Healthy, quiet and comfortable environments...

Boron Based

Cellulosic Isolation Era

ACOUSTIC SPRAY INSULATION

CelluBOR®

Heat - Sound - Fire Insulation

كينيتكس ميدل إيست ذ.م.م.

KINETICS

Middle East LLC

What is CelluBOR?

CelluBOR is a boron-based cellulosic material, which is used of thermal, sound, and fire insulator. Thanks to the pouring, blow-filling and special spraying machines, CelluBOR can be applied to all kinds of surfaces easily.

It mimics naturally-occuring materials thanks to its porous structure, which can breath. Producing the material entirely from natural materials ensures that the performance of the product remains constant throughout its lifetime. There is no volumetric loss and no deterioration in terms of thermal, sound and fire insulation.

CelluBOR has the possibility to be applied on every surface at desired thickness and density. During its application no gap is left which prevents the formation of thermal and sound bridges.

CelluBOR is completely environmentally friendly. The assessment of waste paper contributes to the country's economy.

It is used in thermal, sound isolation and acoustic regulations. It can be used in Cinemas, concert halls, meeting factories, workshops and other open-public spaces and also in places where sound isolation is required at high levels, such as recording studios.

Density: It can be applied at densities ranging from 30-150 kg / m^3.

It is completely inert towards enzymatic reactions. Thus, it does not biologically degredade. It is not carcinogenic. It does not deteriorate with time, does not rot, does not corrode.

Energy

More Thermal Resistance with CelluBOR

Thanks to the high thermal insulation provided by CelluBOR, up to 70% fuel saving is achieved. Thus, more thermal resistance is obtained by paying less.

Economy

CelluBOR is Economic

If the insulation material is expensive, the recycling period of the investment will be prolonged and the economic contribution to the consumer will decrease. In addition to thermal insulation, CelluBOR also makes fire and sound insulation. It also contributes to the use of boron, which is a natural resource in Turkey.

Ecology

CelluBOR is Environmentally and Health Friendly

CelluBOR does not contain any carcinogenic or harmful substances. It allows the buildings to breathe thanks to its physical structure. It prevents mold, dampness and rust. It is nature friendly as it is made of recycled paper (%80).

Insulation Sector Performance Awards 2006 INVESTMENT AWARD OF THE YEAR

CelluBOR® Heat - Sound - Fire Insulation

TS EN 15101

ISO 9001:2008

Certificate Of Conformity To Turkish and European Standards

TURKISH STANDARDS INSTITUTION
CERTIFICATE OF CONFORMITY TO TURKISH STANDARDS

Description of the Mark

TSE or  or TSE

REFERENCE NUMBER OF LICENCE	:	035767 - TSE - 01/02
DATE OF FIRST ISSUE OF LICENCE	:	03.11.2015
LICENCE VALID UNTIL	:	03.11.2017
NAME OF THE LICENCE HOLDER	:	ÇAĞ ENGINEERING ARCHITECTURE CONSTRUCTION TRADE COMPANY
ADRESS OF THE LICENCE HOLDER	:	MİMAR SİNAN MAHALLESİ ÇAVUŞBAŞI CADDESİ ÖZGE SOKAK ZİNDE İŞ MERKEZİ NO: 1/10 ÇEKMEKÖY İSTANBUL/TÜRKİYE
NAME OF THE MANUFACTURING PLACE	:	ÇAĞ ENGINEERING ARCHITECTURE CONSTRUCTION TRADE COMPANY
ADRESS OF THE MANUFACTURING PLACE	:	FEVZİ ÇAKMAK MAHALLESİ MAKPARSAN SANAYİ SİTESİ DEVECİ SOKAK 2. BLOK NO: 7 KARATAY KONYA/TÜRKİYE
INDICATION OF SUPERSEDED LICENCE (if any)	:	035767 - TSE - 01/01
REGISTERED TRADE MARK	:	Cellu BOR
RELATED STANDARD	:	TS EN 15101-1 / Thermal Insulation Products for Buildings - In -situ formed Loose Fill Cellulose (LFCI) Products - Part 1: Specification for the Products Before Installation / 13.02.2014

SCOPE OF LICENCE

"CelluBOR" Trade Mark
Thermal Insulation Products for Buildings - In -situ formed Loose Fill Cellulose (LFCI) Products

Fire Resistance: B S1 d0
Thermal Insulation Coefficient: 0.037 W/m.
The Settlement Class of Horizontal Dry Applications: SH 10
Short Duration Water Absorption Ratio Class: WS2
The Resistance Class to Fungus: BA0
Weighted SoundAbsorption Coefficient (Qw) is1,0 and sound absorption Class : A

TÜRK STANDARTLARI ENSTİTÜSÜ KONYA BELGELENDİRME MÜDÜRLÜĞÜ

03/11.2015

İBRAHİM YÜCEL AYDEMİR
KONYA BELGELENDİRME MÜDÜRÜ
(V)

CelluBOR is Healthy and Long-Lasting

In order for the insulation material to be long lasting, it must not contain fungi, microbiological organisms, insects etc. Such living structures reduce the life of the material in a short time, putting human health in danger. In the following experiments performed according to TS EN 13501, no microorganisms were found in CelluBOR. According to this, CelluBOR does not rot and is very long-lasting. It's totally hygienic. The building is made in full compliance with health conditions.

