.5
2500	18.1		14.2		16.3		18.7		16.5		16.6		16.3		18.2		14.8	
3150	18.2		15.4		16.3		20.5		18.1		18.1		16.2		18.0		14.9	
4000	20.1	19.9	17.2	17.0	17.5	17.4	23.2	22.4	23.4	21.1	23.4	21.2	18.6	18.3	18.9	19.4	18.2	17.4
5000	22.3		19.4		18.8		24.4		25.2		25.4		21.9		22.7		21.8	