

2. TABLA: PROPIEDADES TÉRMICAS DE LOS PANELES PREFABRICADOS



奥邦建材(厦门)有限公司
XIAMEN OBON BUILDING MATERIALS CO., LTD

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Tel: +86-592-6185577 Fax: +86-592-6185577 Zip Code: 361000

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Thickness	K (Heat Transfer coefficient)	U (Heat Transfer coefficient)	R (Thermal Resistance)	λ (Thermal Conductivity)	Remarks
	w/(m ² ·k)	w/(m ² ·k)	(m ² ·k)/w	w/(m·k)	
60mm	1.92	1.60	0.63	0.12	K is based on Chinese standard, while U is based on European and American standard
75mm	1.85	1.54	0.65	0.14	
90mm	1.58	1.32	0.76	0.14	
100mm	1.41	1.18	0.85	0.14	
120mm	1.22	1.02	0.98	0.15	
150mm	1.05	0.88	1.14	0.16	
180mm	0.94	0.79	1.27	0.17	
200mm	0.90	0.75	1.33	0.18	
250mm	0.80	0.67	1.50	0.20	

3. CÁLCULOS

Cerramientos verticales

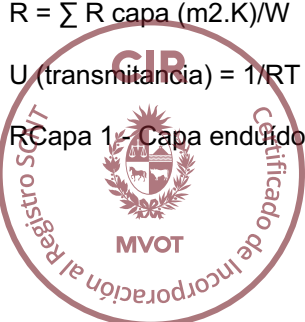
Enduido de cal o cemento para interior 5 mm / Espesor 150mm de panel / Enduido de cal o cemento para exterior 5 mm

Ancho muro: 15 cm

$$R = \sum R \text{ capa (m}^2 \cdot \text{K)/W} \quad R_c = e/\lambda \quad RT = R_{se} + R + R_{si} \text{ (m}^2 \cdot \text{K)/W}$$

$$U \text{ (transmitancia)} = 1/RT \text{ (W/(m}^2 \cdot \text{K))}$$

RCapa 1:- Capa enduido interior, espesor = 5 mm, $\lambda = 1.1 \text{ W/m} \cdot \text{K}$ / $R_1 = 0.0045 \text{ m}^2 \cdot \text{K/W}$



RCapa 2 – Panel 150mm, $R_3 = 1,14 \text{ m}^2\text{K/W}$

RCapa 3 – Capa enduido exterior, espesor = 5 mm, $\lambda = 1.4 \text{ W/m.K}$ / $R_5 = 0,0036 \text{ m}^2\text{K/W}$

- $R = 0,0045 \text{ m}^2\text{K/W} + 1,14 \text{ m}^2\text{K/W} + 0,0036 \text{ m}^2\text{K/W} = 1,1481 \text{ m}^2\text{K/W}$

$$RT = R_{se} + R + R_{si} \text{ (m}^2\text{.K)/W}$$

$$R_{se} = 0.04 \text{ m}^2\text{K/W}$$

$$R = 1.01 \text{ m}^2\text{K/W}$$

$$R_{si} = 0.13 \text{ m}^2\text{K/W}$$

$$RT = 1,3181 \text{ m}^2\text{K/W}$$

$$U = 1/1,3181 \text{ m}^2\text{K/W} = 0,76 \text{ W/m}^2\text{K}$$

U=0,76 m²K/W, VERIFICA

Cerramiento horizontal

Membrana asfáltica 4 mm + Cerramiento Panel 60 mm + Aislante lana de vidrio 50mm + Cámara de aire 100mm + Cielorraso de yeso 10 mm

$$R = \sum R \text{ capa (m}^2\text{.K)/W}$$

$$R_c = e/\lambda$$

$$RT = R_{se} + R + R_{si} \text{ (m}^2\text{.K)/W}$$

$$U \text{ (transmitancia)} = 1/RT \text{ (W/(m}^2\text{K))}$$

Capa 1 – Membrana asfáltica 4 mm, $\lambda = 0.58 \text{ W/m.K}$ / $R_1 = 0.0069 \text{ m}^2\text{K/W}$

