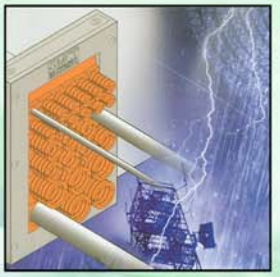
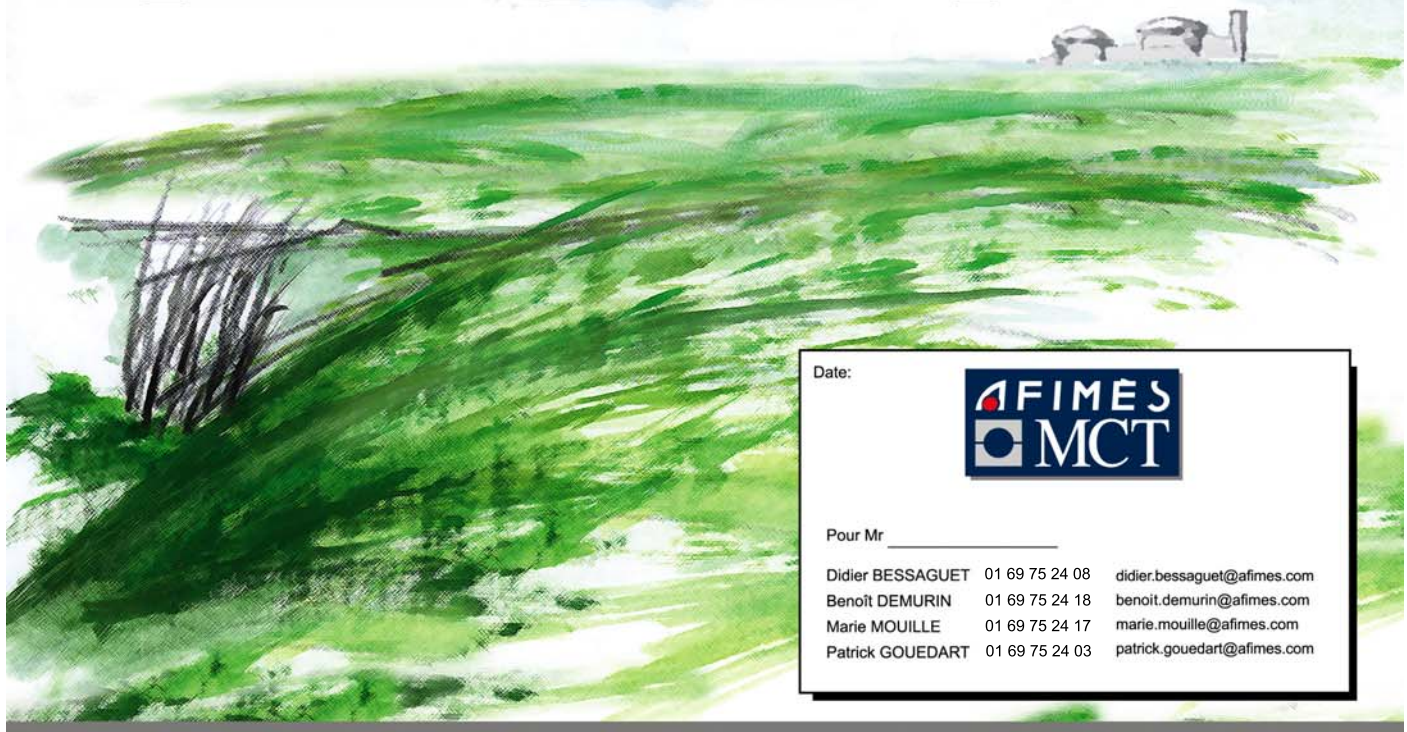
MCT Brattberg™

Système sécurisé de passage de câbles et canalisations



- Coupe-feu
- Étanchéité à l'eau, aux gaz et à l'air
- Résistance à la pression
- Résistance aux produits chimiques
- Résistance aux explosions (Ex)
- Isolation phonique
- Résistance aux vibrations, aux chocs
- Résistance aux rongeurs
- CEM
- Résistance aux radiations
- Classements Marine MED - A & H
- Résistance au froid



Date:

AFIMES MCT

Pour Mr _____

Didier BESSAGUET	01 69 75 24 08	didier.bessaguet@afimes.com
Benoît DEMURIN	01 69 75 24 18	benoit.demurin@afimes.com
Marie MOUILLE	01 69 75 24 17	marie.mouille@afimes.com
Patrick GOUEDART	01 69 75 24 03	patrick.gouedart@afimes.com

AFIMES

ZA Les Godets
12 bis rue des Petits Ruisseaux
91370 Verrières le Buisson

Tél.: +33 (0)169 752 400 - Fax : +33 (0) 169 752 401
eMail: mct@afimes.com
http://www.afimes.com

Test Report No. L/2164
for
Lycab Ltd
Station Road
Facit Whitworth
Nr Rochdale
Lancashire
OL12 8LN

Dated : 31 January 1992

LABORATORY MEASUREMENT OF THE SOUND REDUCTION INDEX OF BRATTBERG M.C.T. 2000 CABLE TRANSIT SYSTEMS

Duxons Turn
Maylands Avenue
Hemel Hempstead
Hertfordshire
HP2 4SB
Telephone: (STD 0442) 247146/9

LABORATORY MEASUREMENT OF THE SOUND REDUCTION INDEX OF BRATTBERG M.C.T. 2000 CABLE TRANSIT SYSTEMS

1. INTRODUCTION

Sound Reduction Index measurements were conducted at the AIRO Acoustics Laboratory at Hemel Hempstead, Herts., in accordance with the British Standard BS 2750:1980 (ref 1). A single figure rating of sound insulation performance, known as the Weighted Sound Reduction Index (Rw), is also derived from these measurements in accordance with the British Standard BS 5821:1984 (ref 2).

The tests to which this report relates were performed during the period 31 December 1991 to 16 January 1992.

AIRO is accredited as a NAMAS TESTING Laboratory No 0483 and measurements of sound reduction index to the above standards are listed within our scope of accreditation.

2. METHOD OF MEASUREMENT TO BS 2750:PART 3:1980

The insulation of a specimen against airborne sound is measured under reverberant sound conditions in which sound is incident on one side of the specimen from all directions.

The test specimen is erected in an aperture of approximately 9 square metres between two reverberant chambers, both constructed of 215 mm brick with reinforced concrete floors and ceilings. The smaller of the two chambers, in which the sound is produced, has a volume of about 100 cubic metres. The larger chamber, used as the receiving chamber, has a volume of about 210 cubic metres and rests on resilient mountings to give a good acoustic isolation from the source chamber and the building exterior. To improve the diffusion of the sound fields, both chambers are irregularly shaped and also several reflecting diffuser panels are suspended within the chambers.

A source of steady, continuous spectrum sound is used to drive a loudspeaker situated in the source chamber, and measurements of the sound levels are made in both chambers at one-third octave intervals in the range 100 to 3150 Hz (as prescribed in BS 2750:Part 3:1980). In each chamber several different microphone positions, randomly spaced, are used to obtain a good average of the sound pressure level in each room in accordance with the repeatability requirements set down in BS 2750:Part 2:1980.

Where the test specimen is intended to be openable then the Standard requires that this shall be done at least ten times immediately prior to testing.