Customer Name / Address : ÇAĞ ENGINEERING ARCHITECTURE CONSTRUCTION TRADE COMPANY
Report No : 72258
Date : 10.12.2014
Reason of Analysis : QUALITY CONTROL
Sample Shipper : ÇAĞ ENGINEERING ARCHITECTURE CONSTRUCTION TRADE COMPANY
Shipper's Address :
Laboratory Arrival Date : 10.12.2014
Start / End date of the analysis : 10.12.2014 / 24.12.2014

SAMPLE'S
Type : CelluBOR Insulation Material
Packing : ORIGINAL PACKING
Production and Expiration Date :
Quantity : 3kg
Explanation :

Analysis Done	*Result / Unit*	*Determined Sublimit*	*Analysis Method*
Aspergilus niger	**Class BA : 0**		**TS EN 15101-1:2013 Annex F**
Trichoderma viride	**Class BA : 0**		**TS EN 15101-1:2013 Annex F**
Chaetomium globosum	**Class BA : 0**		**TS EN 15101-1:2013 Annex F**
Paecilomyces variotti	**Class BA : 0**		**TS EN 15101-1:2013 Annex F**
Penicillum pinophilum	**Class BA : 0**		**TS EN 15101-1:2013 Annex F**

The above mentioned values were determined as the result of the inspection and analysis.

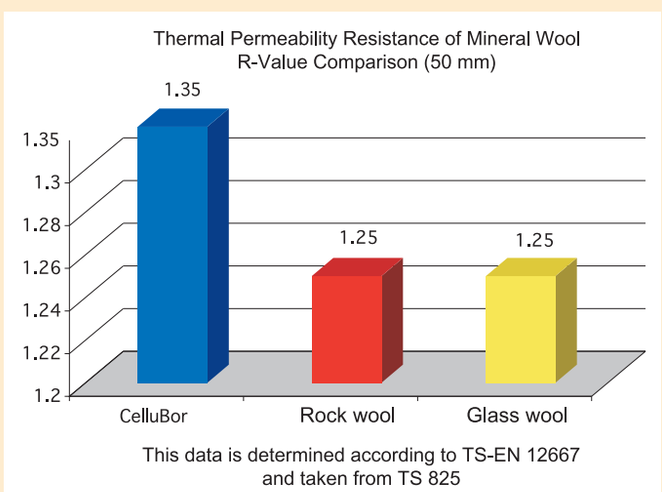
Features of CelluBOR

Thermal

The thermal conductivities (λ) of the insulation materials should be between 0.020-0.060 W/mK. CelluBOR's λ value is not affected by density variation and temperature changes. Its thermal conductivity value is 0.037 W / mK.

R value

R value -thermal resistance- is the figure demonstrates the total thermal insulation value of the structure. The R value, expressed as resistance of components and insulation materials against heat transfer, is an important criterion for selecting materials. The heat conductivity resistance of CelluBOR is 1.35m^2 K / W at 50mm thickness. It is temperature independent.



Acoustic and Noise Transition

CelluBOR absorps sounds due to its flexible and soft structure. Its irregular and fiber textured structure (High surface weight and porous structure) prevents reverberation and tinnitus. When used with the appropriate components and applied in appropriate thickness, the CelluBOR system has the ability to absorp sounds up to 70 dB of noise. Acoustically the sound absorbing feature is perfect. Its sound absorption coefficient is 1.0, which corresponds to class A.

CelluBOR® Heat - Sound - Fire Insulation

TS EN 15101

ISO 9001:2008

The Right Choice for Fire Safety

CelluBOR ...

Fire

The fire retardant boron components in CelluBOR provide the necessary fire protection (duration, smoke amount, no dripping, no fire advance etc). for the building.
CelluBOR is in Class B Fireproof Materials according to EN 13501-1 Norm. CelluBOR is in fire reaction class B-s1, d0.

A, B, C, D, E (Class of building products, except floor coverings)	
Class B	According to the EN ISO 11925-2 test and the EN 13823 test, providing FIGRA (=$FIGRA_{0,2\ Mj}$) ≤ 120 W/s $THP_{600s} \leq 7,5_{Mj}$

S_i-smoke generation class (S_1, S_2, S_3)*	
According to S1 = EN13823	SMOGRA ≤ 30 m^2/s^2 ve $TSP_{600s} \leq 50\ m^2$

d_0- Drop formation class (d_0, d_1, d_2)*	
d_0	According to EN 13823 in 600s Burning drops/ particles do not occur

*These data have been determined according to EN 13501. Details about other classes and classifications are available here.
**Product specifications of 'CelluBOR' (Cellulosic Insulation Material) is determined according to TS EN 15101 standards.
***The CelluBOR fire response tests above were made by the TSE laboratory and were reported in 25/11/2014.

