聲學測試服務有限公司
Acoustic Testing Services Limited
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HOKLAS 173 TEST

Test Report for Laboratory Measurement of Airborne Sound Reduction

TEST REPORT REFERENCE NUMBER:	**ATS16-049-RP008**
DATE OF REPORT:	**06 December 2016**
TESTED FOR:	**Fujian Jumbo New Material Corporation Limited** **Industrial Zone, Chang Shan Overseas Chinese Economic Development Zone, Zhang Zhou, Fujian, China**
ATTENTION:	**Mr. Tommy Liu**
UNIT UNDER TEST:	**JUMBO High Density (HD) 150mm thickness Gypsum Block Wall System with 5mm thick JUMBO Plastering (JUMBO MP300) on both sides**
TEST STANDARD:	**BS EN ISO 10140 - 2 : 2010**
TESTED AT:	**Unit E, 2/F., Century Industrial Centre, 33-35 Au Pui Wan Street, Fo Tan, Shatin, New Territories, Hong Kong.**

Approved by: _____

Ir Dr. Fan CHONG / Managing Director
CEng, RPE, MHKIE, FIMechE, FIOA
MHKIOA, MCIBSE, MASHRAE, MHKIQEP

HKAS has accredited Acoustic Testing Services Limited (Reg. No. HOKLAS 173) under HOKLAS for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories.

1. METHOD OF TEST

The test was conducted in accordance with BS EN ISO 10140-2:2010 "Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurements of airborne sound insulation" in the reverberation chamber of Acoustic Testing Services Limited. The single-figure quantity for airborne sound insulation rating, Weighted Sound Reduction Index, was evaluated in accordance with BS EN ISO 717-1:2013 "Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation".

2. INSTRUMENTATION

Description:	Serial Number:
Bruel & Kjaer Type 3560-B Real Time Frequency Analyzer	2454296
Ultragraph Pro Equalizer	N0517513166
STK V-6 Amplifier	C04OM013
Bruel & Kjaer Type 4292-L OmniPower Sound Source	005007
Bruel & Kjaer Type 4942 Random Incident ½" Microphone (Source Room)	2497997
Bruel & Kjaer Type 4942 Random Incident ½" Microphone (Receiving Room)	2497998
Bruel & Kjaer Type 4231 Sound Level Calibrator	2478237

The measuring equipment has been calibrated by an external recognized accredited laboratory, and is in current calibration.

3. PRINCIPLE OF TEST

The Sound Reduction Index of building element can be measured in a laboratory by placing the element in an opening between two adjacent reverberant rooms designed for such tests. Random noise is introduced into one of the rooms, referred to as the source room, and part of the sound energy is transmitted through the test element into the second room, referred to as the receiving room. In each one-third octave band of centre frequency 100 Hz to 5000 Hz, the resulting space-average sound pressure levels in the source room and the receiving room are L_1 and L_2, respectively. The sound reduction index is given by

$$R = L_1 - L_2 + 10\lg(S/A)$$

where,

S is the area of the test specimen, in square metres;
A is the equivalent absorption area in the receiving room, in square metres.

$$A = \frac{0.16V}{T}$$

where,

V is the receiving room volume, m^3;
T is reverberation time in the receiving room, s..

According to BS EN ISO 717-1:2013, the Weighted Sound Reduction Index (R_W) in decibels (dB) is calculated by comparing the sixteen measured sound reduction index from 100 Hz to 3150 Hz with a defined reference curve by shifting the relevant reference curve in steps of 1 dB towards the measured curve until the sum of unfavourable deviations is as large as possible but not more than 32 dB. An unfavourable deviation at a particular frequency occurs when the result of measurements is less than the reference value. Only the unfavourable deviations shall be taken into account. The value, in decibels, of the reference curve at 500 Hz, after shifting it in accordance with this procedure, is R_W.

According to BS EN ISO 717-1:2013, spectrum adaptation terms C, C_{tr}, $C_{100\text{-}5000}$ and $C_{tr,100\text{-}5000}$, which are to be added to the single-number rating to take account of the characteristics of particular sound spectra, are also calculated, in decibels. C is calculated with spectrum No. 1 (A-weighted pink noise); C_{tr} is calculated with spectrum No. 2 (A-weighted urban traffic noise). C and C_{tr} are calculated in frequency range from 100 Hz to 3150 Hz. While $C_{100\text{-}5000}$ and $C_{tr,100\text{-}5000}$ are calculated in frequency range from 100 Hz to 5000 Hz.

4. MEASUREMENT PROCEDURES

4.1 Firstly, the background noise level was measured at receiving room before the sound pressure level measurement.

4.2 Then, the sound pressure level was measured for 15s in the source room and receiving room simultaneously for each measurement. 8 measurements of sound pressure levels in each room were taken for the first loudspeaker location in the source room; another 8 measurements of sound pressure levels in each room were taken for the second loudspeaker location. Total 16 measurements of sound pressure levels in each room were made.