Capa 3 – Panel 60mm, $R_3 = 0,63 \text{ m}^2\text{K/W}$

Capa 5 – Lana de vidrio 50 mm / $\lambda = 0.036 \text{ W/m.K}$ / $R_6 = 1,39 \text{ m}^2\text{K/W}$

Capa 6 – Cámara de aire 100 mm, / $R_5 = 0.17 \text{ m}^2\text{K/W}$

Capa 7– Cielorraso de Yeso 10 mm / $\lambda = 0.30 \text{ W/m.K}$ / $R_6 = 0.033 \text{ m}^2\text{K/W}$

$$R = 0.0069 \text{ m}^2\text{K/W} + 0.63 \text{ m}^2\text{K/W} + 1,39 \text{ m}^2\text{K/W} + 0.17 \text{ m}^2\text{K/W} + 0.033 \text{ m}^2\text{K/W} = 2,23 \text{ m}^2\text{K/W}$$

$$RT = R_{se} + R + R_{si} \text{ (m}^2\text{.K)/W}$$

$$R_{se} = 0.04 \text{ m}^2\text{K/W}$$

$$R = 2,23 \text{ m}^2\text{K/W}$$

$$R_{si} = 0.13 \text{ m}^2\text{K/W}$$

$$RT = 2,4 \text{ m}^2\text{K/W}$$

$$U = 1/2,4 = 0,42 \text{ m}^2\text{K/W}$$

U=0.42 m²K/W, VERIFICA



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Archivo: El cerramiento no fue guardado antes de ser exportado

Sección 1 : Datos Cerramiento

e -> Espesor [mm]

ro -> Densidad [kg/m³]M -> Masa [Kg/m²]

Lambda -> Conductividad térmica [W/(m.K)]

Cp -> Calor específico [kJ/m².K]R -> Resistencia térmica [m².K/W]CT -> Capacidad térmica media [kJ/(m².K))]

delta -> Permeabilidad al vapor de agua [kg/m.s.Pa]

Z -> Resistencia al vapor de agua [m².s.Pa/kg]1/Z -> Permeancia al vapor de agua [kg/m².s.Pa]

mu -> Factor de resistencia al vapor de agua

Sd -> Espesor de aire equivalente Sd [m]

OBS -> Observaciones:

BDO: Material proveniente de la base de datos original.

	e	ro	M	Lambda	Cp	R	CT	delta	Z	1/Z	mu	Sd	OBS
Pintura - emulsión	1.0	1000.0	1.0		1.0	0.00E+00	1.00E-03		5.05E+08	1.98E-09		0.1	
Enduido de yeso	2.0	1150.0	2.3	1.1	1000.0	1.82E-03	2.3	3.30E-11	6.06E+07	1.65E-08	6.0		
U-Panel	150.0	600.0	90.0	0.13	1000.0	1.154	90.0	6.60E-11	2.27E+09	4.40E-10	3.0		
Basecoat	2.0	1150.0	2.3	1.4	1000.0	1.43E-03	2.3	3.30E-11	6.06E+07	1.65E-08	6.0		
Pintura - emulsión	1.0	1000.0	1.0		1.0	0.00E+00	1.00E-03		5.05E+08	1.98E-09		0.1	

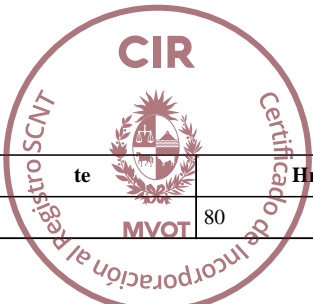
Sección 2 : Condiciones base

te -> Temperatura Exterior [°C]

Hre -> Humedad relativa exterior [%]

ti -> Temperatura Interior [°C]

Hri -> Humedad relativa exterior [%]

Rse -> Resistencia superficial exterior [m².K/W]Rsi -> Resistencia superficial interior [m².K/W]


	te	Hre	ti	Hri	Rse	Rsi
4	80		18.0	50	0.04	0.25

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Archivo: El cerramiento no fue guardado antes de ser exportado

