SOUND ABSORPTION TEST REPORT

EN ISO 354: 2003

For

Wooden Acoustic Panel

Model Name:

2440*128*15mm

Brand Name: REMAK

Report No.: ENC110509GZ74E1

Date of Issue: May 12, 2011

Prepared For

Detech Real Estate and Trading Joint stock Company

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GENERAL INFORMATION:

Product Description:	Wooden Acoustic Panel
Model Number:	2440*128*15mm
Model Difference:	All models use the same materials
Brand Name:	**REMAK**
Applicant:	Detech Real Estate and Trading Joint Stock Company
	Head Office: P301 Detech Building, 15B Pham Hung, Tu Liem, HN, VN Branch Office: P706 B2 Block, Ham Nghi, My Dinh 1, Tu Liem, HN, VN
Manufacturer:	Remak Co.,Ltd
	Room A68, Building 04, Area A, Junjing Garden, Shishan Town, Nanhai District, Foshan City, Guangdong Province
Report No.:	ENC110509GZ74E1
Test Methods:	EN ISO 354: 2003 Acoustics - Measurement of sound absorption in a reverberation room. The absorption class was determined in conformance with EN ISO 11654:1997
Test Results:	See next sheet
Sample Receiving Date:	May 9, 2011
Test Performing Date:	May 9, 2011 –May12, 2011

Summary of test results:

sound absorption coefficient - Wooden Acoustic Panel (2440*128*15mm)

Octave centre frequency f / Hz		125	250	500	1000	2000	4000	α_w	Sound absorption class
Installation Methods	Stick metope	0.05	0.10	0.35	0.50	0.35	0.45	0.35	D
	3 cm spaces	0.10	0.25	0.50	0.60	0.60	0.65	0.50	C
	27.5 cm spaces	0.05	0.25	0.50	0.70	0.60	0.70	0.55	C
	3 cm Thickness/Fill 3 cm thickness 50kg/m^3 soft materials	0.60	0.80	0.70	0.80	0.75	0.60	0.75	B
	27.5 cm spaces/ Fill 4 cm thickness 50kg/m^3 soft materials	0.70	0.75	0.85	0.75	0.85	0.90	0.80	B

Checked By Yemig
Yemig May12, 2011

Authorized By Ray Zhou
Ray Zhou May12, 2011

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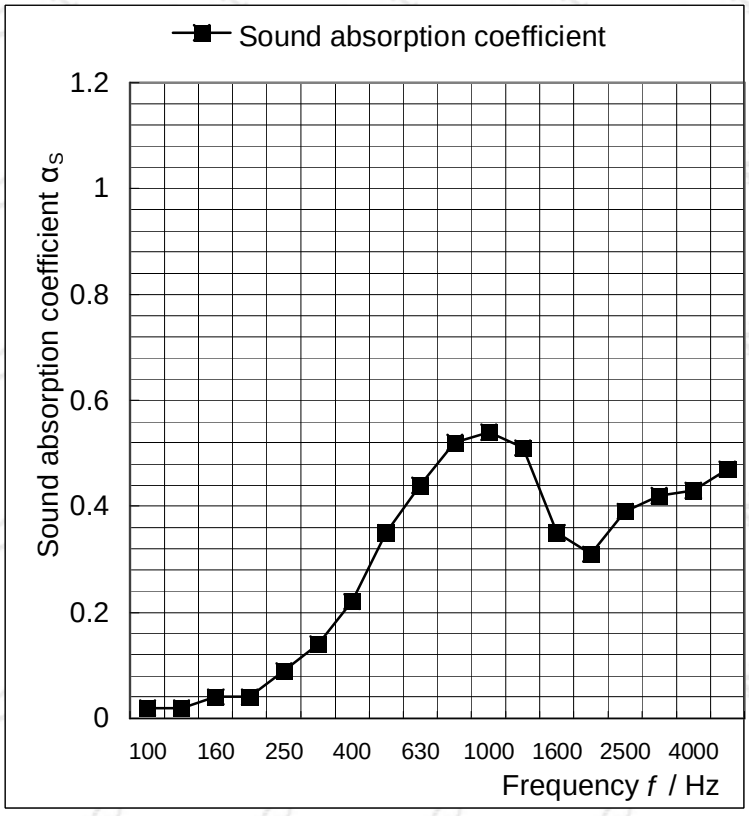
Annex1: Test result 1

Specimen:	Wooden Acoustic Panel (2440*128*15mm)
Installation Methods:	Stick metope
Client:	Detech Real Estate and Trading Joint stock Company
Laboratory:	East Notice Certification Service Co., Ltd.