4.3 After measurements of sound pressure levels, the reverberation times were measured at total 3 microphone positions with 5 times measurement at each microphone positions in the receiving room.

4.4 Before and after the measurement, the used measurement system was calibrated by sound level calibrator.

5. RESULTS APPLICATION

The results obtained can be used to design building elements with appropriate acoustic properties, to compare the sound insulation properties of building elements and to classify such elements according to their sound insulation capabilities.

The test was performed in laboratory facilities in which transmission of sound through flanking paths is suppressed. Results of measurements shall not be applied directly in the field without accounting for other factors affecting sound insulation, especially flanking transmission and loss factor.

The test results obtained relate only to the Unit Under Test.

6. DETAILS OF TEST

Date of receipt of Unit Under Test:	22 October 2016
Date of test:	31 October 2016
Static Pressure during the test:	100.3 kPa
Unit Under Test:	JUMBO High Density (HD) 150mm thickness Gypsum Block Wall System with 5mm thick JUMBO Plastering (JUMBO MP300) on both sides
Sample I. D.:	ATS16-049-TS004
Dimensions used for calculation:	3500 mm (width) X 3000 mm (height)
Manufacturer:	Fujian Jumbo New Material Corporation Limited
Installed by:	Fujian Jumbo New Material Corporation Limited

Additional Description:

Brand:	"JUMBO"
Model:	B 150
Density:	1100 kg/m^3 (±5%)
Size:	600mm (L) x 247mm (H)
Thickness:	150mm
Others:	Gypsum block fixed to supporting frame using JUMBO Gypsum Bonding Adhesive (JUMBO MB100). Jointing of blocks to be filled by JUMBO Gypsum Bonding Adhesive (JUMBO MB100). 5mm thick JUMBO Plastering (JUMBO MP300) was applied on surface of gypsum block wall on both sides.

The details of the Unit Under Test refer to the drawings given in Appendix 2, if applied. The information of the Unit Under Test is provided by the Client and is not verified by the laboratory.

7. TEST RESULTS

Source Room:

Temperature:	26	°C
Humidity:	70	%
Volume:	221	m^3

Receiving Room:

Temperature:	26	°C
Humidity:	70	%
Volume:	80	m^3

Specimen Dimension used for calculation:

Width:	3500	mm
Height:	3000	mm

Sound Reduction Index:

Freq. (Hz)	1/3 Oct, R (dB)	1/1 Oct, R (dB)
100	35.7	
125	37.5	37.1
160	38.4	
200	36.0	
250	38.9	38.1
315	40.8	
400	42.8	
500	45.0	44.8
630	48.5	
800	51.2	
1000	53.0	52.6
1250	54.3	
1600	55.9	
2000	57.8	57.4
2500	59.1	
3150	59.5	
4000	61.6	60.9
5000	62.2	