Tipo de cerramiento: Cerramiento Vertical

Zona C

Fuera de Norma

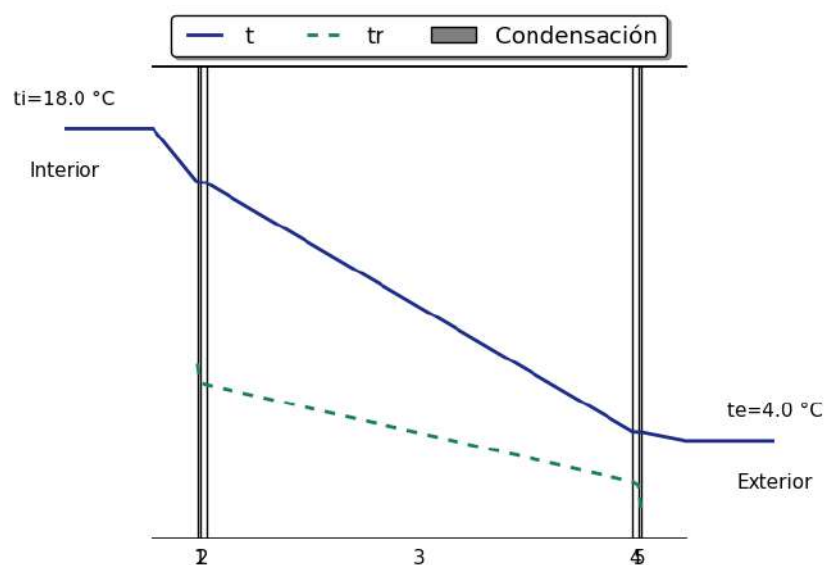
Sección 3 : Gráfica Condensación

Plano	Temperatura [°C]	Temperatura rocío [°C]
In-1	15.58	7.43
1-2	15.58	6.61
2-3	15.56	6.51
3-4	4.4	2.16
4-5	4.39	2.03
5-Ex	4.39	0.87

Transmitancia Térmica: 0.75 W/m²K @ Rsi=0.13 m².K/W

Masa: 96.6 Kg/m²

Espesor: 0.156 m



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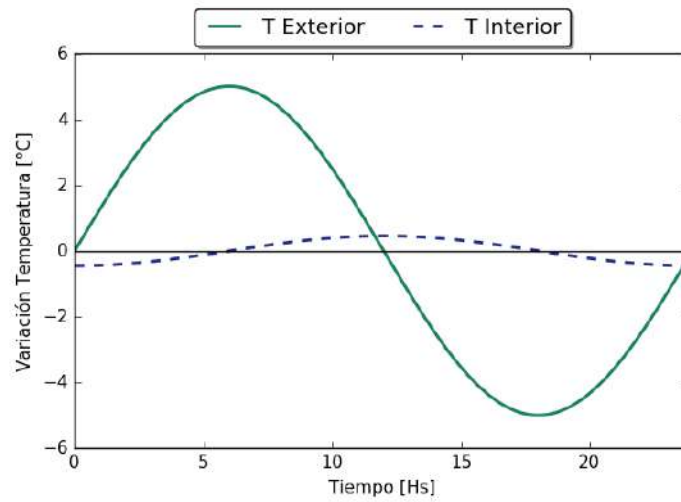
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Sección 4 : Gráfica Amortiguamiento

Factor de Amortiguación: 0.091

Retardo Térmico: 6.02 Hs



07/02/2022 16:21:14

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Archivo: El cerramiento no fue guardado antes de ser exportado

Sección 1 : Datos Cerramiento

e -> Espesor [mm]

ro -> Densidad [kg/m3]

M -> Masa [Kg/m2]

Lambda -> Conductividad térmica [W/(m.K)]

Cp -> Calor específico [kJ/m2.K]

R -> Resistencia térmica [m2.K/W]

CT -> Capacidad térmica media [kJ/(m2.K))]

delta -> Permeabilidad al vapor de agua [kg/m.s.Pa]

Z -> Resistencia al vapor de agua [m2.s.Pa/kg]

1/Z -> Permeancia al vapor de agua [kg/m2.s.Pa]

mu -> Factor de resistencia al vapor de agua

Sd -> Espesor de aire equivalente Sd [m]