Specimen area:	0.085 m^2	Test room volume:	155 m^3
Surface mass:	9.0 kg/m^2	Area of room boundaries:	179 m^2
Temperature of test room:	22 ℃	Test date:	2011-05-10
Relative humidity:	61 %	Test file identification:	ENC110509GZ74E1-1
Atmospheric pressure:	102 KPa		

Third octave band results:

Frequency [Hz]	αS 1/3 octave	αp oktave
100	0.02	0.05
125	0.02	
160	0.04	
200	0.04	0.10
250	0.09	
315	0.14	
400	0.22	0.35
500	0.35	
630	0.44	
800	0.52	0.50
1000	0.54	
1250	0.51	
1600	0.35	0.35
2000	0.31	
2500	0.39	
3150	0.42	0.45
4000	0.43	
5000	0.47	



α_S Sound absorption coefficient according to ISO 354

α_p Practical sound absorption coefficient according to ISO 11654

Weighted sound absorption coefficient α_w = 0.35, Sound absorption class: D

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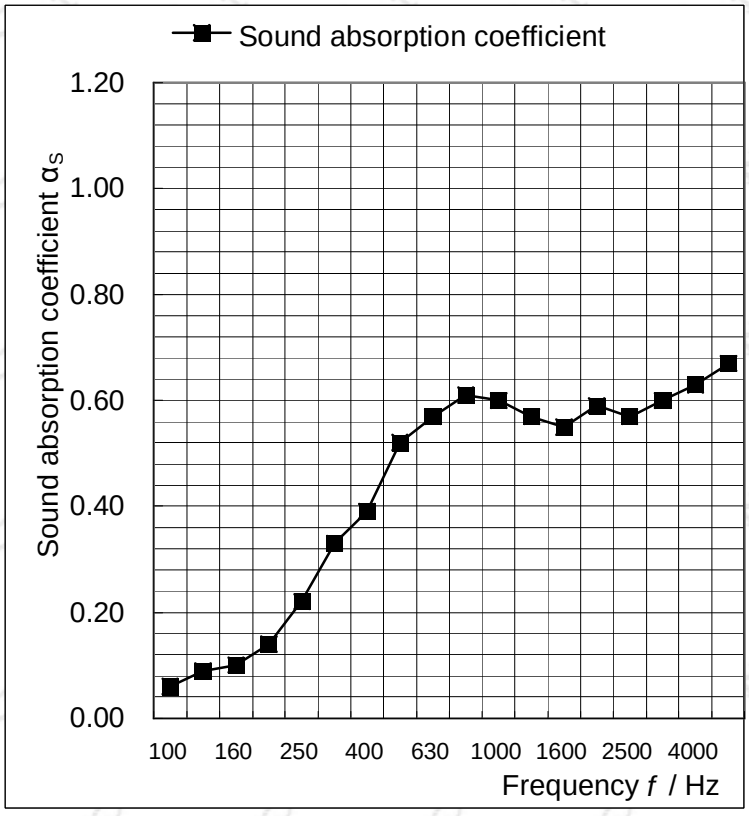
Test result 2

Specimen:	Wooden Acoustic Panel (2440*128*15mm)
Installation Methods:	3 cm spaces
Client:	Detech Real Estate and Trading Joint stock Company
Laboratory:	East Notice Certification Service Co., Ltd.