4.3 Test Results

One-Third Octave Band Frequency	Sound Reduction Index, R (dB) Test 1	Test 2	Test 3
100	35.6	37.0	37.1
125	36.0	36.8	37.1
160	42.8	42.1	42.2
200	40.3	40.5	42.8
250	42.5	42.2	44.4
315	46.2	46.7	45.3
400	46.2	46.6	46.2
500	51.4	51.2	50.6
630	52.7	53.9	53.3
800	53.4	55.3	55.0
1000	56.9	57.4	57.8
1250	58.2	58.9	58.7
1600	59.9	60.3	60.4
2000	62.5	62.9	62.4
2500	64.2	65.0	64.6
3150	66.6	67.4	67.2
Weighted Sound Reduction Index, R_w (BS 5821:Part 1:1984)	54	54	55
Average Sound Reduction Index (100 Hz - 3150 Hz)	51.0	51.5	51.6

4. TEST SPECIMEN AND MOUNTING CONDITIONS

4.1 Test Object : Brattberg M.C.T. 2000 Transfer System Type RGB 6x2

Test Nos. L/2164/1 to 3

4.2 Description of Specimen

The descriptions of the test specimens are as follows:

Test 1 : Brattberg M.C.T. 2000 Transfer System Type RGB 6x2 without Cables

The test specimen comprised a Brattberg M.C.T. 2000 Transfer System Type RGB 6x2 pre-cast into a nominal 450 mm x 450 mm x 115 mm thick dense concrete block which was built into a brickwork wall. The 215 mm thick brickwork wall was constructed from LBC Commons laid with frogs-up in English Bond with a sand and cement mortar and filled the 2920 mm wide x 3005 mm high test aperture. The Transfer System, with overall dimensions of 372 mm x 241 mm x 60 mm deep (including steel mounting flanges), included two cable pathways each with 120 mm x 218 mm dimensions which were packed with Lycron Polymer blocks.

Test 2 : Brattberg M.C.T. 2000 Transfer System Type RGB 6x2 with Cables

The test specimen comprised a Brattberg M.C.T. 2000 Transfer System Type RGB 6x2 pre-cast into a nominal 450 mm x 450 mm x 115 mm thick dense concrete block which was built into a brickwork wall. The 215 mm thick brickwork wall was constructed from LBC Commons laid with frogs-up in English Bond with a sand and cement mortar and filled the 2920 mm wide x 3005 mm high test aperture. The Transfer System, with overall dimensions of 372 mm x 241 mm x 60 mm deep (including steel mounting flanges), included two cable pathways each with 120 mm x 218 mm dimensions. Twelve cables (four each at 12.5 mm diameter, 30 mm diameter and 46 mm diameter) passed through the Transfer System packed in Lycron Polymer blocks.

Test 3 : Brickwork Wall

The test specimen comprised a 215 mm thick brickwork wall constructed from LBC Commons laid with frogs-up in English Bond with a sand and cement mortar and filled the 2920 mm wide x 3005 mm high test aperture.

The estimated mass of the brickwork wall = 350 kg/m^2

The Transfer System was supplied by : Lycab Ltd on 26 November 1991.

The results of the Sound Reduction Index measurements are presented in the following table and graphically on Data Sheets L/2164/1/SRI to L/2164/3/SRI. Data Sheet L/2164/1/D shows a sectional drawing whilst photographs of the installed Transfer System, with and without Cables, are presented on Data Sheet L/2164/2/D.

The Sound Reduction Index (R) for the test specimen is defined as the ratio, expressed in decibels, of the sound energy incident on the specimen to that transmitted through it. This is calculated using the equation:-

$$R = L_1 - L_2 + 10 \lg \frac{S}{A} \qquad \text{dB} \qquad \text{Equation (i)}$$

where L_1 is the measured sound pressure level in the source chamber in the frequency band of interest (dB)

L_2 is the measured sound pressure level in the receiving chamber in the frequency band of interest (dB)

S is the area of the test specimen (square metres)

A is the equivalent absorption area in the receiving chamber in the frequency band of interest (square metres)

The value of 'A' is obtained by a separate measurement in accordance with International Standard ISO 354-1985 (ref 3) and evaluated using Sabine's formula:-

$$A = \frac{0.163\ V}{T} \qquad m^2 \qquad \text{Equation (ii)}$$

where V is the volume of the receiving chamber (cubic metres)

T is the reverberation time of the receiving chamber in the frequency band of interest (seconds)

When the test specimen is smaller than the test aperture, the test specimen is installed within a purpose built highly insulating partition within the test aperture.

3. PRACTICAL APPLICATION OF THE SOUND REDUCTION INDEX

It should be noted that the Sound Reduction Index is a property of the test specimen alone. When the test specimen forms part of an enclosure, the sound insulation obtained will depend on additional factors such as the relative surface areas involved and the volume of the receiving enclosure. Also, in buildings the transmission of sound via alternative paths may not be negligible in comparison with transmission through the test specimen alone, particularly when the Sound Reduction Index of the test specimen is high. Such indirect transmission of the sound would result in a lower effective insulation.

AIRO

DATA SHEET

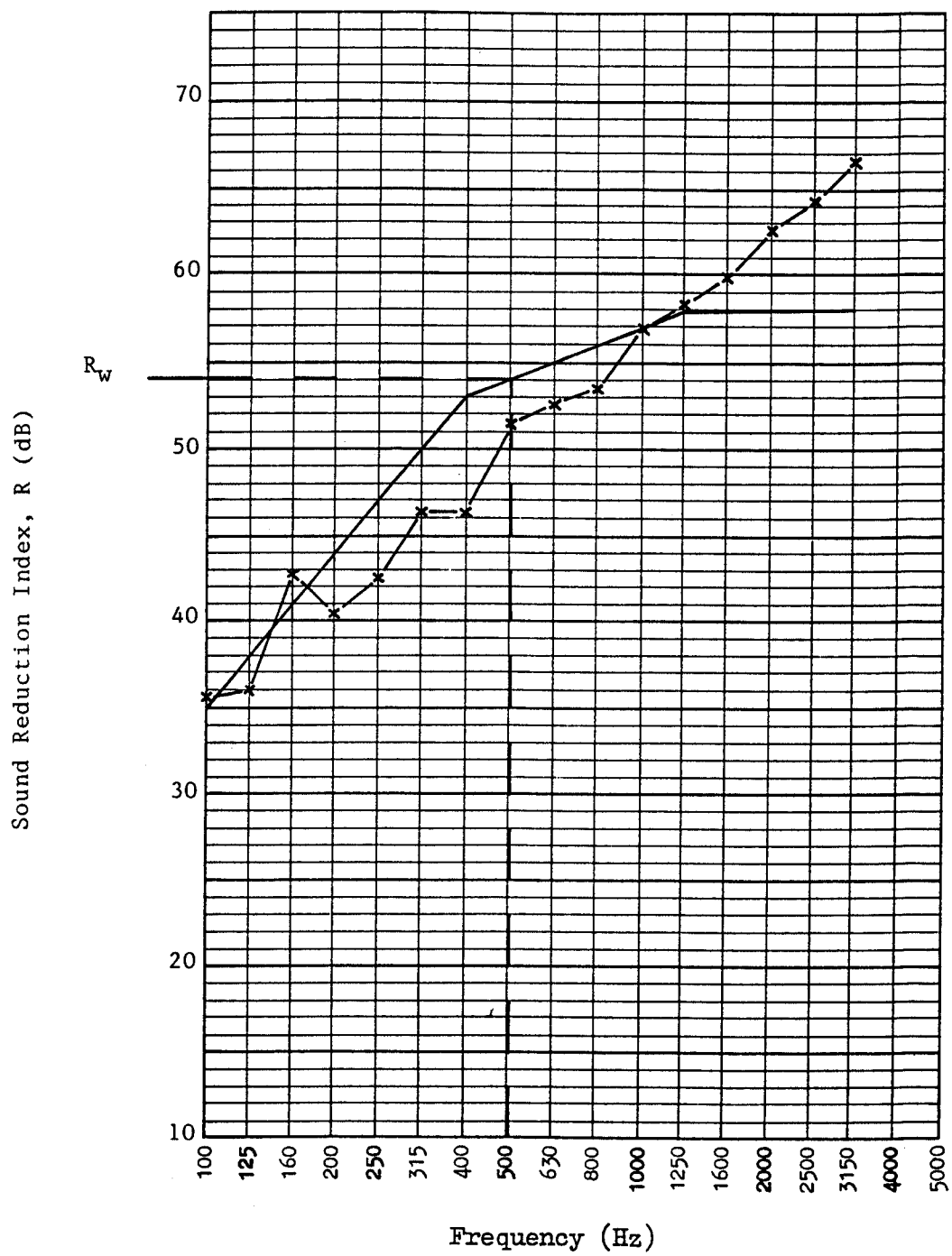
Date	No.
JANUARY 1992	L/2164/1/SRI

Client

Lycab Ltd

Laboratory Measurement of the Sound Reduction Index

Brattberg M.C.T. 2000 Transfer System Type RGB 6x2 without Cables



x——x Measured value of Sound Reduction Index, R (dB)