OBS -> Observaciones:

BDO: Material proveniente de la base de datos original.

	e	ro	M	Lambda	Cp	R	CT	delta	Z	1/Z	mu	Sd	OBS
Pintura - emulsión	1.00E-03	1000.0	1.00E-03		1.0	0.00E+00	1.00E-06		5.05E+08	1.98E-09		0.1	BDO
Placa de Yeso	10.0	900.0	9.0	0.25	1000.0	4.00E-02	9.0	1.98E-11	5.05E+08	1.98E-09	10.0		
Lana de vidrio	50.0	107.5	5.375	4.25E-02	700.0	1.176	3.763	1.98E-10	2.53E+08	3.96E-09	1.0		
Cámara de aire no ventilada ..	15.0			9.38E-02	1008.0	0.16			5.05E+07	1.98E-08		1.00E-02	BDO
U-Panel	60.0	600.0	36.0	0.4	1000.0	0.15	36.0	6.60E-11	9.09E+08	1.10E-09	3.0		
Membrana asfáltica	4.0	2100.0	8.4	0.7	1000.0	5.71E-03	8.4	3.96E-07	1.01E+04	9.90E-05	5.00E-04		

Sección 2 : Condiciones base

te -> Temperatura Exterior [°C]

Hre -> Humedad relativa exterior [%]

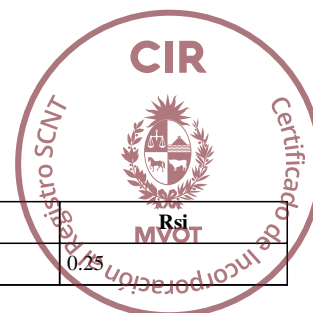
ti -> Temperatura Interior [°C]

Hri -> Humedad relativa exterior [%]

Rse -> Resistencia superficial exterior [m2.K/W]

Rsi -> Resistencia superficial interior [m2.K/W]

te	Hre	ti	Hri	Rse	Rsi
4	85	18.0	50	0.04	0.25



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Archivo: El cerramiento no fue guardado antes de ser exportado

Tipo de cerramiento: Cerramiento Horizontal

Zona A

Fuera de Norma

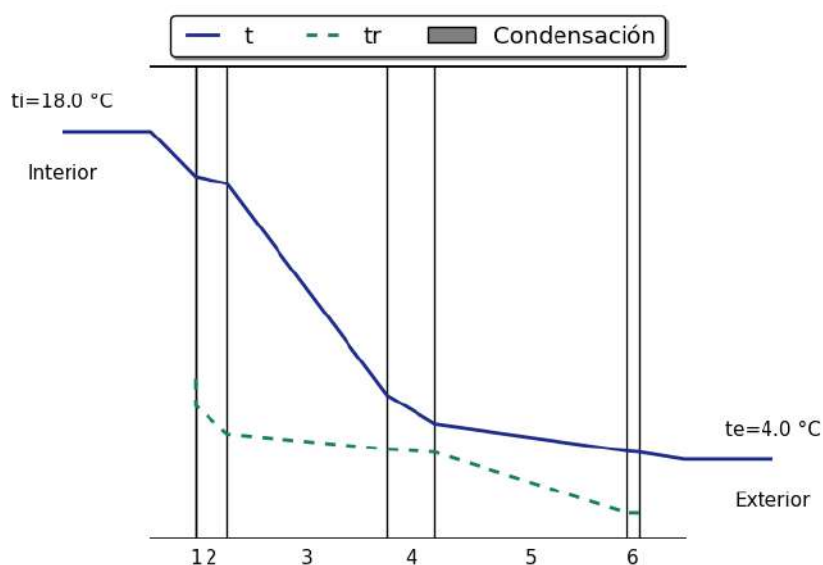
Sección 3 : Gráfica Condensación

Plano	Temperatura [°C]	Temperatura rocío [°C]
In-1	16.08	7.43
1-2	16.08	6.3
2-3	15.77	5.08
3-4	6.73	4.43
4-5	5.5	4.3
5-6	4.35	1.71
6-Ex	4.31	1.71