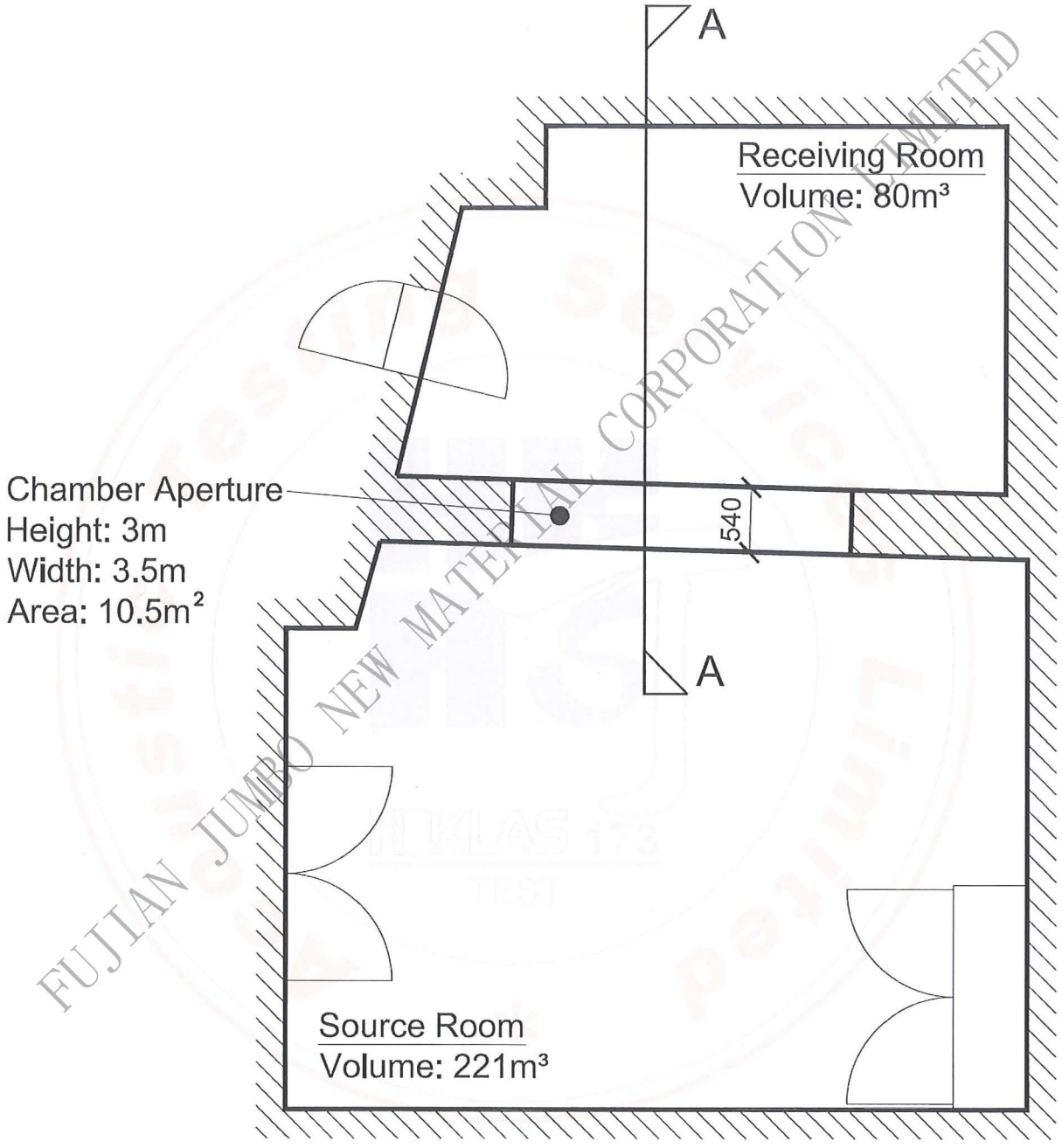
R_w ($C;C_{tr}$) = 50 (-1;-5)dB
$C_{100-5000}$ = 0 dB
$C_{tr,100-5000}$ = -5 dB