Specimen area:	0.085 m^2	Test room volume:	155 m^3
Surface mass:	9.0 kg/m^2	Area of room boundaries:	179 m^2
Temperature of test room:	22 ℃	Test date:	2011-05-10
Relative humidity:	61 %	Test file identification:	ENC110509GZ74E1-2
Atmospheric pressure:	102 KPa		

Third octave band results:

Frequency [Hz]	αS 1/3 octave	αp oktave
100	0.06	0.10
125	0.09	
160	0.10	
200	0.14	0.25
250	0.22	
315	0.33	
400	0.39	0.50
500	0.52	
630	0.57	
800	0.61	0.60
1000	0.60	
1250	0.57	
1600	0.55	0.60
2000	0.59	
2500	0.57	
3150	0.60	0.65
4000	0.63	
5000	0.67	



α_S Sound absorption coefficient according to ISO 354

α_p Practical sound absorption coefficient according to ISO 11654

Weighted sound absorption coefficient α_w = 0.50, Sound absorption class: C

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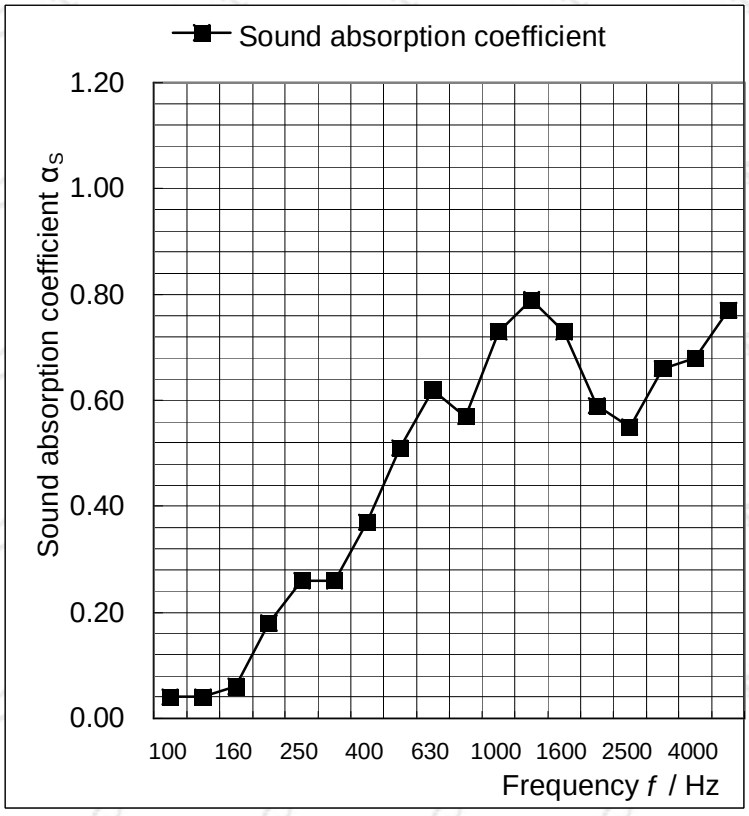
Test result 3

Specimen:	Wooden Acoustic Panel (2440*128*15mm)
Installation Methods:	27.5 cm spaces
Client:	Detech Real Estate and Trading Joint stock Company
Laboratory:	East Notice Certification Service Co., Ltd.

Specimen area:	0.085 m^2	Test room volume:	155 m^3
Surface mass:	9.0 kg/m^2	Area of room boundaries:	179 m^2
Temperature of test room:	22 ℃	Test date:	2011-05-10
Relative humidity:	61 %	Test file identification:	ENC110509GZ74E1-3
Atmospheric pressure:	102 KPa		

Third octave band results:

Frequency [Hz]	αS 1/3 octave	αp oktave
100	0.04	0.05
125	0.04	
160	0.06	
200	0.18	0.25
250	0.26	
315	0.26	
400	0.37	0.50
500	0.51	
630	0.62	
800	0.57	0.70
1000	0.73	
1250	0.79	
1600	0.73	0.60
2000	0.59	
2500	0.55	
3150	0.66	0.70
4000	0.68	
5000	0.77	