Transmitancia Térmica: 0.6 W/m²K @ Rsi=0.1 m².K/W

Masa: 58.78 Kg/m²

Espesor: 0.139 m



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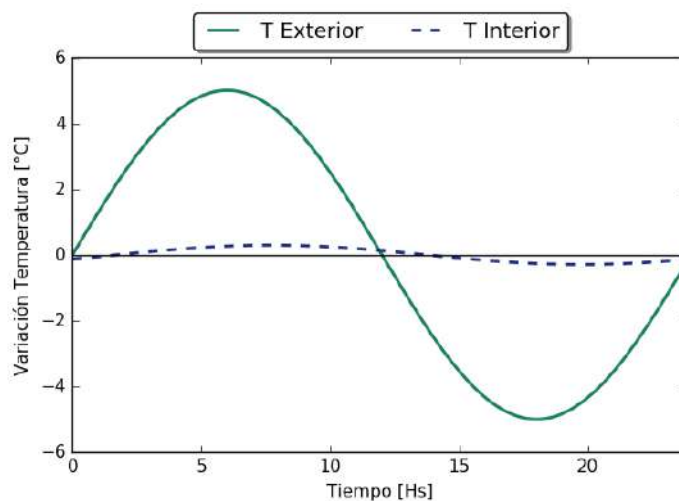
V.17.12

Archivo: El cerramiento no fue guardado antes de ser exportado

Sección 4 : Gráfica Amortiguamiento

Factor de Amortiguación: 0.059

Retardo Térmico: 1.7 Hs



Sistema U-Panel

ENSAYOS



U-Panel



180002280586



(2018)国认监认字(342)号



检测
CNAS L0690

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TEST REPORT

No: XJ2018C03C00657



Applicant OBON Fujian Building Materials Co.,Ltd.

Sample Name LIGHT AND ENERGY SAVING WALL MATERIALS

Test Type Type test

**National Center of Quality Supervision &
Test for Building Materials**



XJ2018C03C00657





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National Center of Quality Supervision & Test for Building Materials

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Test Report

No: XJ2018C03C00657

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Sample Name	LIGHT AND ENERGY SAVING WALL MATERIALS	Test Type	Type test
Applicant	OBON Fujian Building Materials Co., Ltd.	Application No.	CTC-CY-2018-0108
Manufacturer	OBON Fujian Building Materials Co., Ltd.	Brand	OBON
Sampling Body	National Center of Quality Supervision & Test for Building Materials	Model/Size	2440 × 610 × 60 unit: mm
Production Date	—	Sampling Base	70000m ²
Sampling Date	Aug. 15th, 2018	Sampling Size	30 m ²
Sample Received Date	Sep. 20th, 2018	Sampled by	Baoyanan
Sampling Method	Random sampling	Sealed by	Liuzhanqing
Sampling Site	Quanzhou luojiang warehouse	Sample Description	Seal good
Test Standard	JG/T 169 - 2005 «Light weight panels for partition walls used in buildings»		
Test Items	Appearance quality, size deviation, etc. A total of 14, see page 2 ~ 4.		
Conclusion	<p>* On inspection, By sampling inspection by all project inspection results accord with JG/T 169-2005 medium plate thickness is 60 mm technical requirements, sampling for qualified products. *</p> <div style="text-align: right;">  Date of issued: Nov.02nd, 2018 (Seal) </div>		
Remarks: (Blank)			



Approved by: 李健伟

Verified by: 李健伟

Compiled by: 李健伟

Test Institution Address: The South Mansion of China Building Materials Academy, Guanzhuang,
Chaoyang District, Beijing, China Telephone: +86-010-65728538 Post Code: 100024


