

**FUGRO TECHNICAL SERVICES (GUANGZHOU) LIMITED**

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Client Ref. : -  
Report No. : G13170AC130013

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# Report on Laboratory Measurements of Airborne Sound Insulation of Building Elements

## Information Supplied by Client

Client : Synergy  
Client Address : 31-35 Heathcote Road, Moorebank NSW 2170 Australia  
Sample Name : Steel Sound Rated Access Panel  
Client Sample I.D. : SR1  
Project : Not request to be reported  
Manufacturer : Not request to be reported

## Laboratory Information

Lab Sample I.D. : AC130013  
Date Received : 21/04/2013  
Date Test Started : 27/04/2013  
Date Test Completed : 27/04/2013  
Test Address : Acoustic Reverberation Chambers, Jin Ke Ecological Park,  
Nancun, Panyu, Guangzhou, PRC  
Test Standards : BS EN ISO 140-3:1995 *Incorporating Amendment No.1*

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**1 Reference instrument**

Name	Type	Serial Number
Hand-held analyzer	B & K 2270	2664200
1/2" Free-field microphone	B & K 4189	02662994 02663055
Omnipower omnidirectional sound source	B & K 4292	024010
Power amplifier	B & K 2716	2667548
Sound level calibrator	B & K 4231	02671619
Temperature & humidity data logger	testo 174H	36616834 36615789

**2 Environment condition**

	Source Reverberation Room	Receiving Reverberation Room
Temperature	24.4°C	24.3°C
Relative humidity	72.4%	77.3%

**3 Description of test specimen (Information supplied by client)**

3.1 The test specimen is steel sound rated access panel of total thickness 30 mm, which consists of 0.8 mm thick galvanized steel frame and panel. The panel is made of 0.8 mm thick galvanized steel face and 20 mm thick sound insulation cotton infill.

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- 3.2 Dimension used to calculate sound reduction index: 600 mm × 600 mm.
- 3.3 Sound insulated sealing strip is sealed around the gap between the frame and the panel.
- 3.4 Details of installation
- 3.4.1 In order to ensure that the flanking path transmitted sound as little as possible, 240 mm thick brick with density of 1700 kg/m<sup>3</sup>, on both side which about 15 mm thick plaster was plastered, was used as filler wall.
- 3.4.2 Then the panel was installed. In order to get better airproof, sealant was caulked around the gap between the frame and filler wall after the panel installed.

The details of the tested unit are referring to the drawings and photoes given in Appendix.

## 4 Principle and procedure

### 4.1 Principle

The test specimen is placed in an opening between two adjacent reverberation rooms. Random noise is introduced into the source room and part of the sound energy is transmitted through the test specimen into the receiving room. In each one-third octave band of centre frequency 100 to 5000 Hz, the resulting average sound pressure levels in the source room and receiving room are  $L_1$  and  $L_2$ , respectively. The sound reduction index is evaluated

$$\text{from } R = D + 10 \lg \frac{S}{A} = L_1 - L_2 + 10 \lg \frac{S}{A} \text{ dB}$$

where

$D$  is the level difference, dB;

$S$  is the area of the test specimen, m<sup>2</sup>;

$A$  is the equivalent sound absorption area in the receiving room, m<sup>2</sup>;

$A = \frac{0.16V}{T}$   $V$  is the receiving room volume, m<sup>3</sup>;  
 $T$  is the reverberation time in the receiving room, s.

The weighted sound reduction index  $R_w$  is determined from the value  $R$  in the 1/3 octave band with centre frequency 100 to 3150 Hz, following the procedure given in ISO 717-1:1996/Amd.1:2006.

