Housing & Building National Research Center

Vice-Chairman Office
for Research and Studies Affairs

المركز القومي لبحوث الإسكان والبناء

مكتب نائب رئيس مجلس الإدارة
لشئون البحوث والدراسات

مرجعنا : ٢٠١٩/٠٧/٣٤

مرجعكم : ٢٠١٩/٠٧/٣٠

الموضوع: إجراء اختبار امتصاص صوتي

الجهة الطالبة: شركة التجهيزات الخشبية

تحية طيبة وبعد،،

إيماءً إلى تعاقد سيادتكم الوارد برقم ٥٩٥ بتاريخ ٢٠١٩/٠٧/٣٠ بخصوص الموضوع عاليه، مرفق طيه التقرير بالنتائج وقد سددت الرسوم المقررة بالقسيمة رقم ٠١٩٧٧٢٢ بتاريخ ٢٠١٩/٠٧/٣٠

وتفضلوا بقبول فائق الاحترام،،

مدير المعهد

أستاذ دكتور /

محمود علي حسن

نائب رئيس مجلس الإدارة

لشئون البحوث والدراسات

أستاذ دكتور/

خالد محمد يسري

المركز القومي لبحوث الإسكان والبناء
إدارة الشئون الإدارية والعمومية
التاريخ ٢٠١٩/٨/٧ المرفقات .....
رقم الصادر .....

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٨٧ شارع التحرير الدقى - جيزة
ص.ب. : ١٧٧٠ القاهرة

Building Physics Institute (BPI)

Housing & Building National Research Center (HBRC)

ACOUSTIC ACTIVITY LABORATORY

SOUND ABSORPTION COEFFICIENTS MEASUREMENTS FOR PERFORATED WOOD PANELS DELIVERDED FROM WOODEK,WOOD EQUIPMENT CO.

Supplier name:	WOODEK,WOOD EQUIPMENT CO.	**Testing name:**	Sound absorption coefficient in Reverberation Room acc. ASTM C423
Supplier code:	BPEL -A-30	**Testing date:**	5/8/2019
Delivery Date:	5/8/2019	**Sample Code:**	BPEL -A-A-85
Delivery No:595		**Report NO:**	BPEL-A-A-85/019

2. Acoustical Technique of Measurements

2.1 Sound Absorption Coefficient

The measurement of sound absorption coefficient is important for materials used for acoustic treatments in building. Using materials of different absorption is often the easiest way to control the reverberation time and other properties defining the acoustical quality of auditorium such as studios theaters cinema, etc. the sound absorption coefficient of acoustic materials measured by using reverberation room. In the reverberation room method a certain portion of the floor of the reverberation room is covered with rock pads samples to be tested, and its effect in changing the reverberation time of the reverberation room is investigated.

3. Measurements of Reverberation Time

The measurements of reverberation time in room under consideration were carried out in the reverberation room without and with the sample according to ASTM C423- type I mounting. Where the tested sample was applied to a substrate and tested in type A mounting including a farm around the test sample. Hand-held Analyzer Type 2270 is used with connection of condenser microphone type 4189 and omni directional loudspeaker type 4292 (B&K) and power amplifier 2716 (B&K). Using the Building Acoustics Software BZ-7228, the analyzer generates noise test signal and excites the reverberation room through third octave filtered noise signal and the reverberation time is measured without sample and with the sample.

3.1 Calculation of the sound Absorption Coefficients

According to standard ASTM C423, the equivalent sound absorption area A, in square meters of the test specimen is calculated according to the formula:

$$A_T = A_2 - A_1 = 55.3\ V\ (1/c_2T_2 - 1/c_1T_1) - 4V(m_1 - m_2)$$

Where:

A_1 The equivalent sound absorption area of the empty reverberation room, A_1, in square metres

A_2 The equivalent sound absorption area of the reverberation room containing a test specimen, A2,
in square metres

V is volume in cubic meter of the empty reverberation room

c_1, c_2 is velocity of the sound in air in meter per second and can be calculated from the formula: c= 331+0.6t where

t is the temperature in degree Celsius

T_1 is the reverberation time in seconds in the reverberation room without specimen

T_2 is the reverberation time in seconds in the reverberation after with specimen

m_1, m_2 is the power attenuation coefficient, in reciprocal meters, calculated according to ISO 9613-1 using the climatic conditions that have been present in the empty reverberation room during the measurement

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The sound absorption coefficient αs of the test specimen shall be calculated using the formula
αs = A/S
S is the surface area of sample

Table 2 List of Equipment Used for Laboratory Sound Transmission Loss Test

Item	Equipment Name	Type	Serial No.
1	Omni Directional Loud Speaker	4292	017022
2	Power Amplifier	2716	562839
3	Sound Level Calibrator	4231	2169925
٤	Fixed Microphone Boom	3923	2610778
٥	KIMO	KH100A0	07031635
6	Sound Level Meter	2270	2679295
7	Preamplifier	ZC0032	11418
8	Microphone	4189	2676444
9	Laser meter	HD50	888564253

Notes:

****The results of this report refer only to the particular item submitted to HBRC acoustic laboratory for testing***

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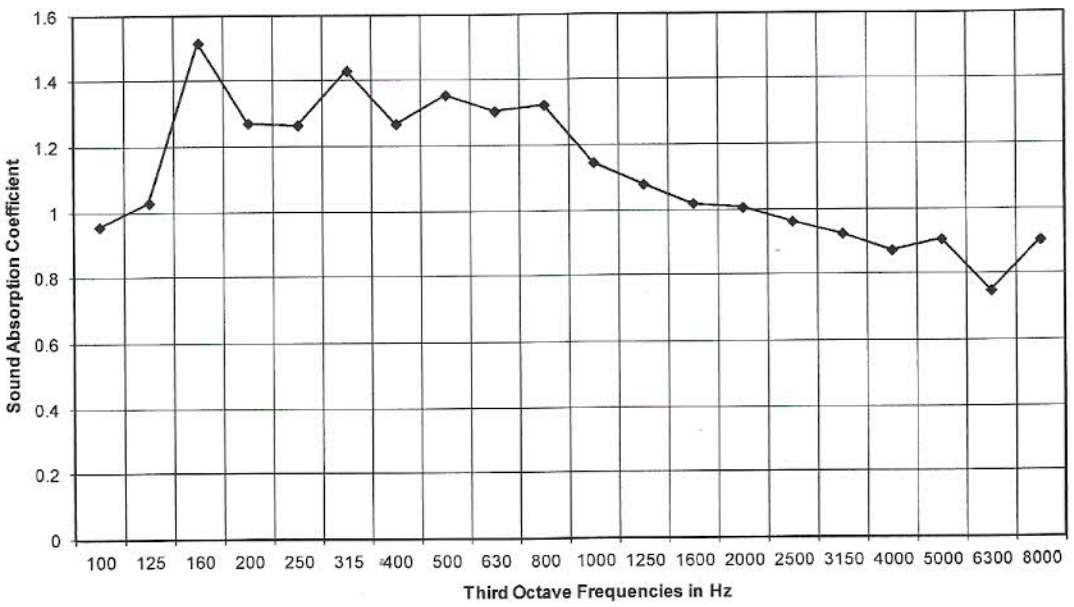
Measurements of Sound absorption coefficient According to ASTM C423

Supplier	**WOODEK,WOOD EQUIPMENT CO.**	**Mounting**	On the wall with air space
Sample specification	perforated wood panels with Rockwool 5 cm, 100kg/m^3 with airspace behind	**Test Date**	6/8/2019
Environmental condition	Tave.: 25	RHave: **52**	**Calibration deviation** 0.15dB
Area of the sample	8 m^2	**Instrumentation**	SLM 2270 (B&K) & BZ BZ-7228 & mic 4189 (B&K) &S.S 4292 (B&K)

Freq.	
100	0.96
125	1.03
160	1.52
200	1.27
250	1.27
315	1.43
400	1.27
500	1.35
630	1.30
800	1.32
1000	1.15
1250	1.08
1600	1.02
2000	1.01
2500	0.96
3150	0.92
4000	0.87
5000	0.91
6300	0.75
8000	0.90
NRC	1



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7/8/2019 6/6 BPEL-A-A-85/019

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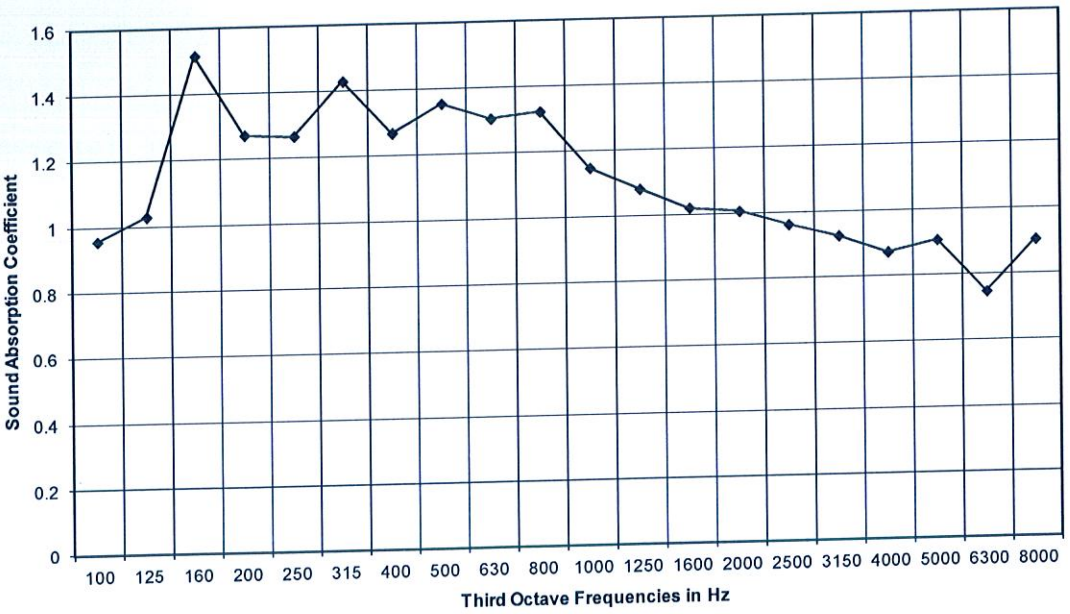

This means that 100% of sound energy is absorbed at these octave fre. (250,500, 1000, 2000 HZ)

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