CelluBOR®
Heat - Sound - Fire Insulation

TS EN 15101

ISO 9001:2008

Weighted Sound Absorption Coefficient and Class

Sound Absorption Coefficient Measurement Test Report

TURKISH ACCREDITATION AGENCY

TÜBİTAK UME

TÜRKAK Test TS EN ISO IEC 17025 AB-0092-T

AB-0092-T
UME G2AK-0002
12-14

TUBITAK
NATIONAL METEOROLOGY INSTITUTE

Test Report

Customer / Adress	:	ÇAĞ ENGINEERING ARCHITECTURE CONSTRUCTION TRADE COMPANY Mimar Sinan Mh. Çavuşbaşı Cad. Özge Sk. No: 1/10 Çekmeköy - İSTANBUL
Order No	:	2014.02162
Name and Identity of Test Item	:	CelluBOR Cellulose Insulation Material
Date of Receipt of Test Item	:	01.12.2014
Remarks	:	Sound Absorption Coefficient Measurement
Date of Test	:	01.12.2014

Technical Description

Manufacturer	ÇAĞ ENGINEERING ARCHITECTURE CONSTRUCTION TRADE COMPANY
Description of materials	CelluBOR Cellulose Insulation Material having thickness of 100 mm
Properties of materials	Content : 81% Cellulose obtained from paper, 7% Borax pentahydrate and 12% Boric acid Thickness : 10cm Density : 30 kg/m^3
Application of material into the room	Absorption surface is obtained by normal spreading method on the room floor. The perimeter of the surface is surrounded by aluminyum plate.

Weighted Sound Absorption Coefficient and Class

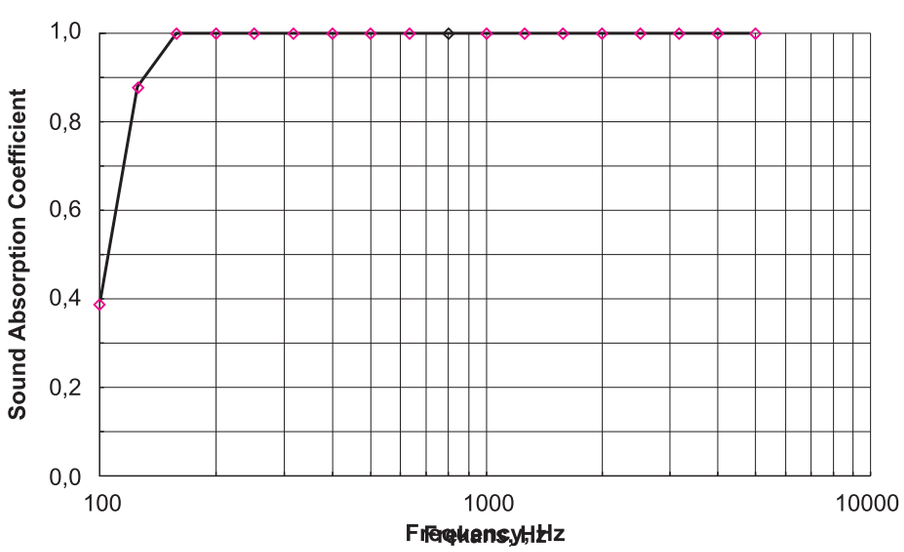
Weighted sound absorption coefficient and absorption class according to ISO 11654:1997 standard

Weighted Sound Absorption Coefficient	1,0
Sound Absorption Class	A

Test Result Details

Measured reverberation time values of empty room and when CelluBOR Cellubose Insulation Material placed the room and calculated sound absorption coefficient values

Frequency (Hz)	Resonate Duration (s)		Sound Absorption Coefficient (α_p)
		Absorbing Surface inside the room	
100	3,77	2,66	0,39
125	7,30	2,59	0,88
160	6,92	2,16	1,00
200	7,95	2,15	1,00
250	8,73	2,19	1,00
315	8,30	2,00	1,00
400	7,80	2,18	1,00
500	8,06	2,19	1,00
630	8,79	2,34	1,00
800	8,07	2,35	1,00
1000	7,51	2,29	1,00
1250	6,89	2,31	1,00
1600	6,37	2,20	1,00
2000	5,60	2,12	1,00
2500	4,64	1,95	1,00
3150	3,53	1,71	1,00
4000	2,86	1,51	1,00
5000	2,18	1,32	1,00



Sound absorption coefficient versus frequency

Sound Transmission Test Report

Accredited by TÜRKAK

HEADSHIP OF TSE TEST and CALIBRATION CENTER
CONSTRUCTION MATERIALS FIRE AND
ACOUSTICS LABORATORY DIRECTORATE

Address: Aydınlı Mah. Gülennur Sok. No: 7/1 Tuzla/İSTANBUL
Tel: +90 (216) 560 05 27 Fax: +90 (216) 560 05 65 E-mail: yalitim@tse.org.tr Web: www.tse.org.tr