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## 4.2 Procedures

- 4.2.1 A calibration was checked on the frequency analyzer with reference calibrator before the measurement.
- 4.2.2 A high power steady sound source, with a continuous spectrum in the frequency bands of interest, was generated in the source room and to ensure the transmitted sound level in the receiving room was at least 6 dB above the background noise level at all frequencies. Loudspeaker and microphone positions were chosen according to standard requirements. Measurements were taken for two loudspeaker positions. For each loudspeaker position, at least five microphone positions were chosen in the source and receiving room. The level difference  $D$  as per defined in the standard was then calculated.
- 4.2.3 Then the loudspeaker was moved to receiving room to measure the reverberation time in accordance with ISO 354:2003. Two loudspeaker positions, for each loudspeaker position, three microphone positions with five readings in each were used.
- 4.2.4 A calibration was checked on the frequency analyzer with reference calibrator after the measurement. If the deviation of the calibration from before and after measurement was less than 0.5 dB, then the measured result was claimed valid.

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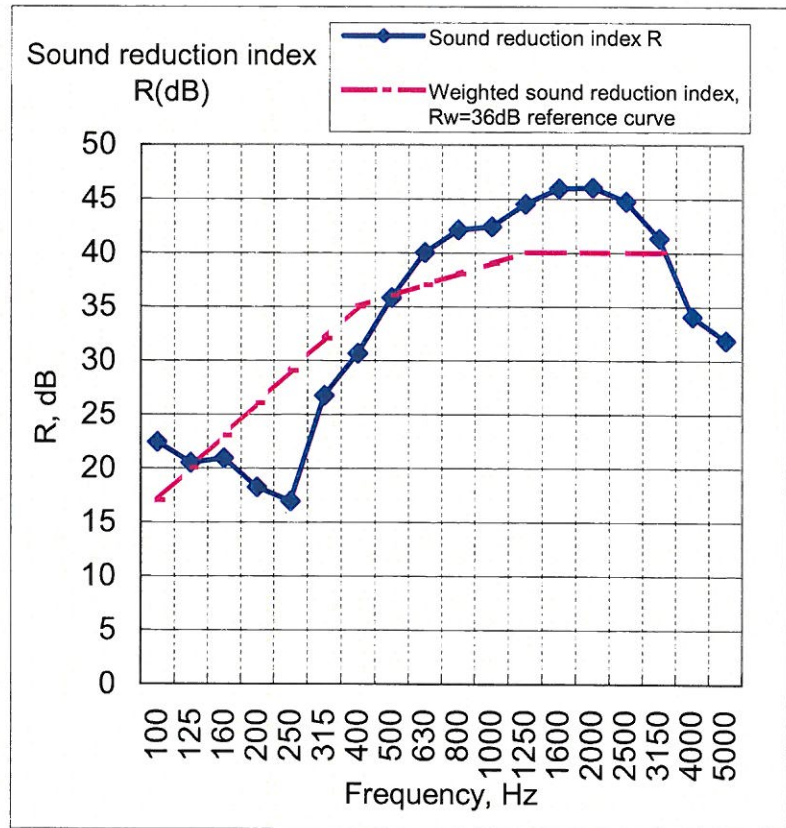


**5 Results**

**Laboratory measurements of airborne sound insulation of building elements**

Area of test specimen: 0.36 m<sup>2</sup>      Key  
Source room volume: 272.5 m<sup>3</sup>      R      Sound reduction index, in dB  
Receiving room volume: 151.3 m<sup>3</sup>      f      frequency, in Hz

Frequency f (Hz)	R (1/3 octave) (dB)
100	22.4
125	20.5
160	20.9
200	18.2
250	16.9
315	26.7
400	30.6
500	35.8
630	40.0
800	42.1
1000	42.4
1250	44.5
1600	45.9
2000	46.0
2500	44.7
3150	41.3
4000	34.0
5000	31.8



The test results are valid only related to the sample submitted.

Rating according to ISO 717-1:1996/Amd.1:2006.

R<sub>w</sub> (C,C<sub>r</sub>) = 36 (-4, -8)dB

Evaluation based on laboratory measurement results obtained by an engineering method.