——— Reference curve for a Weighted S.R.I., R_w = 54 dB (BS 5821:Part 1:1984)

D2

AIRO

DATA SHEET

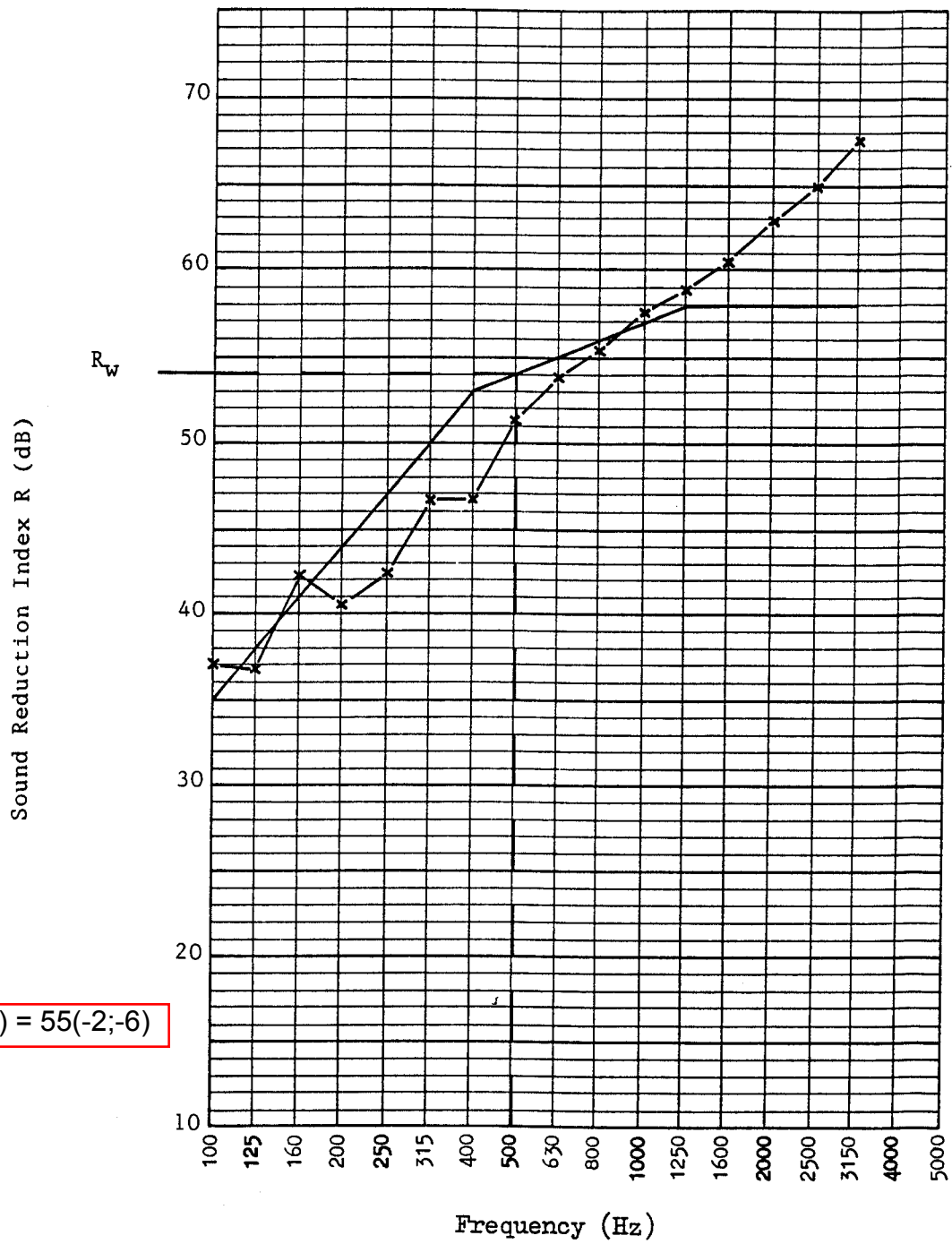
Date	No.
JANUARY 1992	L/2164/2/SRI

Client

Lycab Ltd

Laboratory Measurement of the Sound Reduction Index

Brattberg M.C.T. 2000 Transfer System Type RGB with Cables



Rw (C;Ctr) = 55(-2;-6)

×——× Measured value of Sound Reduction Index, R (dB)

——— Reference curve for a Weighted S.R.I., R_w = 54 dB (BS 5821:Part 1:1984)

D2

AIRO

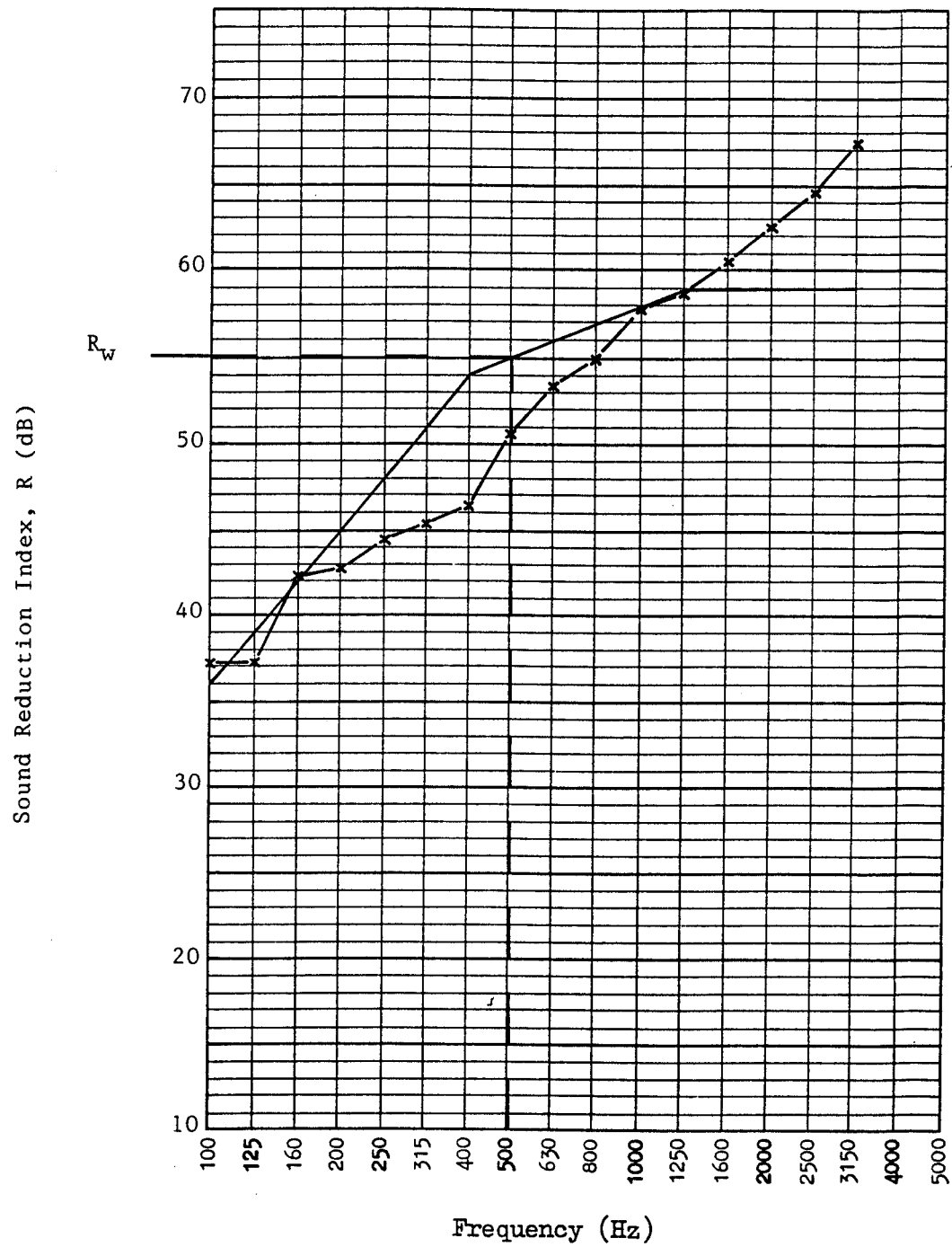
DATA SHEET

Date	No.
JANUARY 1992	L/2164/3/SRI

Client Lycab Ltd

Laboratory Measurement of the Sound Reduction Index

Brickwork Wall



x——x Measured value of Sound Reduction Index, R (dB)