TÜRKAK Test TS EN ISO/IEC 17025 AB-0001-T

AB-0001-T
293746
04-16

TEST REPORT

Introduction

At the request of **ÇAĞ Engineering Architecture Construction Trade Company,** airborne sound insulation measurements were carried out for Wall system that was constituted gypsum board (Knauf Alçıpan Flex 12,5mm) and insulation material (Cellubor) at the acoustic department of TSE Construction Materials Fire and Acoustic Laboratory according to TS EN ISO 10140-2: 2013 on 24.03.2016

Description of the test specimen

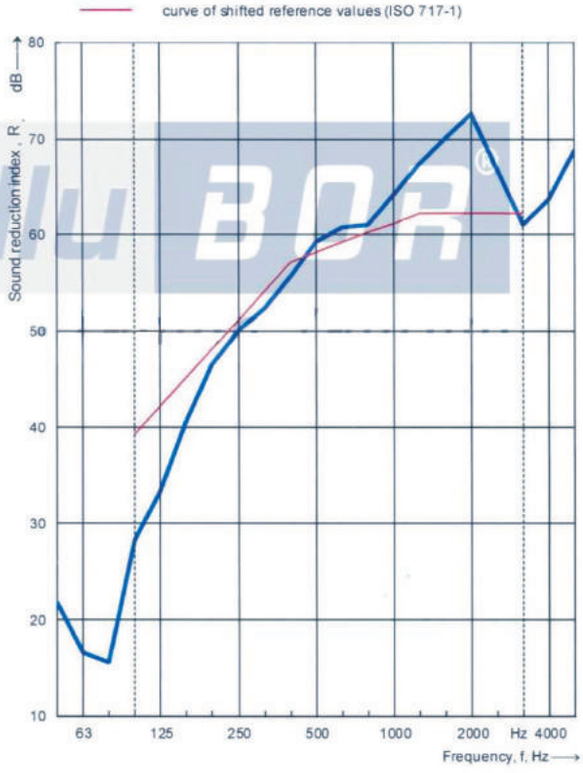
Description of the product: Wall system that was constituted using double gypsum board (Knauf Alçıpan Flex 12,5 mm) on both sides with 10 cm air gap, and the air gap was filled with sound insulation material called Cellubor.
Made of: Gypsum board, Insulation material (Cellubor), support system (C shaped studs)
Surface area: 12,42m^2
Mass per unit area (system): ≈39,9kg/m^2

Dimensions (Wall system)	Length (mm)	Height (mm)	Thickness (mm)
	4060	3060	150

Static pressure:	99,0 kPa
Air temperature:	17,4 °C
Relative air humidity:	58,5 %
Mass per unit area:	≈39,9kg/m²
Area, S, of test element:	12,42 m²
Source room volume:	114,9 m³
Receiving room volume:	174,4 m³

Frequency f [Hz]	R 1/3 octave [dB]	
50	21,9	
63	16,7	
80	15,6	
100	28,2	
125	33,3	
160	40,6	
200	46,5	2
250	50,2	2
315	52,3	2
400	55,7	2
500	59,2	2
630	60,7	
800	61,0	
1000	64,1	
1250	67,4	
1600	70,1	
2000	72,6	
2500	66,8	
3150	61,0	
4000	63,7	
5000	68,8	

² Minimum values



Rating according to ISO 717-1
R_w (C;C_{tr}) = 58,2 (-4 ; -12) dB
Evaluation based on laboratory measurement results obtained in one-third-octave bands by an engineering method.

$C_{50-3150}$ = -12 dB $C_{50-5000}$ = -11 dB $C_{100-5000}$ = -4 dB
$C_{tr,50-3150}$ = -24 dB $C_{tr,50-5000}$ = -24 dB $C_{tr,100-5000}$ = -12 dB

Sound Transmission Test Report

HEADSHIP OF TSE TEST and CALIBRATION CENTER
CONSTRUCTION MATERIALS FIRE AND ACOUSTICS LABORATORY

TEST RESULTS

TS EN ISO 10140-2: 2013; TS EN ISO 717-1: 2013

AB-0001-T
293746
04-16

Sound reduction index according to ISO 10140-2

Laboratory measurement of sound insulation of building elements

Rating according to ISO 717-1

R_w $(C;C_{tr})$ = 58,2 (-4 ; -12) dB

$C_{50\text{-}3150}$ = -12 dB $C_{50\text{-}5000}$ = -11 dB $C_{100\text{-}5000}$ = -4 dB

$C_{tr,50\text{-}3150}$ = -24 dB $C_{tr,50\text{-}5000}$ = -24 dB $C_{tr,100\text{-}5000}$ = -12 dB

Evaluation based on laboratory measurements results obtained in one-third-octave bands by an engineering method.