Checked by: Lu      Date: 09/05/2013      Certified by: Amy      Date: 09/05/2013  
AC-R-004(25/2/2013)      Wang Riheng(Acoustic Engineer)

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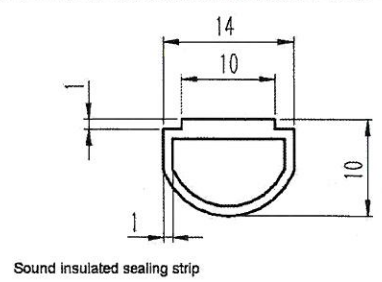
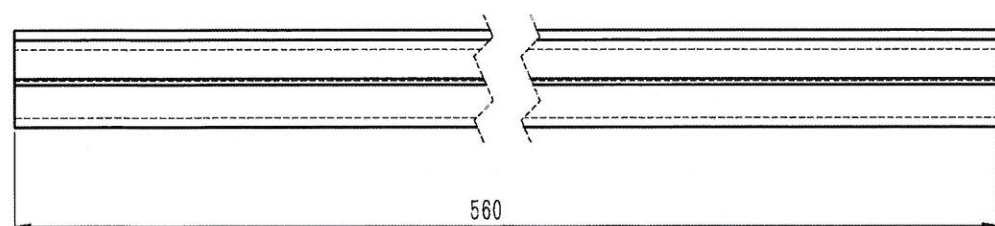
## Appendix 1: Details of test specimen (Information supplied by client)

视图 D  
比例 1:6  
657.8

视图 C  
比例 1:6

1:1

9	SM9164-09-107	Countersunk head aluminum rivet	6	A1			
8	SM9164-09-105	Sound insulation cotton	1	隔音棉			
7	SM9164-09-104	Sound insulated sealing strip	2	泡棉胶			
6	SM9164-09-103	Sound insulated sealing strip	2	泡棉胶			
5	SM9164-09-02	Lock	2				
4	SM9164-09-102	Galvanized steel	1	Q235		同SM9164-01-02	
3	SM9164-09-101	Galvanized steel	1	Q235			
2	SM9164-09-01	Frame	1			同SM9164-01-01	
1	Q3 12x18-20 [牙] 塑料圆头螺栓(5x8)		2				
序号	代号	名称	数量	材料	单重	总重	备注
						Yangzhou Superman sporting equipment Co., Ltd	
Mark/Punis/Partition/Change/NC/Signature/Year, month, day						600X600 隔音安全门	
Design	XDW	Standard		Stage marker	Weight/Proportion		
To examine					7.02		
Technology	Date	2013.4	A total of 1 The first one				SM9164-09



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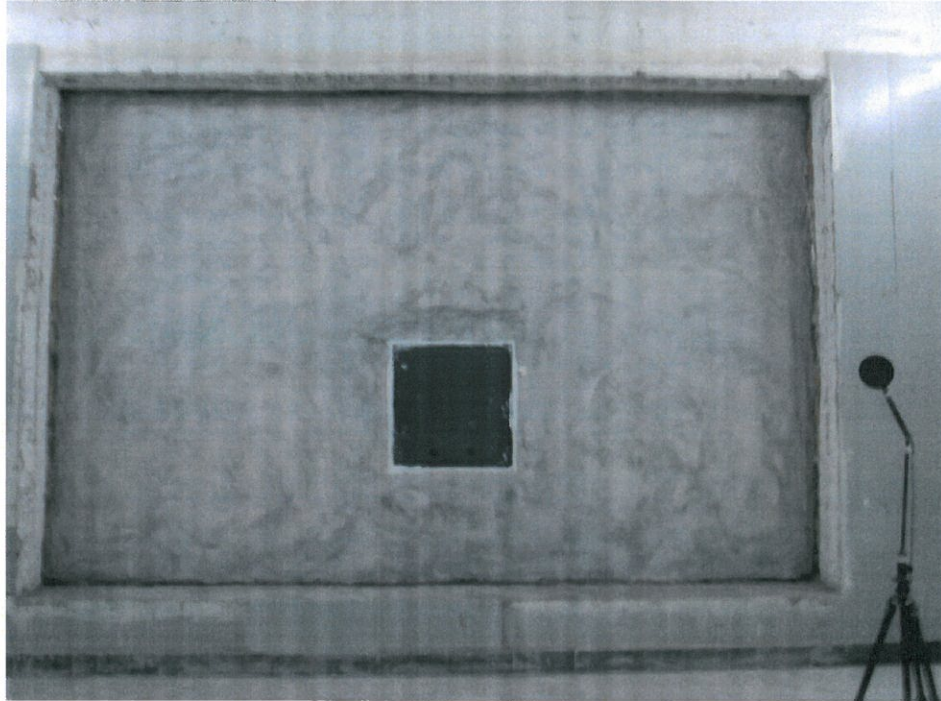
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**Appendix 2: Photographic records**