——— Reference curve for a Weighted S.R.I., R_w = 55 dB (BS 5821:Part 1:1984)

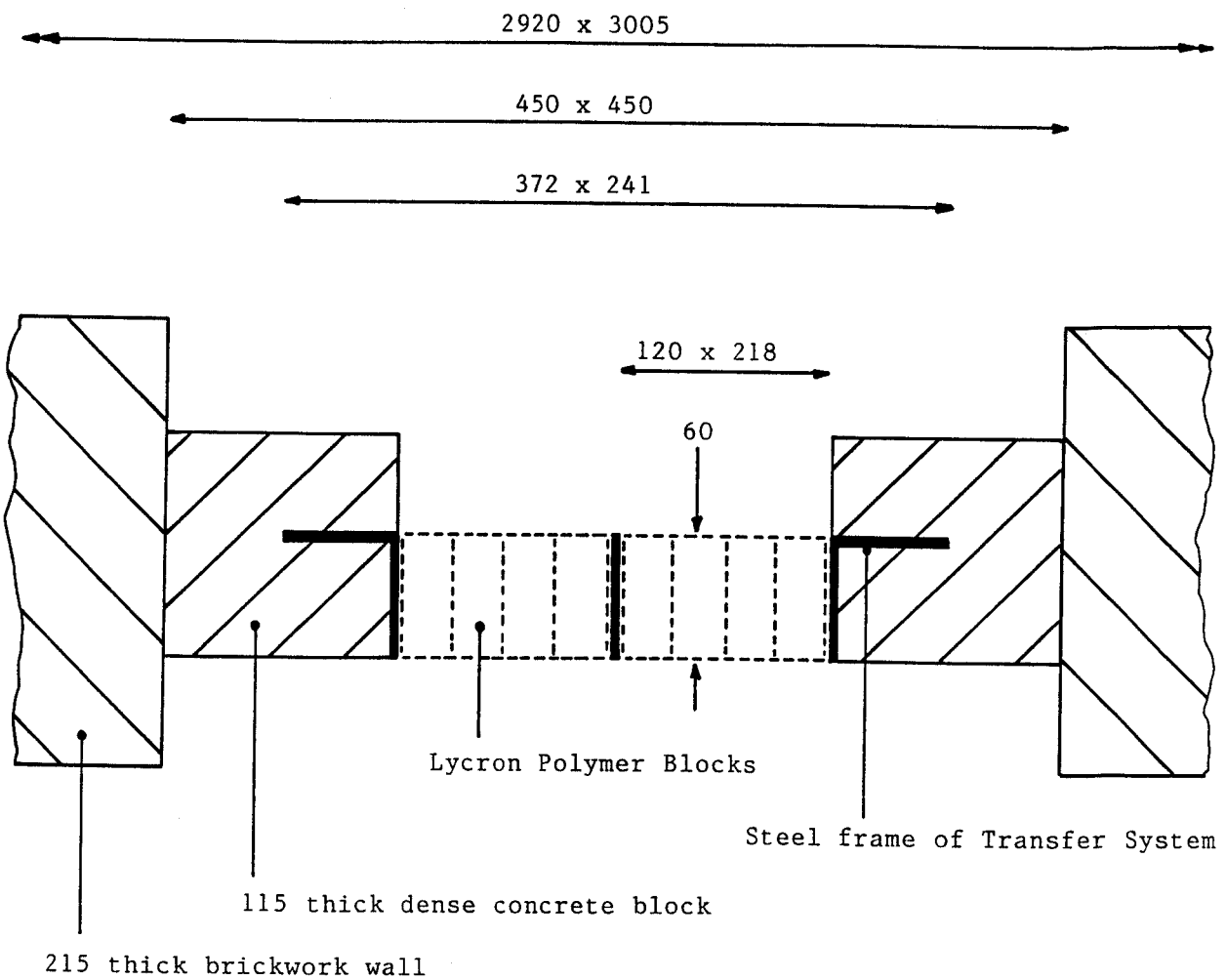
D2

AIRO	DATA SHEET	
	Date: JANUARY 1992	No.: L/2164/1/D

Client: Lycab Ltd

Sectional Drawing of Test Specimen

Brattberg M.C.T. 2000 Transfer System Type RGB 6x2



Cables not shown for clarity

Not to scale

All dimensions in mm

D1

AIRO

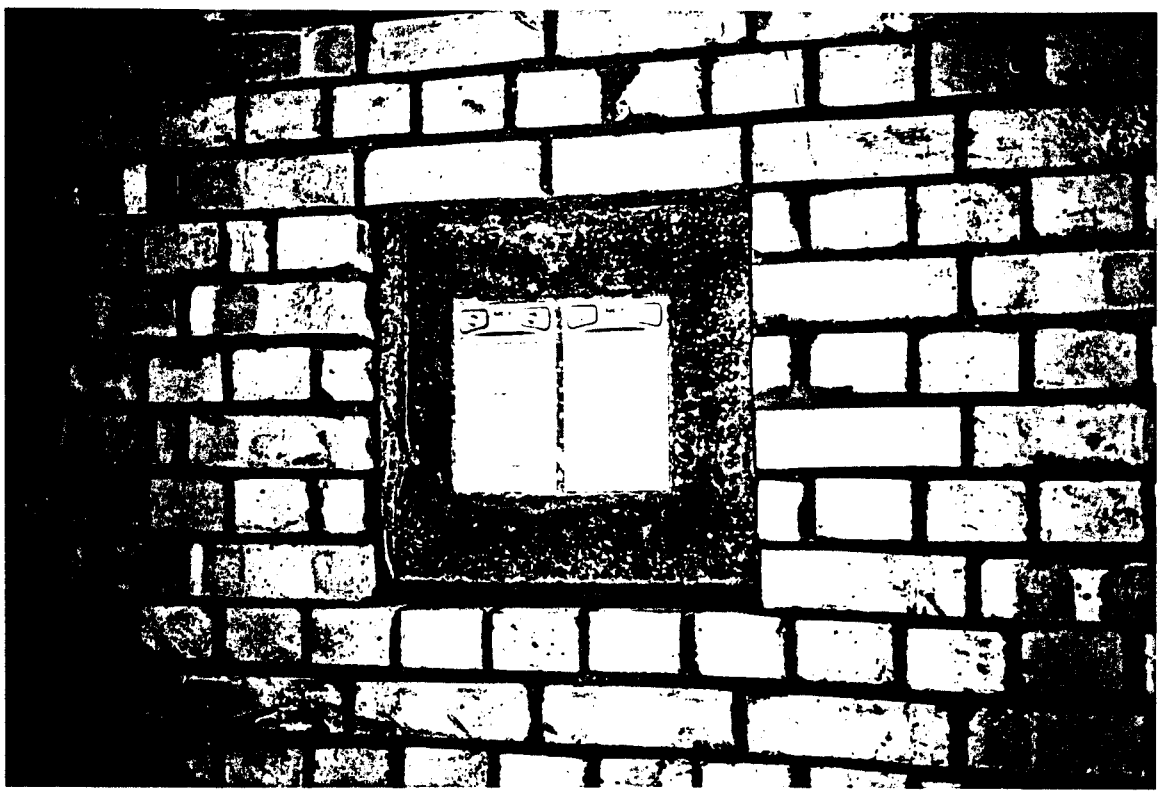
DATA SHEET

Date	No.
JANUARY 1992	L/2164/2/D

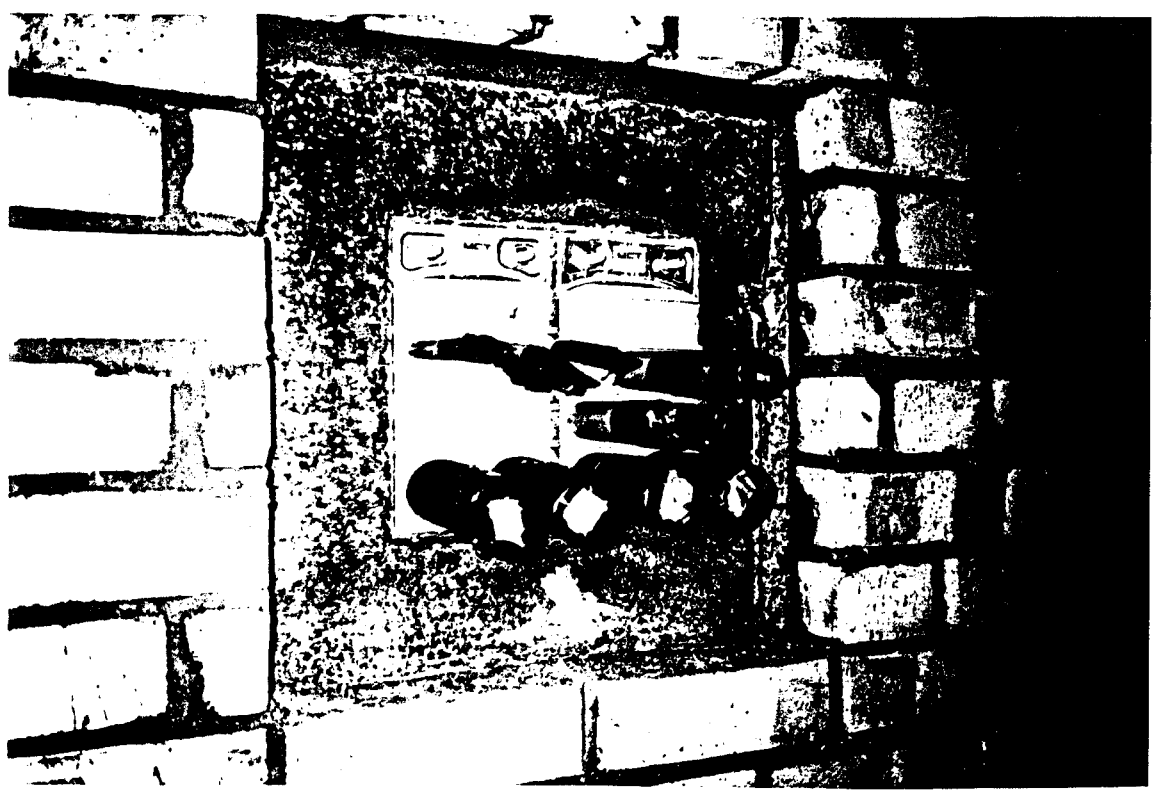
Client

Lycab Ltd

Photographs showing the Brattberg M.C.T. 2000 Transfer System Type RGB 6x2 without Cables (1) and with Cables (2) within the Brickwork Wall



1



2

D1

5. TEST SPECIMEN AND MOUNTING CONDITIONS

5.1 Test Object : Brattberg M.C.T. 2000 Transfer System Type RGP 200

Test Nos. L/2164/4 to 6

5.2 Description of Specimen

The description of the test specimens are as follows:

Test 4 : Brattberg M.C.T. 2000 Transfer System Type RGP 200 without Cables

The test specimen comprised a Brattberg M.C.T. 2000 Transfer System Type RGP 200 mounted into a nominal 305 mm x 305 mm x 115 mm thick dense concrete block which was built into a brickwork wall. The 215 mm thick brickwork wall was constructed from LBC Commons laid with frogs-up in English Bond with a sand and cement mortar and filled the 2920 mm wide x 3005 mm high test aperture. The 200 mm diameter x 60 mm deep Transfer System included a 120 mm x 120 mm cable pathway which was packed with Lycron Polymer blocks.

Test 5 : Brattberg M.C.T. 2000 Transfer System Type RGP 200 with Cables