National Center of Quality Supervision & Test for Building Materials Test Report

No: XJ2018C03C00657

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No.	Test items		Requirements of standard (60mm)	Test results	Individual conclusion
1	Appearance quality	With fiber,burr outside	Not allowed	pass	pass
		Cracks on board face, Length: 50mm~100mm, Width: 0.5mm~1.0mm	≤ 2/sheet	pass	pass
		Honeycomb air holes, Width:5mm~30mm	≤ 3/sheet	pass	pass
		Angles coming off , Width×Length:10mm×25mm~20mm×30mm	≤ 2/sheet	pass	pass
		Board face come off	Not allowed	pass	pass
2	Size deviation	Length, mm	±5	3	pass
		Width, mm	±2	0	pass
		Thickness,mm	±1	0	pass
		Board face smoothness,mm	≤ 2	0.30	pass
		Diagonal deviation,mm	≤ 6	0	pass
		Side direction bending,mm	L/1000 = 2.44	0.20	pass
3	Impact resistance,times		≥ 5	10 no craze	pass
4	Flexural Load, multiples of panel weight		≥ 1.5	4.3	pass
Remarks : (Blank)					

SCNT

CIR

Test Institution Address: The South Mansion of China Building Materials Academy, Guanzhuang,
Chaoyang District, Beijing, China Telephone: +86-010-65728538 Post Code: 100034

National Center of Quality Supervision & Test for Building Materials Test Report

No: XJ2018C03C00657

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No.	Test items	Requirements of standard (60mm)	Test results	Individual conclusion
5	Planar density, kg/m ²	≤70	44.8	pass
6	Percentage of moisture, %	≤12	6.1	pass
7	Dry shrinkage, mm/m	≤0.6	0.37	pass
8	Handing load, N	≥1000	1000 no craze	pass
9	Compress strength, MPa	≥3.5	4.3	pass
10	Soften coefficient	≥0.80	0.82	pass
11	Air sound insulation value, dB	≥35	37	pass
12	Limit of yadionuclides	Internal exposure index $I_{Ra} \leq 1.0$	0.15	pass
		External exposure index $I_r \leq 1.0$	0.28	pass
13	Heat transfer coefficient, W/(m ² · K)	≤2.0	1.92	pass
Remarks: (Blank)				

Remarks: (Blank)

Test Institution Address: The South Mansion of China Building Materials Academy, Guanzhuang,
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National Center of Quality Supervision & Test for Building Materials Test Report

№: XJ2018C03C00657

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No.	Test items		Requirements of standard (60mm)	Test results	Individual conclusion
14	Fire resist-ance	insulation	$\geq 60\text{min}$ The average temperature rise value above the initial average temperature must not be more than 140°C or increase above the initial average temperature at measure spot not be more than 180°C .	120min,the average temperature rise value on unexposed sueface is 59.8°C , the max temperature rise value on unexposed sueface is 178.4°C .	The fireproof limit 120 min
		integrity	$\geq 60\text{min}$ Does not burn the test cotton pad or no more than 10 seconds flames penetrate through the unexposed side of the wall,or a 6mm diameter penetrating the joint to the fire side with movement of no more than 150mm along the joint ; or a 25mm diameter prodder is not able to go through the joint to the fir side.	120min The specimen remain integrity	
Remarks: (Blank)					