Source room side



Receiving room side



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**\*\* End of report \*\***



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# Report on Laboratory Measurements of Airborne Sound Insulation of Building Elements

## Information Supplied by Client

Client : Synergy Access Panels Pty Ltd.  
Yangzhou Synergy Scaffold Co.,Ltd.

Client Address : 14-26 Commercial Road Kingsgrove NSW 2208 Australia  
No.95, Jiangping Road, JiangDu Area, YangZhou, JiangSu, China

Sample Name : Steel Sound Rated Access Panel

Client Sample I.D. : SR1

Project : Not request to be reported

Manufacturer : Not request to be reported

## Laboratory Information

Lab Sample I.D. : AC130013

Date Received : 21/04/2013

Date Test Started : 27/04/2013

Date Test Completed : 27/04/2013

Test Address : Acoustic Reverberation Chambers, Jin Ke Ecological Park,  
Nancun, Panyu, Guangzhou, PRC

Test Standards : AS 1191 - 2002

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**1 Reference instrument**

Name	Type	Serial Number
Hand-held analyzer	B & K 2270	2664200
1/2" Free-field microphone	B & K 4189	02662994 02663055
Omnipower omnidirectional sound source	B & K 4292	024010
Power amplifier	B & K 2716	2667548
Sound level calibrator	B & K 4231	02671619
Temperature & humidity data logger	testo 174H	36616834 36615789

**2 Environment condition**

	Source Reverberation Room	Receiving Reverberation Room
Temperature	24.4°C	24.3°C
Relative humidity	72.4%	77.3%

**3 Description of test specimen (Information supplied by client)**

- 3.1 The test specimen is steel sound rated access panel of total thickness 30 mm, which consists of 0.8 mm thick galvanized steel frame and panel. The panel is made of 0.8 mm thick galvanized steel face and 20 mm thick sound insulation cotton infill.

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3.2 Dimension used to calculate sound reduction index: 600 mm × 600 mm.

3.3 Sound insulated sealing strip is sealed around the gap between the frame and the panel.

3.4 Details of installation

3.4.1 In order to ensure that the flanking path transmitted sound as little as possible, 240 mm thick brick with density of 1700 kg/m<sup>3</sup>, on both side which about 15 mm thick plaster was plastered, was used as filler wall.

3.4.2 Then the panel was installed. In order to get better airproof, sealant was caulked around the gap between the frame and filler wall after the panel installed.

The details of the tested unit are referring to the drawings and photos given in Appendix.

4 Principle and procedure

4.1 Principle

The test specimen is placed in an opening between two adjacent reverberation rooms. Random noise is introduced into the source room and part of the sound energy is transmitted through the test specimen into the receiving room. In each one-third octave band of centre frequency 100 to 5000 Hz, the resulting average sound pressure levels in the source room and receiving room are  $L_1$  and  $L_2$ , respectively. The sound reduction index is evaluated

$$\text{from } R = D + 10 \lg \frac{S}{A} = L_1 - L_2 + 10 \lg \frac{S}{A} \text{ dB}$$

where

$D$  is the level difference, dB;

$S$  is the area of the test specimen, m<sup>2</sup>;

$A$  is the equivalent sound absorption area in the receiving room, m<sup>2</sup>;

$A = \frac{0.16V}{T}$   $V$  is the receiving room volume, m<sup>3</sup>;

$T$  is the reverberation time in the receiving room, s.

The weighted sound reduction index  $R_w$  is determined from the value  $R$  in the 1/3 octave band with centre frequency 100 to 3150 Hz, following the procedure given in AS/NZS 1276.1.