The test specimen comprised a Brattberg M.C.T. 2000 Transfer System Type RGP 200 mounted into a nominal 305 mm x 305 mm x 115 mm thick dense concrete block which was built into a brickwork wall. The 215 mm thick brickwork wall was constructed from LBC Commons laid with frogs-up in English Bond with a sand and cement mortar and filled the 2920 mm wide x 3005 mm high test aperture. The 200 mm diameter x 60 mm deep Transfer System included a 120 mm x 120 mm cable pathway. Four cables (three at 30 mm diameter and one at 46 mm diameter passed through the Transfer System packed in Lycron Polymer blocks.

Test 6 : Brickwork Wall

The test specimen comprised a 215 mm thick brickwork wall constructed from LBC Commons laid with frogs-up in English Bond with a sand and cement mortar and filled the 2920 mm wide x 3005 mm high test aperture.

The estimated mass of the brickwork wall = 350 kg/m^2

The Transfer System was supplied by : Lycab Ltd on 26 November 1991.

The results of the Sound Reduction Index measurements are presented in the following table and graphically on Data Sheets L/2164/4/SRI to L/2164/6/SRI. Data Sheet L/2164/3/D shows a sectional drawing whilst photographs of the installed Transfer System, with and without Cables, are presented on Data Sheet L/2164/4/D.

5.3 Test Results

One-Third Octave Band Frequency	Sound Reduction Index, R (dB) Test 4	Test 5	Test 6
100	37.2	37.3	37.1
125	36.4	37.0	37.1
160	42.5	42.7	42.2
200	40.7	41.3	42.8
250	43.0	43.2	44.4
315	45.8	46.6	45.3
400	45.0	46.3	46.2
500	51.4	51.6	50.6
630	52.3	53.5	53.3
800	54.4	55.6	55.0
1000	57.3	57.1	57.8
1250	58.8	59.3	58.7
1600	60.5	60.7	60.4
2000	63.2	63.1	62.4
2500	65.5	65.6	64.6
3150	67.2	67.5	67.2
Weighted Sound Reduction Index, R_w (BS 5821:Part 1:1984)	54	55	55
Average Sound Reduction Index (100 Hz - 3150 Hz)	51.3	51,8	51.6