Sum of unfavourable deviations : 31,8 dB

Max. unfavourable deviation : 11,0 dB at 100 Hz

Frequency [Hz]	R [dB]	L1 [dB]	L2 [dB]	T [s]	Corr. [dB]	u. Dev. [dB]	Bgn status	Ftm status
50	21,9			2,26				
63	16,7			1,99				
80	15,6			2,24				
100	28,2			2,83		11,0		
125	33,3			2,62		8,9		
160	40,6			2,59		4,6		
200	46,5			2,68		1,7		Minimum values
250	50,2			2,99		1,0		Minimum values
315	52,3			2,62		1,9		Minimum values
400	55,7			2,96		1,5		Minimum values
500	59,2			3,14				Minimum values
630	60,7			3,01				
800	61,0			2,84				
1000	64,1			2,64				
1250	67,4			2,37				
1600	70,1			2,30				
2000	72,6			2,51				
2500	66,8			2,57				
3150	61,0			2,37		1,2		
4000	63,7			2,04				
5000	68,8			1,84				

Receiving room volume:	174,4 m³	Air temperature:	17,4 °C
Source room volume:	114,9 m³	Relative air humidity:	58,5 %
Area, S, of test element:	12,42 m²	Static pressure:	99,0
		Mass per unit area:	≈39,9kg/m²

TÜRK STANDARDLARI ENSTİTÜSÜ KALİBRASYON MERKEZİ BAŞKANLIĞI 1954

CelluBOR Applications

Spraying and Filling Applications

Spraying can be applied on interior and exterior walls, basement and basement walls, prefabricated structures, cathedral interiors and industrial roofs. Ceiling/floor insulation in commercial buildings is necessary for sound control between the flooring. It provides noise absorption for wall and roof constructions.

Casting and Pouring Applications

The casting-pouring method can be applied on floors of attics, between two walls and between two spaces formed.
It is preferred due to its excellent performance values when compared to mineral wool insulators applied in cast form. With its high density and perfect compatibility, CelluBOR is the right solution to maximize thermal efficiency by reducing air leaks and heat dissipation on ceiling and floor. In all angles and configurations, CelluBOR can be applied by pouring, injection or spraying with manual casting or special application machine.

CelluBOR Application Areas

• Constructions can be coated with CelluBOR by external spraying under siding, concrete based materials, glass, aluminum, granite etc.
• The inner surfaces of the structures are sprayed and filled under the cover.
• Construction roofs are in the form of casting and pouring.
• Can be filled between two bricks.
• On buildings with steel construction, the building structure is protected against fire.
• On Metal roofs and facades.
• In cold storages.
• In farms.
• Sound insulation is required in mosques, concert halls, meeting rooms, schools, factories, workshops and other public spaces, as well as recording studios.
• In technical insulations on roofs and walls of industrial installations.
• On ships, wagons and containers, on exteriors.
• The most important part of technical infrastructure that hotels and motels, meeting, entertainment and sports facilities and similar facilities.
• In all industrial building roofs, concrete onduline, eternit, sheet metal, membrane etc. provide excellent adhesion to all kinds of materials regardless of the floor.

CelluBOR® Heat - Sound - Fire Insulation

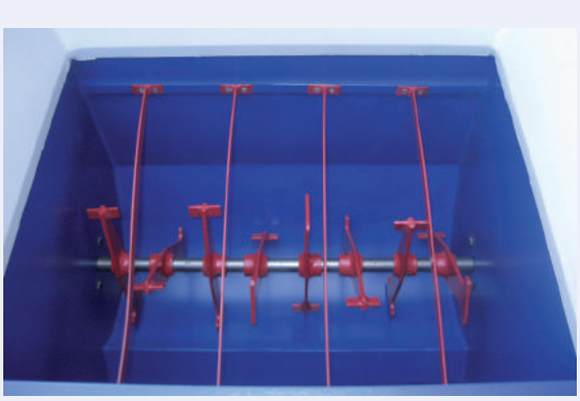
TS EN 15101 ISO 9001:2008

Blowing Machines and Equipment

CelluMAK insulation machines are used to blow the loose form insulation material vertically and horizontally by pneumatic processing form. Wet spraying unit added to CelluMAK spraying system is designed to do both blowing of dry fiber for filling of material inside the vertical gaps and laying of the fiber over the horizontal layers; and spraying of wet fiber material horizontally and vertically to all layers. CelluMAK insulation machine systems are produced under CE certification and production facilities are operated according to the ISO quality management system.

CelluMAK CM-150 model basically consists of 2 units. Main machine unit is opening the pressed material into loose form and blow it by air. The wet spraying unit is mixes the glue inside the tank and pumps it. During the wet insulation application the insulation fiber is blowed inside the hose pipe and the glue is pumped inside the water pipe. Both of them intersect on the air after leaving the CelluMAK pistol. So, the mixed material adhere to the surfaces.

CelluMAK CM-150 system consists of; main blowing machine and its electric box, glue tank and pump, glue filters, 24 meters of pipes and its accessories, 24 meters of insulation transfer hose, electrical control unit and 24 meters of electrical cable, spraying pistol, its filters and nozzles. Shortly, CelluMAK CM-150 system consists of all needed parts for the application of both dry blowing and wet spraying either individually or together.