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## 4.2 Procedures

4.2.1 A calibration was checked on the frequency analyzer with reference calibrator before the measurement.

4.2.2 A high power steady sound source, with a continuous spectrum in the frequency bands of interest, was generated in the source room and to ensure the transmitted sound level in the receiving room was at least 6 dB above the background noise level at all frequencies. Loudspeaker and microphone positions were chosen according to standard requirements. Measurements were taken for two loudspeaker positions. For each loudspeaker position, at least five microphone positions were chosen in the source and receiving room. The level difference  $D$  as per defined in the standard was then calculated.

4.2.3 Then the loudspeaker was moved to receiving room to measure the reverberation time in accordance with AS 1045. Two loudspeaker positions, for each loudspeaker position, three microphone positions with five readings in each were used.

4.2.4 A calibration was checked on the frequency analyzer with reference calibrator after the measurement. If the deviation of the calibration from before and after measurement was less than 0.5 dB, then the measured result was claimed valid.

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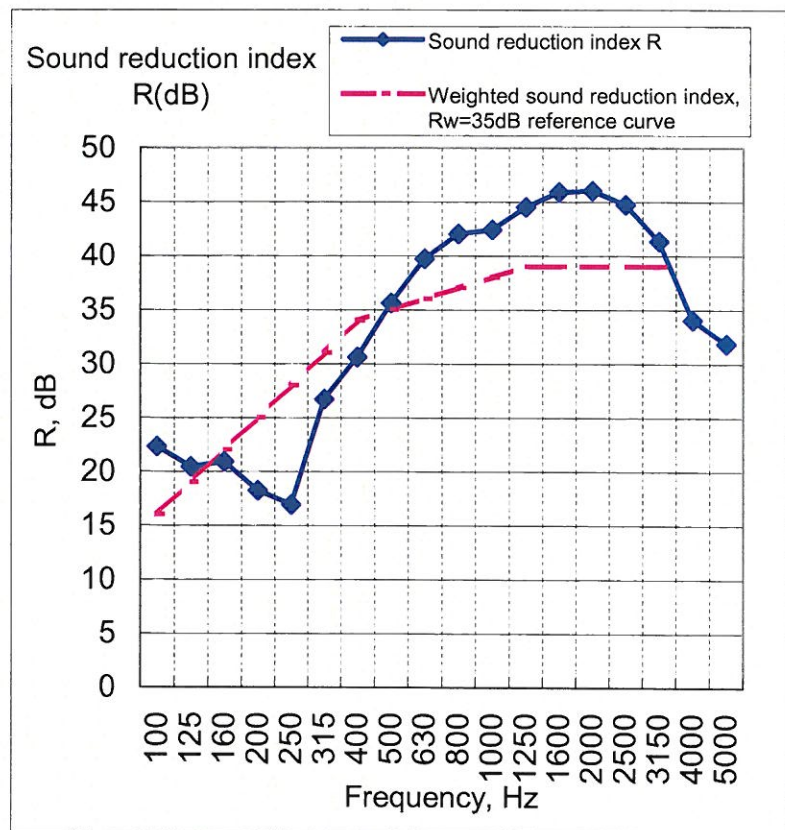
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5 Results

Laboratory measurements of airborne sound insulation of building elements

Area of test specimen: 0.36 m<sup>2</sup>      Key  
Source room volume: 272.5 m<sup>3</sup>      R      Sound reduction index, in dB  
Receiving room volume: 151.3 m<sup>3</sup>      f      frequency, in Hz

Frequency f (Hz)	R (1/3 octave) (dB)
100	22.3
125	20.4
160	20.9
200	18.2
250	16.9
315	26.7
400	30.6
500	35.6
630	39.7
800	42.0
1000	42.4
1250	44.5
1600	45.9
2000	46.0
2500	44.7
3150	41.3
4000	34.0
5000	31.8



The test results are valid only related to the sample submitted.