AIRO

DATA SHEET

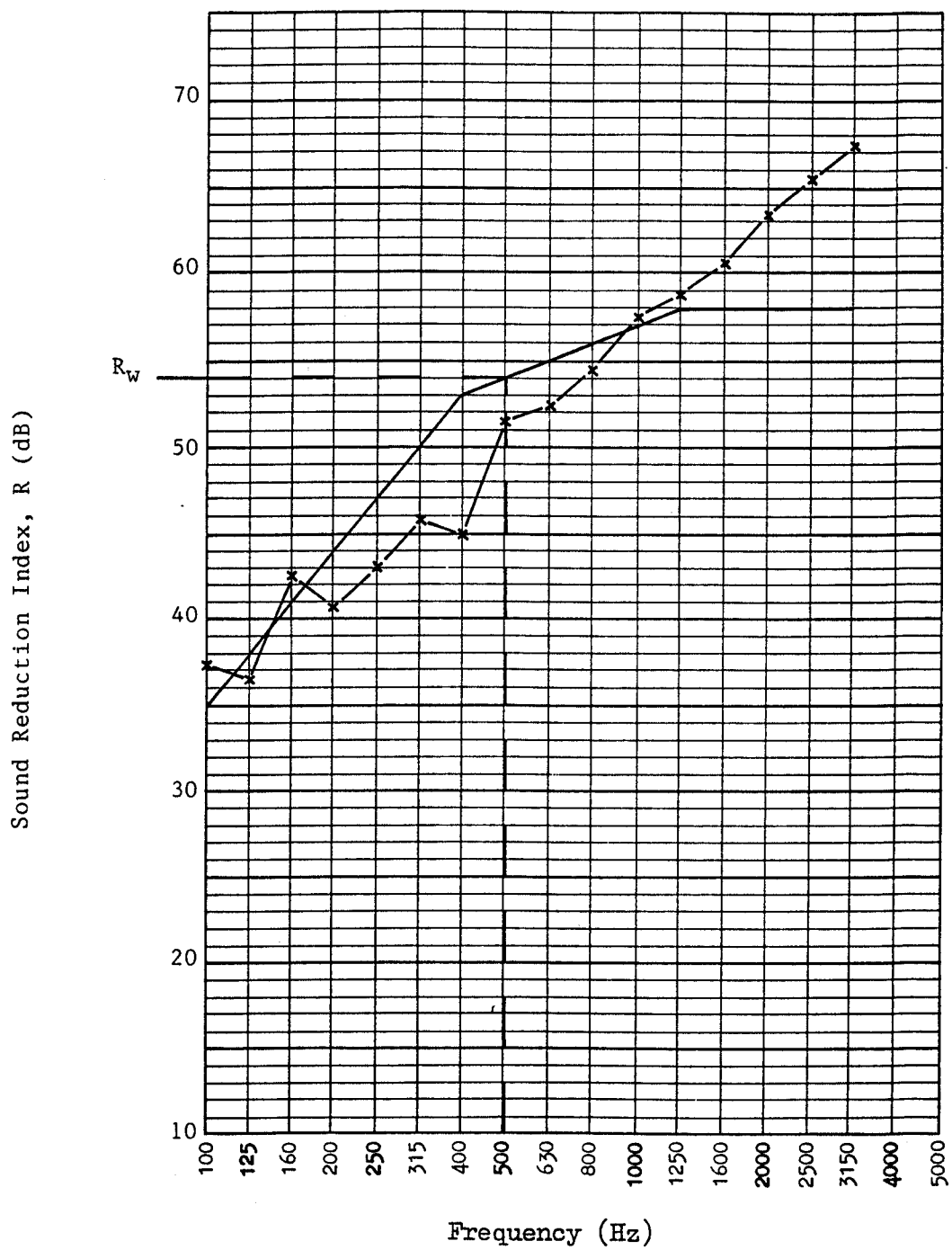
Date	No.
JANUARY 1992	L/2164/4/SRI

Client

Lycab Ltd

Laboratory Measurement of the Sound Reduction Index

Brattberg M.C.T 2000 Transfer System Type RGP 200 without Cables



×——× Measured value of Sound Reduction Index, R (dB)

——— Reference curve for a Weighted S.R.I., R_W = 54 dB (BS 5821:Part 1:1984)

D2

AIRO

DATA SHEET

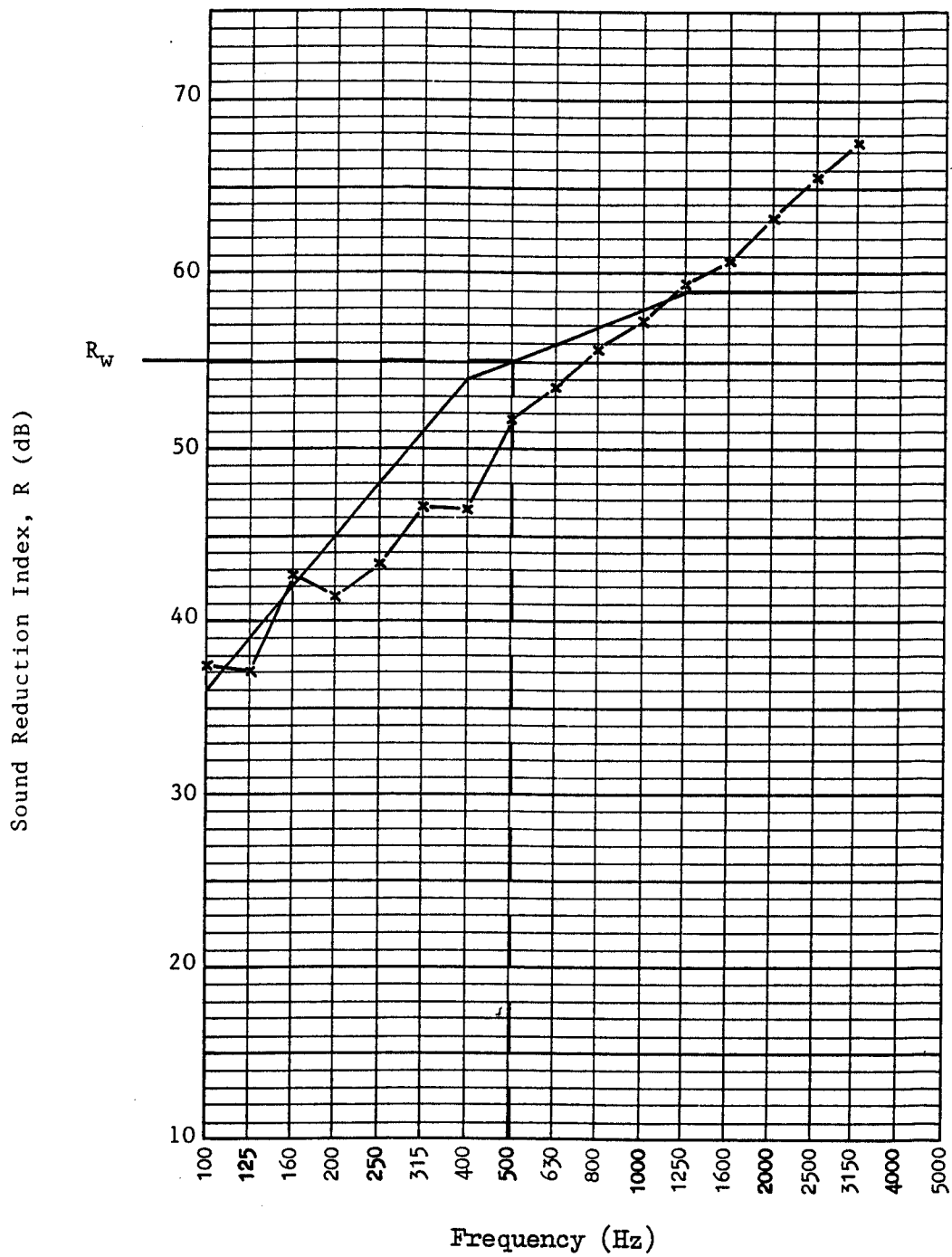
Date	No.
JANUARY 1992	L/2164/5/SRI

Client

Lycab Ltd

Laboratory Measurement of the Sound Reduction Index

Brattberg M.C.T. 2000 Transfer System Type RGP 200 with Cables



x——x Measured value of Sound Reduction Index, R (dB)

——— Reference curve for a Weighted S.R.I., R_W = 55 dB (BS 5821:Part 1:1984)