ISO 9001:2008

HEADSHIP OF TSE TEST and CALIBRATION CENTER

CONSTRUCTION MATERIALS FIRE AND ACOUSTICS LABORATORY DIRECTORATE

Address: Aydinli Mh. Gulennur Sk. No:7/1 Tuzla/ISTANBUL

Tel: +90 (216) 560 05 27 Fax: +90 (216) 560 05 65 E-Mail: yalitim@tse.org.tr Web: www.tse.org.tr

TEST REPORT

Institution of Request:	KONYA CERTIFICATION OFFICE
Customer:	CAG ENGINEERING ARCHITECTURE CO. FEVZI CAKMAK MH. 10615 SK. NO:7 D:1 KARATAY/KONYA
Order Date / Number:	04 May 2018 / 213742
Description of the Sample:	405737, Loose Form Cellulose Insulation (LFCI) Material, CelluBOR, 12.00 square meter
Test Item Receive Date:	04 May 2018
Date of Test:	07 May 2018 – 17 May 2018
Applied Standard/Method:	TS EN ISO 354:2007-02 , TS EN ISO 11654:2002-02
Number of Pages:	9

The Turkish Accreditation Agency (TURKAK) is signatory to the multilateral agreements of the European co-operation for the Accreditation (EA) and of the International Laboratory Accreditation (ILAC) for the Mutual recognition of test reports.

The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages which are part of this report.

Seal	Date	Person in Charge for Testing	Reviewer	Approved By
	17/05/2018	Berat USTA	Sencer GUVEN	Metehan CALIS
		Technician	Technical Chief	Laboratory Manager

Name and Address of the Testing Laboratory	TSE Construction Materials Fire and Acoustics Laboratory Acoustics Department
Institution of Request	Konya Certification Office
Manufacturer	Cag Engineering Architecture Co. Fevzi Cakmak Mh. 10615 Sk. No:7 D:1 Karatay/ KONYA
Type of Inspection	Follow-up audit
Sample Type	CelluBOR brand, on-site casting loose form cellulosic insulation material

1.Introduction

As a request of **TSE Konya Certification Office**, this test had been done in TSE Construction Materials Fire and Acoustics Laboratory Acoustics Department, on the date of **07.05.2018,** aiming to measure sound absorption coefficient with the standard of **"TS EN ISO 354:2007 – Measuring sound absorption coefficient in the reverberation room"** for CelluBOR branded LFCI insulation material.

2. Testing Facility

Testing facility fulfills all the requirements of TS EN ISO 354 standard. Shape-size of the reverberation room and installation method of the sample is attached to the report. (page 9)

Volume of the Reverberation Room	298,5 m^3
Surface Area of the Reverberation Room	273 m^2
Number of Diffuser	9
Surface Area of Diffuser	69,5 m^2
Microphone Located	10
Source Located	2

3. Testing Sample

Testing sample had been chosen and delivered to the Testing Facility by TSE Konya Certification Office personnel.

Production date of the sample: 2018

Laboratory arrival date of the sample: 05/2018

3.1 Identification of the Testing Sample

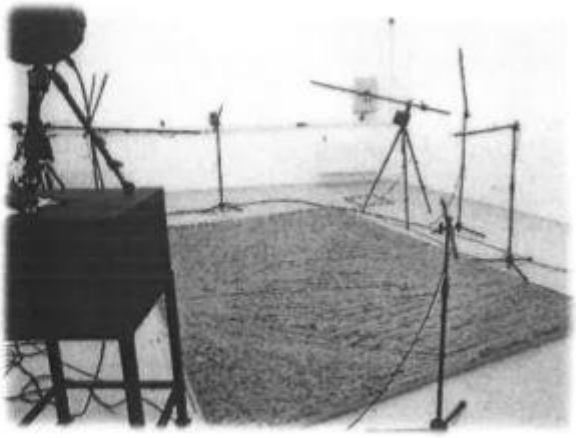
Definition of the sample: CelluBOR brand, on-site casting loose form cellulosic insulation material Unit Weight: ≈3,4 kg/m^2 Surface Area: ≈12 m^2			
Dimensions	Width (mm)	Height (mm)	Thickness (mm)
	3000	4000	≈50

3.2. Installation Method of the Testing Sample

Testing sample have placed in the testing room properly according to TS EN ISO 354 standard, Attachment B, installation type A, which is;

- Sample casted on the ground of reverberation room directly inside the metal frame with the height of 50 mm, not parallel to the side walls of the room.
- Sample is casted inside the frame by hand with approximately 50 mm height.
- Because of the molecular structure of the sample, some surface unevenness observed.
- Sample size is 3000x4000 (mm) and area covered is approximately 12 meter square.

Installation and Measurement Photos



4.Testing Method

Sound absorption coefficient calculated with the formulas below by measuring the reverberation with and without the sample installed inside the reverberation room.