Rating according to AS/NZS 1276.1

R<sub>w</sub> (C, C<sub>tr</sub>) = 35 (-3, -7)dB

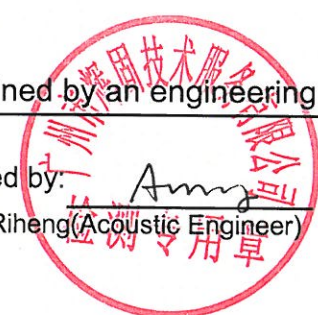
Evaluation based on laboratory measurement results obtained by an engineering method.

Checked by:     Lin          Date:     09/05/2013    

Certified by:     Amy          Date:     09/05/2013    

Wang Riheng (Acoustic Engineer)

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## Appendix 1: Details of test specimen (Information supplied by client)

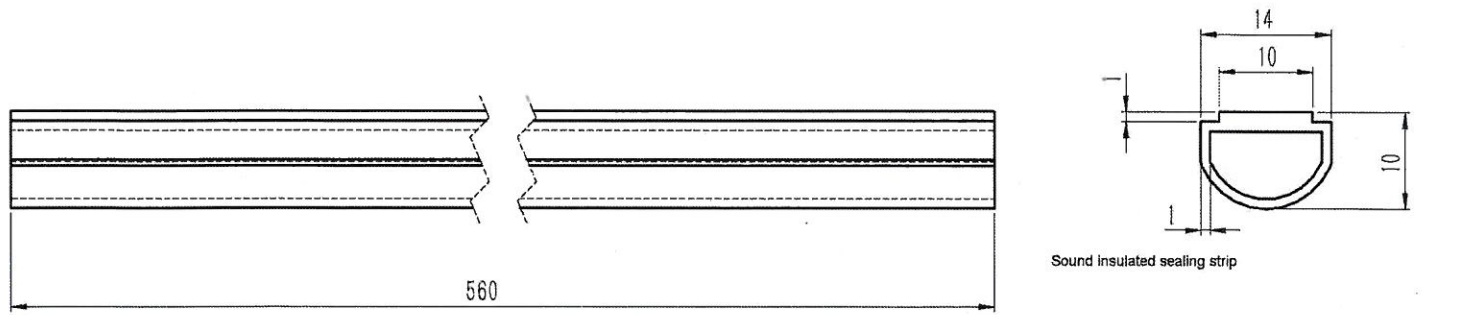
视图 D  
比例 1:6  
657.8

视图 C  
比例 1:6

1:1

1:1

9	SM9164-09-107	Countersunk head aluminum rivet	6	Al			
8	SM9164-09-105	Sound insulation cotton	1	隔音棉			
7	SM9164-09-104	Sound insulated sealing strip	2	密封胶			
6	SM9164-09-103	Sound insulated sealing strip	2	密封胶			
5	SM9164-09-02	Lock	2				
4	SM9164-09-102	Galvanized steel	1	Q235		同SM9164-01-02	
3	SM9164-09-101	Galvanized steel	1	Q235			
2	SM9164-09-01	Frame	1			同SM9164-01-01	
1	GB 12418-89[若口型副锁另编零件号]		2				
序号	代号	名称	数量	材料	单重	总重	备注
						Yangzhou Superman sporting equipment Co., Ltd	
						600X600隔音安全门	
						SM9164-09	
Mark	Punish	Partition change	NC	Signature	Year, month, day		
Design	X, DW	Standard			Stage marker	Weight	Proportion
To examine						7.02	
Technology		Date	2013-4		A total of 1 The first one		