α_S Sound absorption coefficient according to ISO 354

α_p Practical sound absorption coefficient according to ISO 11654

Weighted sound absorption coefficient α_w = 0.55, Sound absorption class: C

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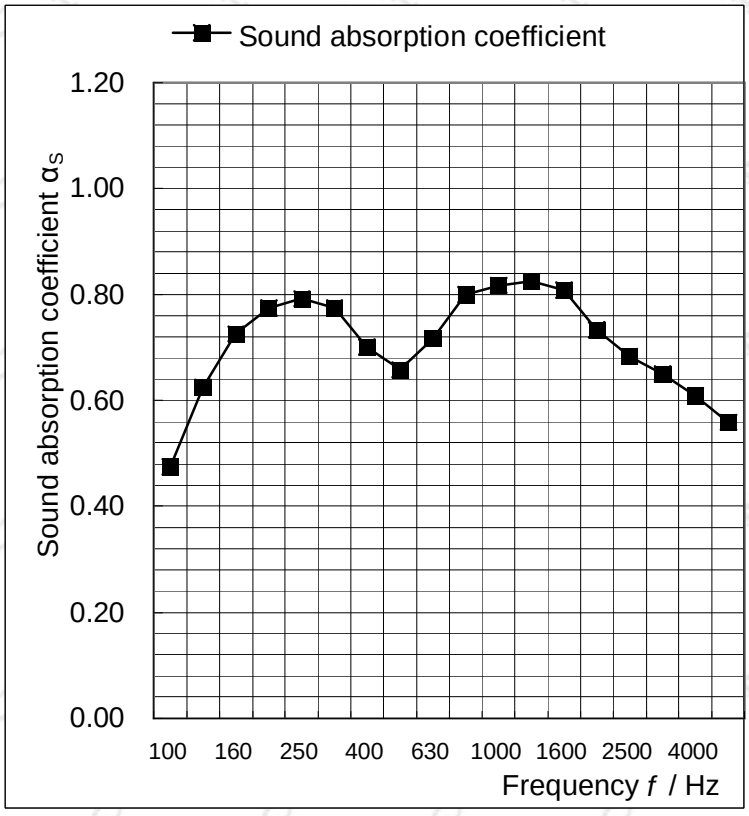
Test result 4

Specimen:	Wooden Acoustic Panel (2440*128*15mm)
Installation Methods:	3 cm Thickness/Fill 3 cm thickness 50kg/m^3 soft materials
Client:	Detech Real Estate and Trading Joint stock Company
Laboratory:	East Notice Certification Service Co., Ltd.

Specimen area:	0.085 m^2	Test room volume:	155 m^3
Surface mass:	9.0 kg/m^2	Area of room boundaries:	179 m^2
Temperature of test room:	22 ℃	Test date:	2011-05-10
Relative humidity:	61 %	Test file identification:	ENC110509GZ74E1-4
Atmospheric pressure:	102 KPa		

Third octave band results:

Frequency [Hz]	αS 1/3 octave	αp oktave
100	0.48	0.60
125	0.63	
160	0.73	
200	0.78	0.80
250	0.79	
315	0.78	
400	0.70	0.70
500	0.66	
630	0.72	
800	0.80	0.80
1000	0.82	
1250	0.83	
1600	0.81	0.75
2000	0.73	
2500	0.68	
3150	0.65	0.60
4000	0.61	
5000	0.56	



α_S Sound absorption coefficient according to ISO 354

α_p Practical sound absorption coefficient according to ISO 11654

Weighted sound absorption coefficient α_w = 0.75, Sound absorption class: B

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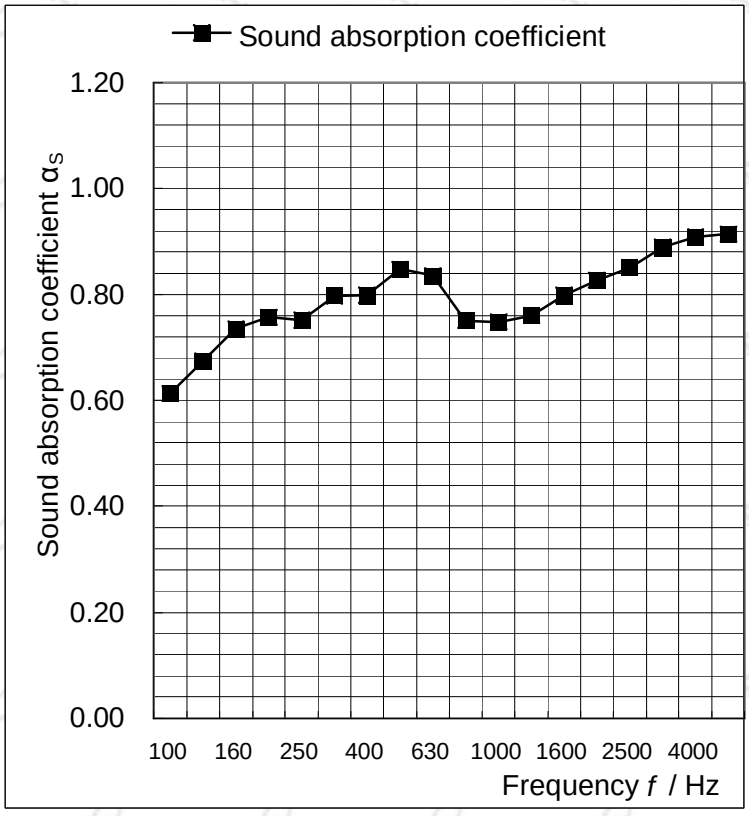
Test result 5