D2

AIRO

DATA SHEET

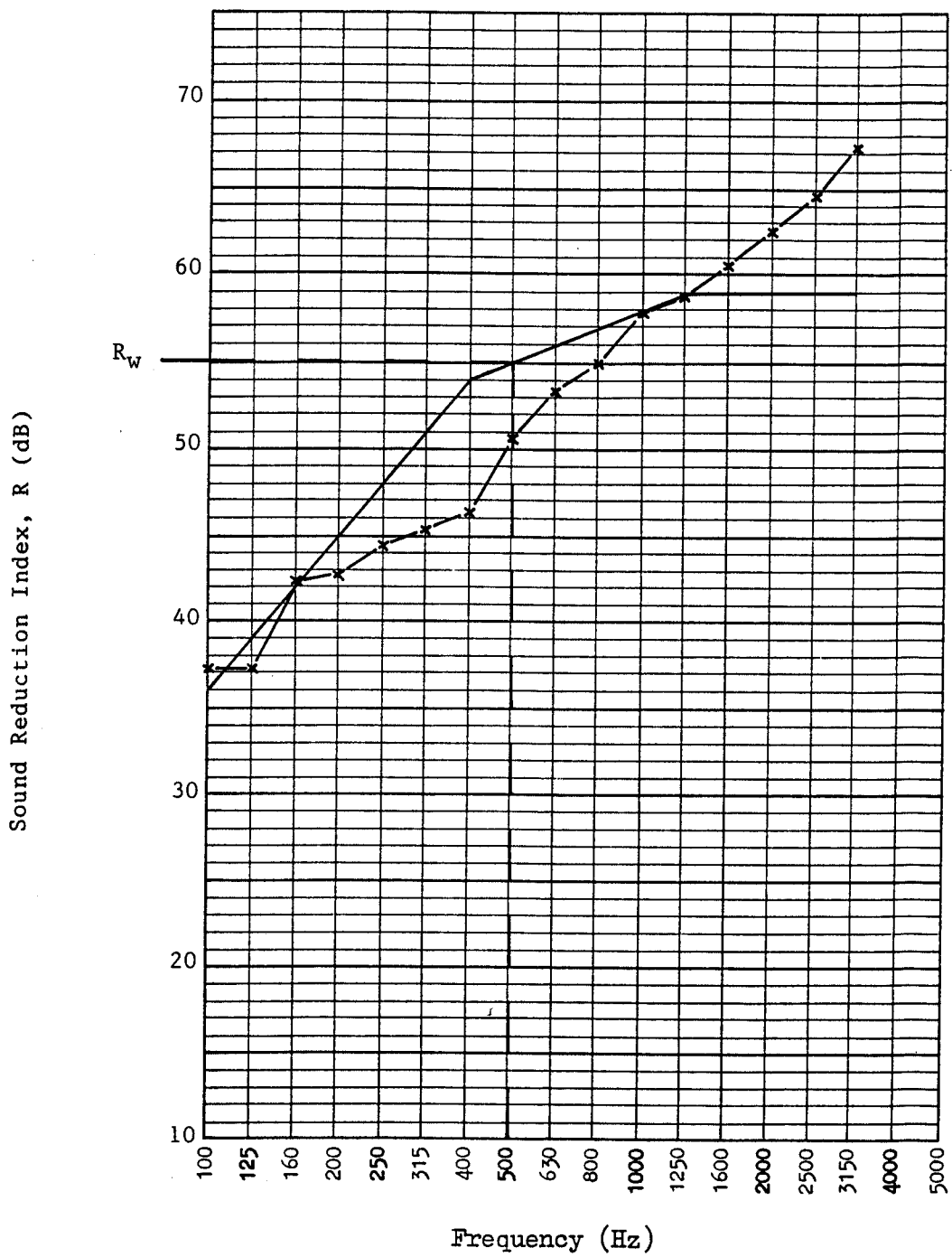
Date	No.
JANUARY 1992	L/2164/6/SRI

Client

Lycab Ltd

Laboratory Measurement of the Sound Reduction Index

Brickwork Wall



×——× Measured value of Sound Reduction Index, R (dB)

——— Reference curve for a Weighted S.R.I., R_W = 55 dB (BS 5821:Part 1:1984)

D2

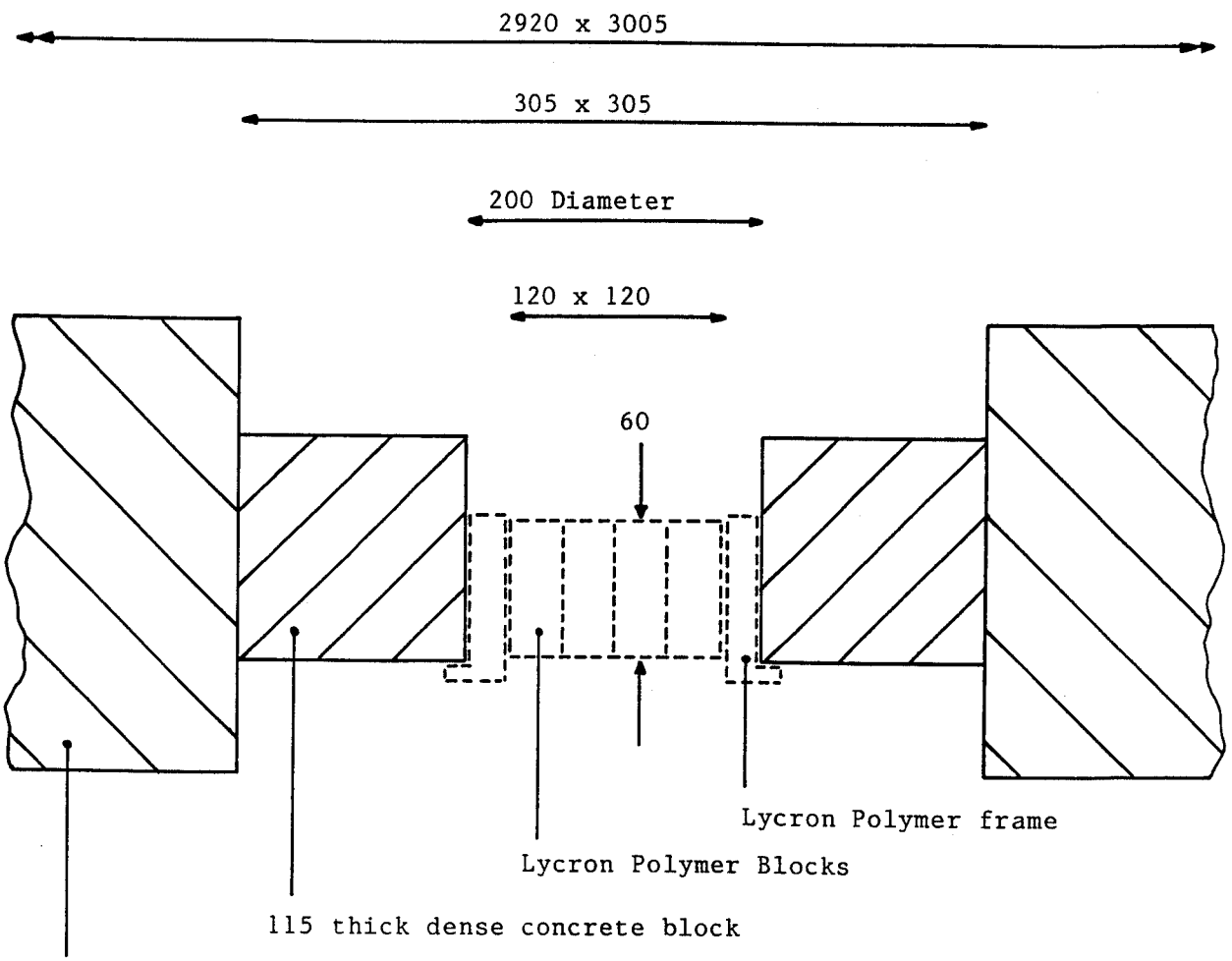
AIRO	DATA SHEET	
	Date JANUARY 1992	No. L/2164/3/D