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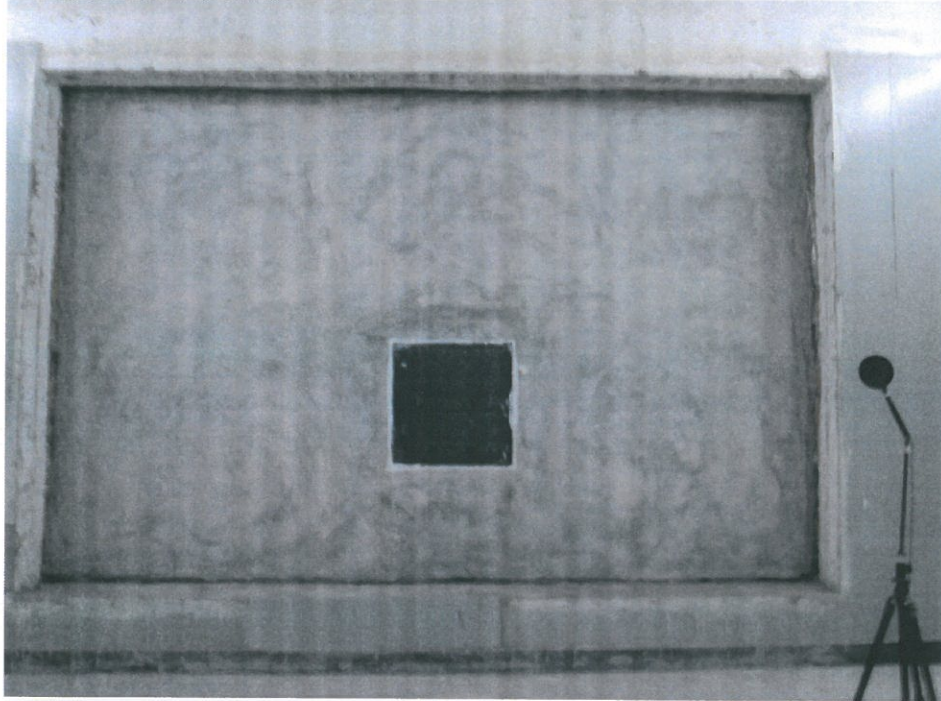
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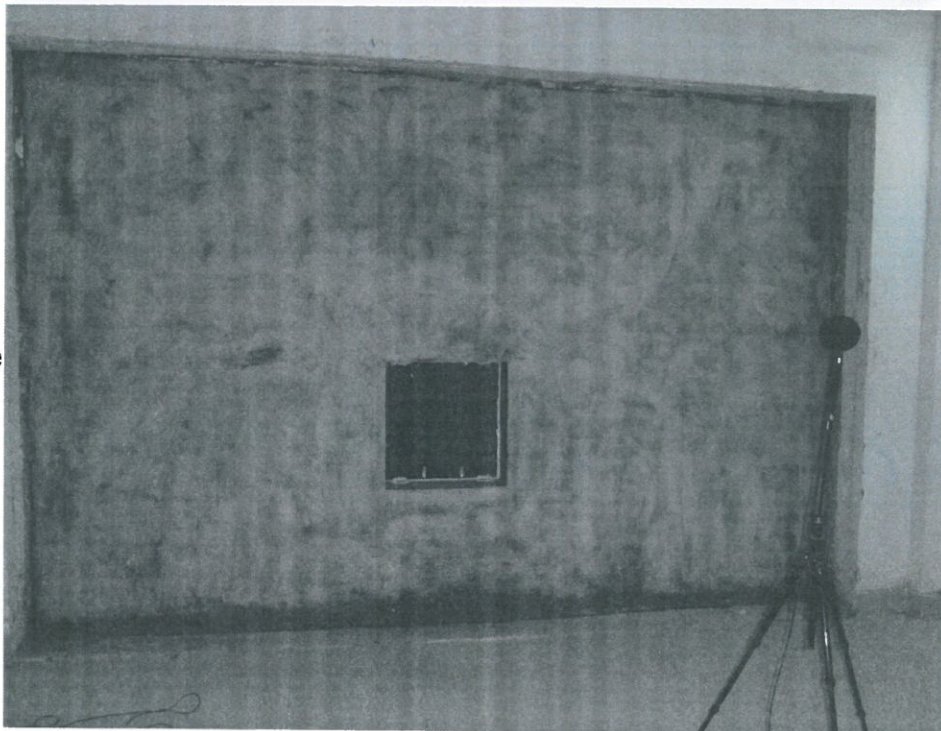
Report No. : G13170AC130013(1)

**Appendix 2: Photographic records**

Source room side



Receiving room side



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**\*\* End of report \*\***

西人田