Specimen:	Wooden Acoustic Panel (2440*128*15mm)
Installation Methods:	27.5 cm spaces/ Fill 4 cm thickness 50kg/m^3 soft materials
Client:	Detech Real Estate and Trading Joint stock Company
Laboratory:	East Notice Certification Service Co., Ltd.

Specimen area:	0.085 m^2	Test room volume:	155 m^3
Surface mass:	9.0 kg/m^2	Area of room boundaries:	179 m^2
Temperature of test room:	22 ℃	Test date:	2011-05-10
Relative humidity:	61 %	Test file identification:	ENC110509GZ74E1-5
Atmospheric pressure:	102 KPa		

Third octave band results:

Frequency [Hz]	αS 1/3 octave	αp oktave
100	0.61	0.70
125	0.67	
160	0.74	
200	0.76	0.75
250	0.75	
315	0.80	
400	0.80	0.85
500	0.85	
630	0.84	
800	0.75	0.75
1000	0.75	
1250	0.76	
1600	0.80	0.85
2000	0.83	
2500	0.85	
3150	0.89	0.90
4000	0.91	
5000	0.91	



α_S Sound absorption coefficient according to ISO 354

α_p Practical sound absorption coefficient according to ISO 11654

Weighted sound absorption coefficient α_w = 0.80, Sound absorption class: B

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Annex 2: Mounting of specimen

The specimen was mounted in the reverberation room in conformance with ISO 354:2003 Annex B.

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Annex 3: Measurement arrangements

1. Acoustical measurements

The test signal was produced to the test room using three fixed omnidirectional loudspeakers (6 x Seas B&K2260D). The test signal (pink noise) was produced by a real time analyzer (Bruel & Kjaer 2133) and amplified with terminal amplifier (B&K2716). The sound pressure level in the reverberation room was measured with a condencer microphone on a tripod (B&K 5821 equipped with a pre-amplifier B&K4296).

The reverberation time at third-octave bands was measured with the real time analyzer (B&K4189) using 20 dB decay range. All frequency bands were measured using 2 sources simultaneously and 4 microphone locations. In every location an ensemble average of 10 decays was measured. The total number of reverberation time measurements was 8.

The acoustical measurement equipment fullfilled the following IEC standards and grades of accuracy:

IEC 651	Sound level meters	type 1
IEC 804	Integrating sound level meters	type 1
IEC 1260	Octave-band and fractional-octave-band filters	class 1
IEC 942	Sound level calibrators	class 1

2. Other measurements

The temperature and the relative humidity of the measurement rooms were measured with a psykrometer (Casella London 7165). The ambient atmospheric pressure was measured with a barometer (B&K MD0001). The specimen was weighed with a 150 kg precision weighing machine (PM 150). The dimensions of the specimen were measured with a roll meter (K-Prof).

3. The test room

The reverberation room was equipped with six fixed diffuser panels. The positions were selected randomly in respect with altitude, angle and position. The amount of diffusers and their arrangement fulfills the requirements of Annex A in ISO 354. The reverberation time of the reverberation room fulfills the requirements of ISO 354 for 155 m^3 test room.

4. References to the ISO standards

Test: ISO 354:2003 (E) Acoustics - Measurement of sound absorption in a reverberation room, International Organization for Standardization, 2003, Genève, Switzerland.

SFS-EN ISO 11654 Acoustics - Sound absorbers for use in buildings - Rating of sound absorption, International Organization for Standardization, 1997, Genève, Switzerland

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