Client

Lycab Ltd

Sectional Drawing of Test Specimen

Brattberg M.C.T. 2000 Transfer System Type RGP 200



Cables not shwon for clarity

Not to scale

All dimensions in mm

D1

AIRO

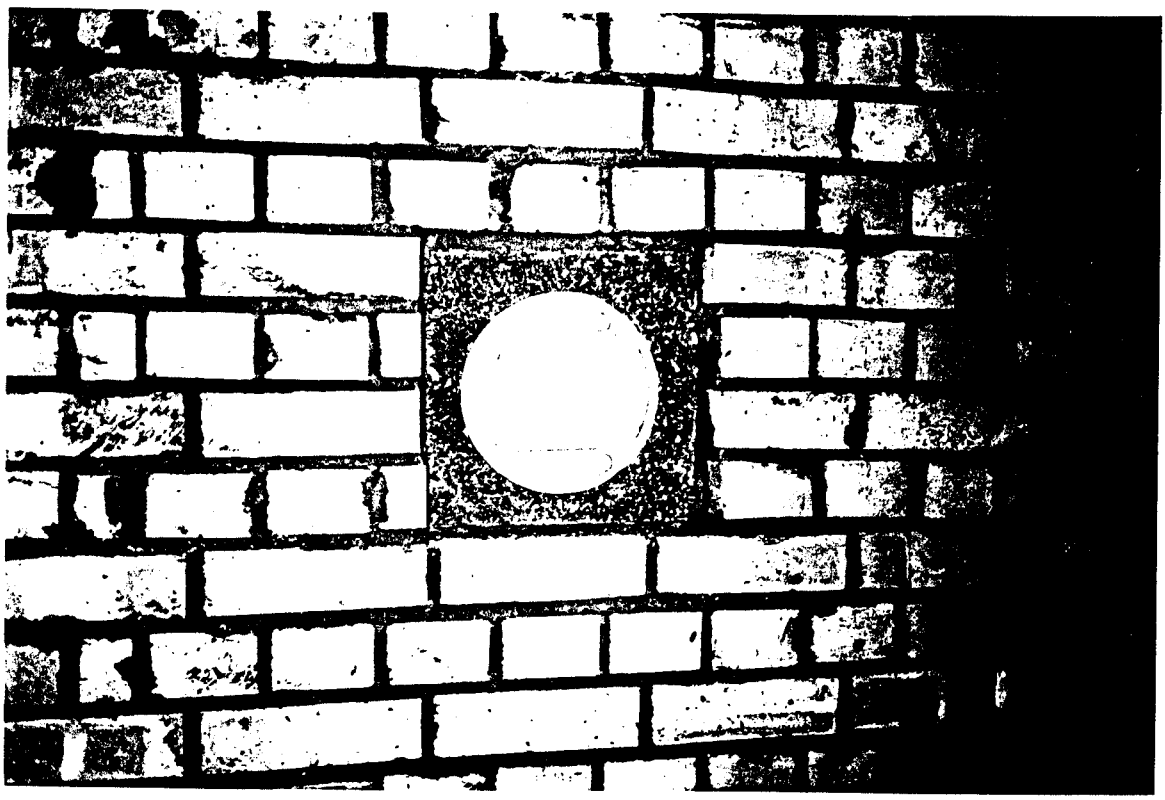
DATA SHEET

Date	No.
JANUARY 1992	L/2164/4/D

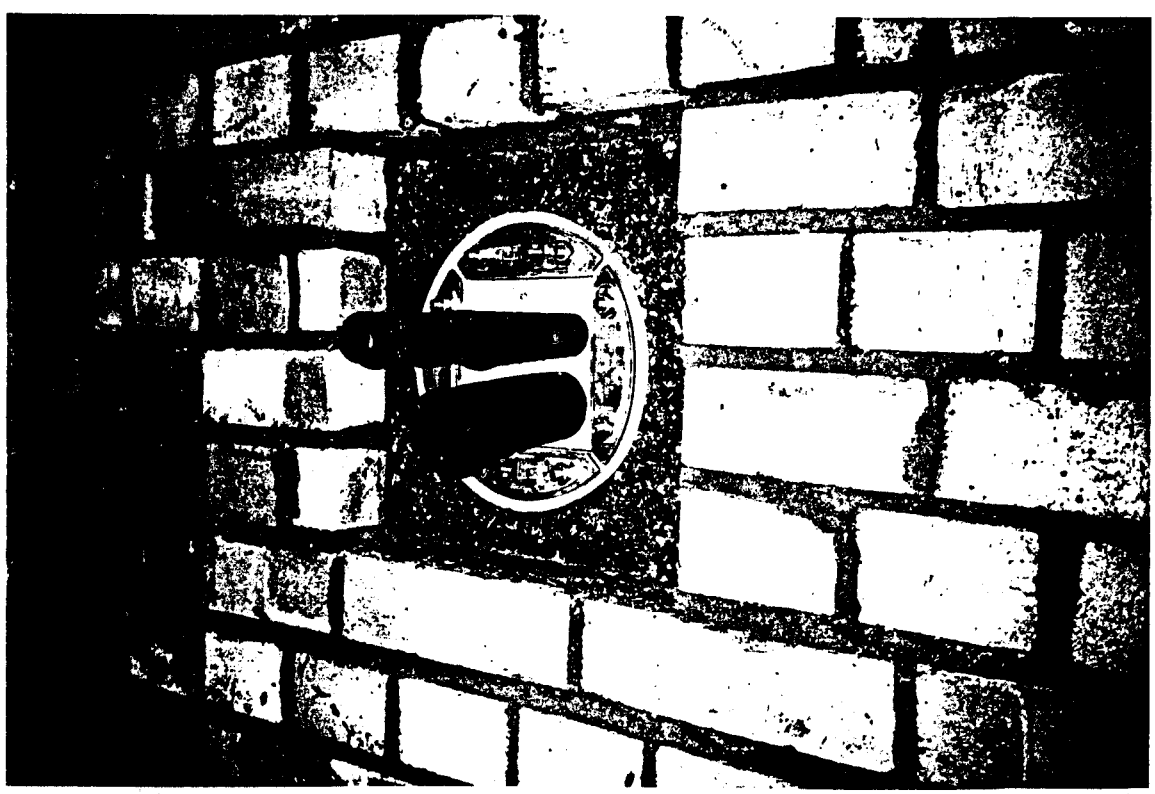
Client

Lycab Ltd

Photographs showing the Brattberg M.C.T. 2000 Transfer System Type RGP 200 without Cables (1) and with Cables (2) within the Brickwork Wall



1



2

6. CONCLUSION

This report presents the results of a series of measurements made to determine the sound insulation performance of the Brattberg M.C.T. 2000 Transfer Systems Type RGB 6x2 and Type RGP 200, with and without cables fitted, when installed within a 215 mm thick brickwork wall. By comparing the performances of the Brickwork Wall and Brickwork Wall with Transfer Systems fitted it can be seen that no significant detrimental performance results from their introduction.

A J Jones BSc PhD CPhys MInstP FIOA
Managing Director

M Sawyer MIOA
Laboratory Supervisor

APPENDIX 1

References

1. British Standard BS 2750
Measurement of sound insulation in buildings and of building elements

Part 1:1980
Recommendations for laboratories

Part 2:1980
Statement of precision requirements

Part 3:1980
Laboratory measurements of airborne sound insulation of building elements

2. British Standard BS 5821
Rating the sound insulation in buildings and of building elements

Part 1:1984
Method for rating the airborne sound insulation in buildings and of interior building elements

3. International Standard ISO 354-1985
Acoustics - Measurement of sound absorption in a reverberation room

APPENDIX 2

Schedule of Equipment

Use	Type	Serial No.
Measuring System	NEAS 823 Sound Measuring System	11048
Microphone	B&K 4165 1/2" Condenser Microphone	1200941
	B&K 4165 1/2" Condenser Microphone	1547245
Pre-Amplifier	B&K 2639 1/2" Microphone Pre-Amplifier	1202653
	B&K 2639 1/2" Microphone Pre-Amplifier	1202654
Calibration	B&K 4220 Pistonphone	243144

APPENDIX 3

Test Procedure

Two loudspeakers are permanently fixed in two different corners of the source chamber, opposite the test specimen, but not directed at it. The loudspeakers are fed with white noise in one-third octave bands with only one speaker operating at any one time. Five microphone positions are randomly distributed throughout each of the source and receive chambers and measurements are made at each position with the two individual sources (i.e. ten measurements in each chamber at each frequency band). The microphone channel passes through a one-third octave band filter which is incremented in step with the noise source. No microphone position is nearer than 0.7 m to the room boundary or a diffuser or 2 m to a loudspeaker.

The equivalent absorption area of the receiving chamber is determined from readings taken using three microphone positions with two reverberation time measurements at each position (six sets of readings). A single loudspeaker is fed with white noise in one-third octave bands and one-third octave band filters are used on the microphone channel.