- A_1 – equivalent absorption area of the empty reverberation room is calculated by the formula below in unit of m^2

$$A_1 = (55,3*V/c*T_1)-4*V*m_1$$

Whereas:

V: Volume of the empty reverberation room in unit of m^3

c: Speed of sound in the air in unit of meter per second

T_1: Reverberation time of the empty reverberation room in unit of second

m_1: power reduction coefficient calculated with formula below by ISO 9613-1 in unit of 1/m

$$m = \alpha / 10\lg(c)$$

Whereas:

c, is between the temperatures of 15 degrees Celsius and 30 degrees Celsius

c = 331+0,6*t in units of m per second where t is temperature in units of degree Celsius

- A_2 – equivalent absorption area of the reverberation room with the sample is calculated with the same formula above in unit of m^2

Whereas:

V: Volume of the empty reverberation room in unit of m^3

c: Speed of sound in the air in unit of meter per second

T_2: Reverberation time of the reverberation room with the sample in unit of second

m_2: power reduction coefficient calculated with formula below by ISO 9613-1 in unit of 1/m

Equivalent absorption area of the sample, A_T , is calculated by formula below in unit of meter square

$$A_T = A_2 - A_1 = 55{,}3 * V ((1/c_2 * T_2) - (1/c_1 * T_1)) - 4 * V * (m_2 - m_1)$$

- Sound absorption coefficient of a plane absorber or test objects in an order is calculated with the formula below

$$\alpha_S = A_T / S$$

Whereas:

A_T: Equivalent absorption area of the sample

S: Surface area covered of the sample in unit of meter square

5. Environmental Conditions

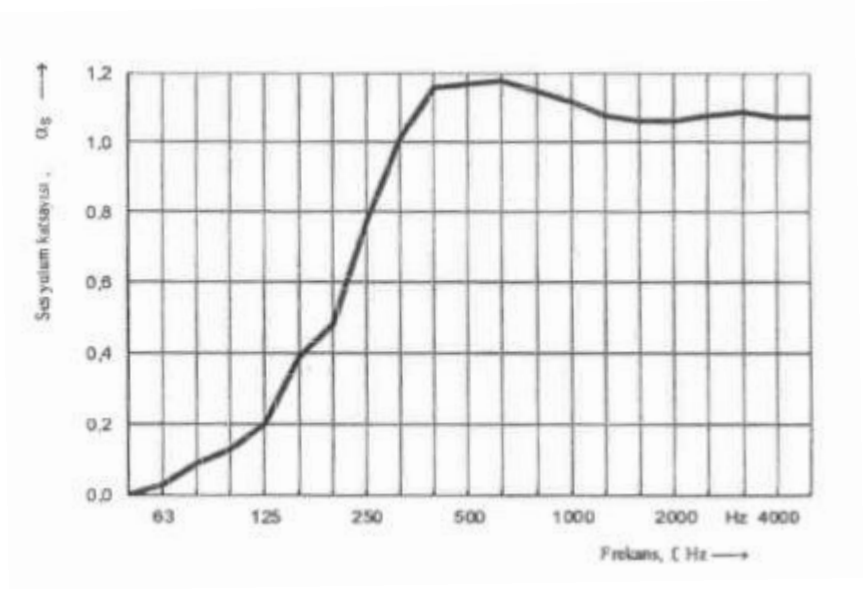
REVERBERATION ROOM	Temperature (˚C)	Pressure (kPa)	Relative Humidity (%)
Empty Room	21,7	100,3	63,7
Room with the Sample	21,9	101,3	68,3

6.Results

Sound absorption coefficients are given with 1/3 octave band on the table below:

According to TS EN ISO 11654 standard, weighted sound absorption coefficient, α_W = 1,00