Figure 1. Sound Reduction Indexes against Frequency

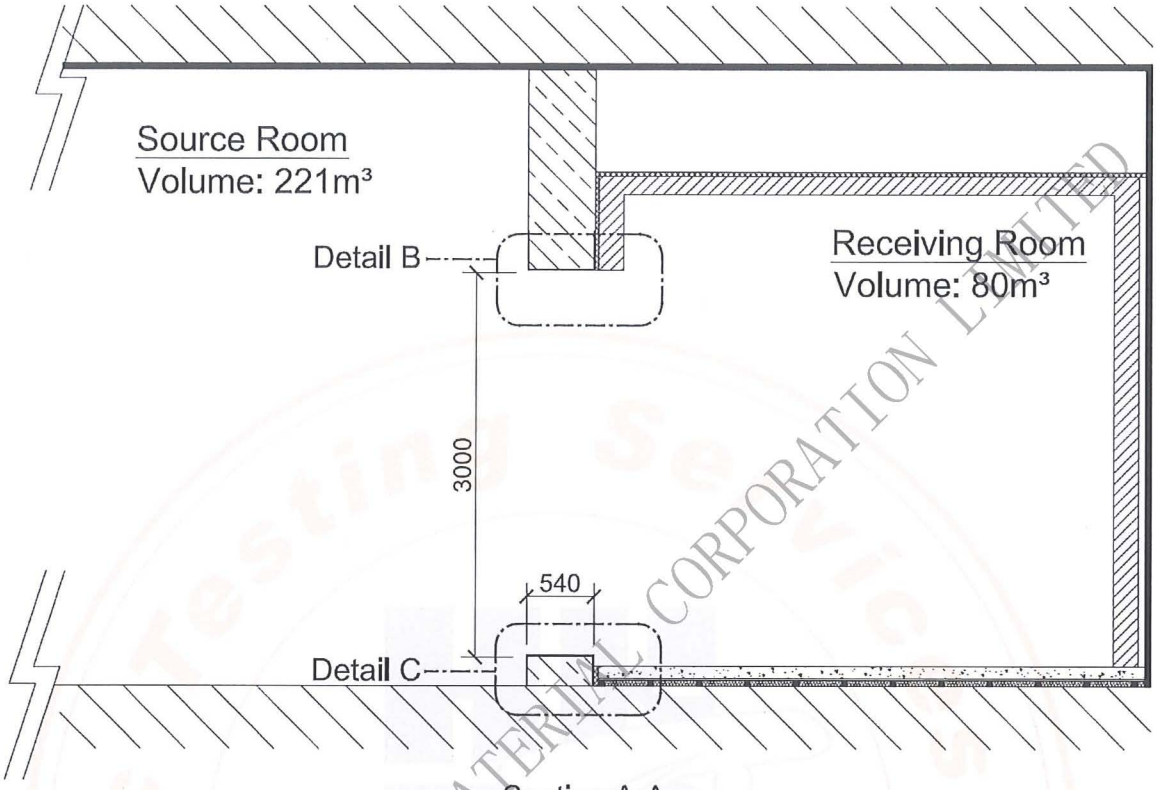
APPENDIX LIST

APPENDIX 1

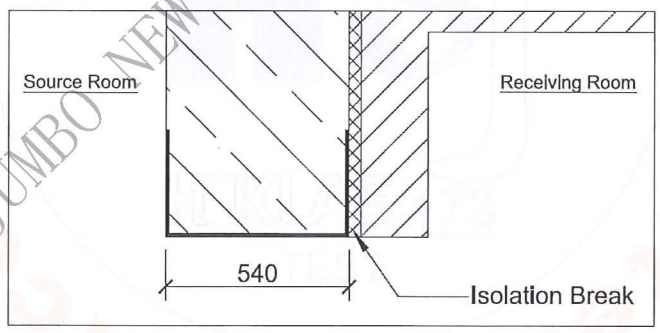
Details of Laboratory



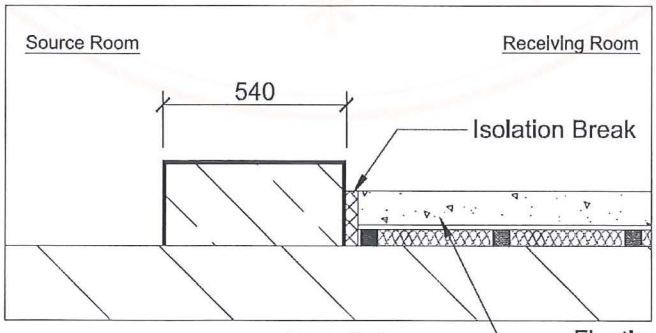
LABORATORY LAYOUT PLAN



Section A-A



Detail B



Detail C

APPENDIX 2

Details of Unit Under Test

福建正嘉新材料股份有限公司
FUJIAN JUMBO NEW MATERIAL CORPORATION LIMITED
福建省漳州市平和县漳浦经济开发区工业区
Industrial Zone,Changpan Overseas Chinese Economic Development Zone, Zhangzhou,Fujian,China
Tel: +86-596-5199019
E-mail: tommy@jmc.net.cn

NOTES: 备注
(1) Do not scale the drawing, Figured dimensions are to be followed. Read the drawing in conjunction with all other relevant drawings. Any discrepancies found in the drawing/on site shall be notified immediately of any discrepancies found in the interior design/on site shall be notified immediately of any discrepancies found in it.
(2) This drawing shall not be used for construction purpose unless otherwise signed by the Architect/or shall apply for submission on site prior to commencement of work.

PROJECT NAME 项目名称
JUMBO GYPSUM BLOCK WALL SYSTEM

PROJECT ADDRESS 项目地址
SOUND TRANSMISSION LOSS MEASUREMENT ASTM E90-09 & BS EN ISO 10140-2:2010 AT ACOUSTIC TESTING SERVICES LTD

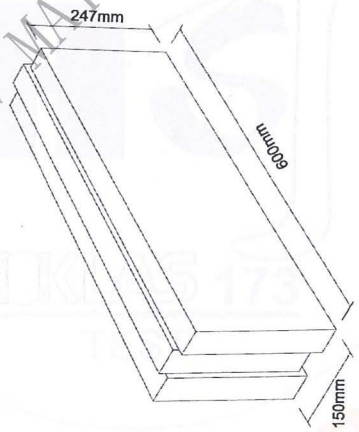
REVISION 修改版本

NO. 编号	DATE 日期	DESCRIPTION 修改

DRAWING TITLE 图纸名称
DETAIL OF JUMBO HIGH DENSITY GYPSUM BLOCK 150mm THICK

DRAWING NO. 图纸编号 FJZB-SJT-02
JOB NO. 项目编号 -
SCALE 比例 AS SHOWN
DATE 日期
DRAWN BY 绘图 LT
CHECKED BY 校对 Y.M
REVISION 修改 -

DIMENSION OF GYPSUM BLOCK
L:600mm
H:247mm
T:150mm



JUMBO GYPSUM BLOCK(HD)
150mm BLOCK WALL SYSTEM
(N.T.S.)

REMARKS:
ALL DIMENSIONS ARE IN MM

APPENDIX 3

Photographic Records

Set-up of Unit Under Test (Source room)

Set-up of Unit Under Test (Receiving room)

End of Report