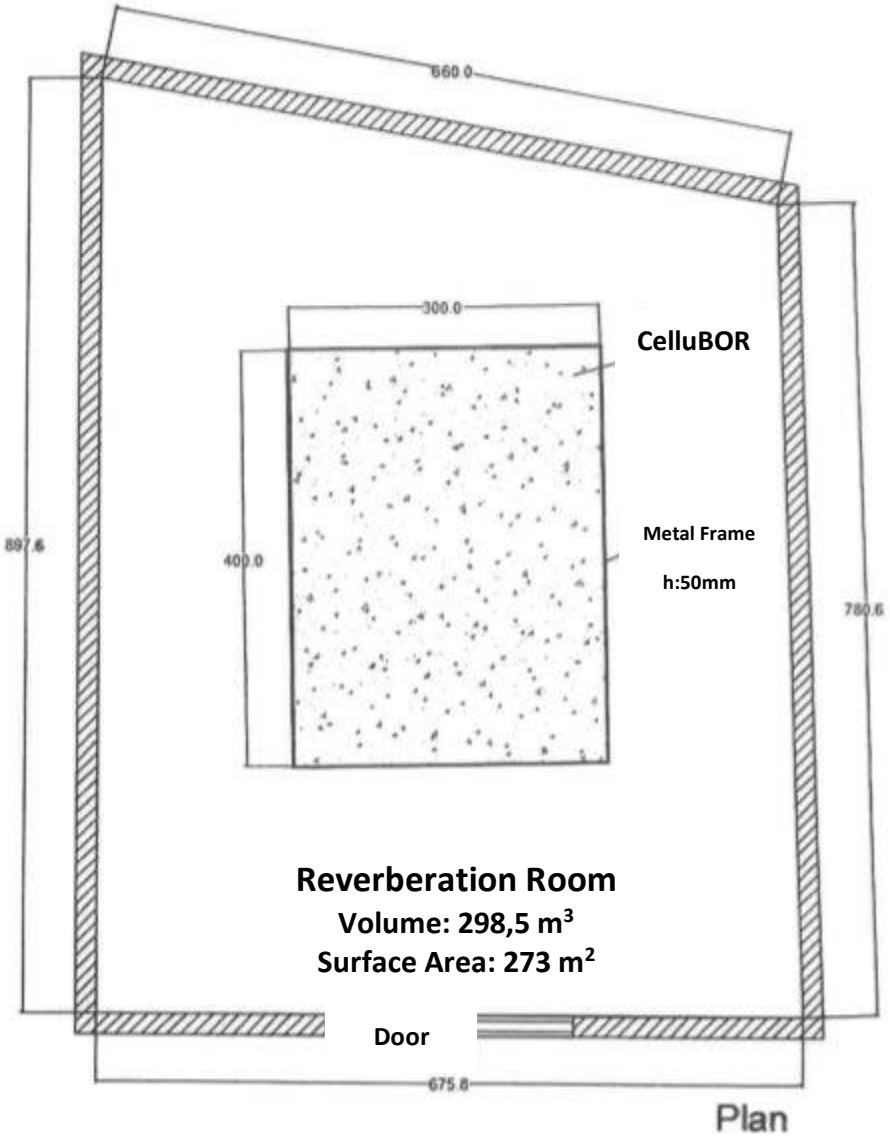
Frequency f (Hz)	α_S 1/3 oktav
50	0,00
63	0,03
80	0,09
100	0,13
125	0,20
160	0,39
200	0,48
250	0,77
315	1,01
400	1,16
500	1,17
630	1,18
800	1,15
1000	1,12
1250	1,08
1600	1,06
2000	1,06
2500	1,08
3150	1,09
4000	1,07
5000	1,07



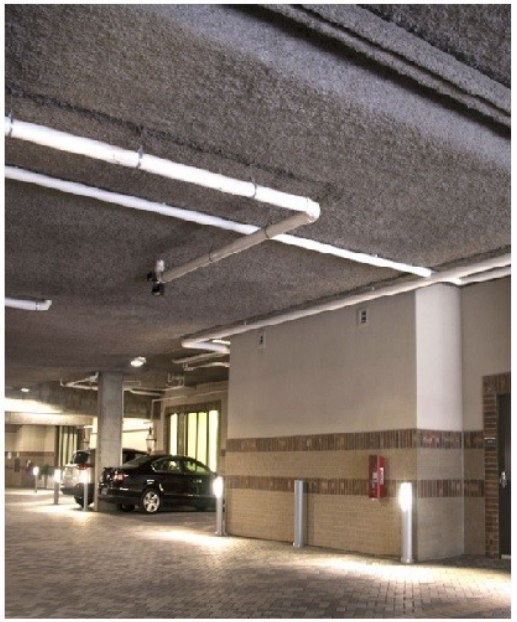
Due to ISO 11654 standard, weighted sound absorption coefficient is;

α_W = 1,00

Frekans [Hz]		a_s	A [m²]	T1 [s]	T2 [s]
50		0,00	0,0	8,94	8,90
63		0,03	0,4	11,90	10,85
80		0,09	1,1	6,14	5,37
100		0,13	1,6	7,18	5,81
125		0,20	2,4	6,02	4,65
160		0,39	4,7	6,97	4,14
200		0,48	5,8	7,12	3,84
250		0,77	9,2	5,78	2,74
315		1,01	12,2	5,91	2,37
400		1,16	13,9	6,83	2,29
500		1,17	14,1	7,32	2,33
630		1,18	14,1	7,55	2,34
800		1,15	13,8	7,39	2,36
1000		1,12	13,4	6,57	2,31
1250		1,08	12,9	5,74	2,25
1600		1,06	12,8	5,20	2,18
2000		1,06	12,8	5,11	2,17
2500		1,08	13,0	4,67	2,07
3150		1,09	13,1	4,10	1,95
4000		1,07	12,8	3,31	1,78
5000		1,07	12,9	2,82	1,63


660.0
300.0
CelluBOR
Metal Frame
h:50mm
897.6
400.0
780.6
Reverberation Room
Volume: 298,5 m3
Surface Area: 273 m2
Door
675.6
Plan

ACOUSTIC SPRAY INSULATION APPLICATION PICTURES



OFFICES, CAR PARKS, PLANT ROOMS, GENERATOR ROOMS, FACTORIES, WORKSHOPS, MALLS, GYMS, MULTI-PURPOSE HALLS ETC.

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KINETICS

Middle East LLC