SCNT

CIR



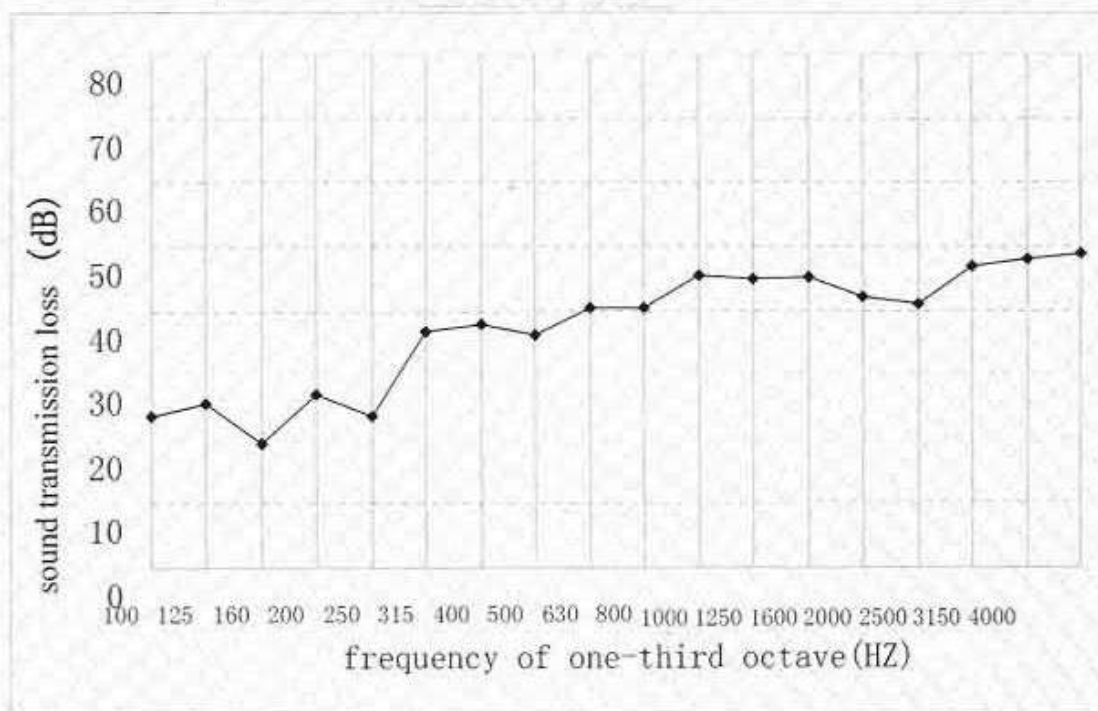
Test Institution Address: The South Mansion of China Building Materials Academy, Guanzhuang,
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National Center of Quality Supervision & Test for Building Materials Test Report

№: XJ2018C03C00657

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Test Item	Test Result								
center frequency, Hz	100	125	160	200	250	315	400	500	630
sound transmission loss, dB	22.3	24.4	19.8	25.9	22.7	35.8	37.5	35.2	40.2
center frequency, Hz	800	1000	1250	1600	2000	2500	3150	4000	5000
sound transmission loss, dB	40.2	44.5	43.9	44.2	41	40	45.5	46.7	47.8
weighting sound transmission loss R_w	$R_w(C;Ctr) = 37 (-1; -2) \text{ dB}$								



The chart of sound transmission loss curve

Remarks: (Blank)

CIR



MVET

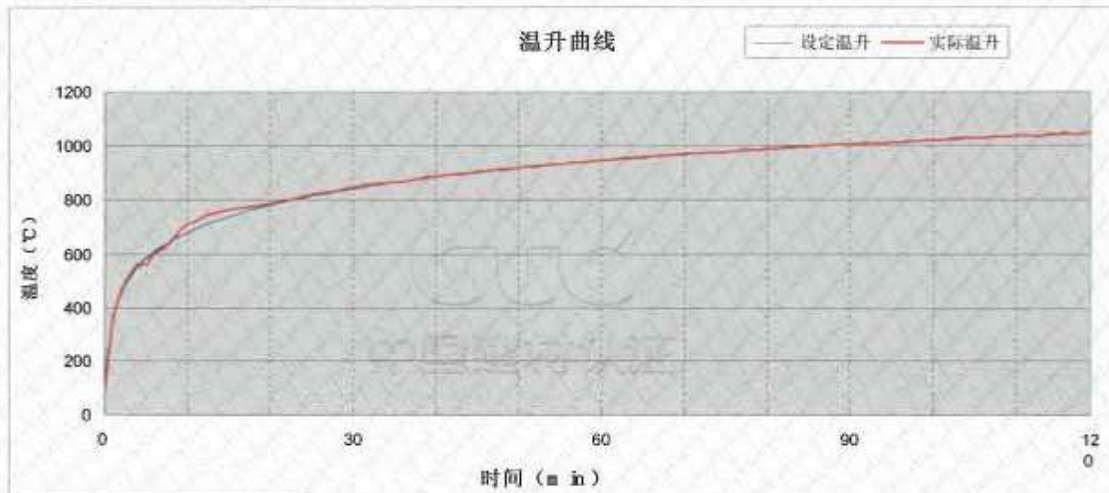
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Chaoyang District, Beijing, China Telephone: +86-010-65728538 Post Code: 100024

National Center of Quality Supervision & Test for Building Materials Test Report

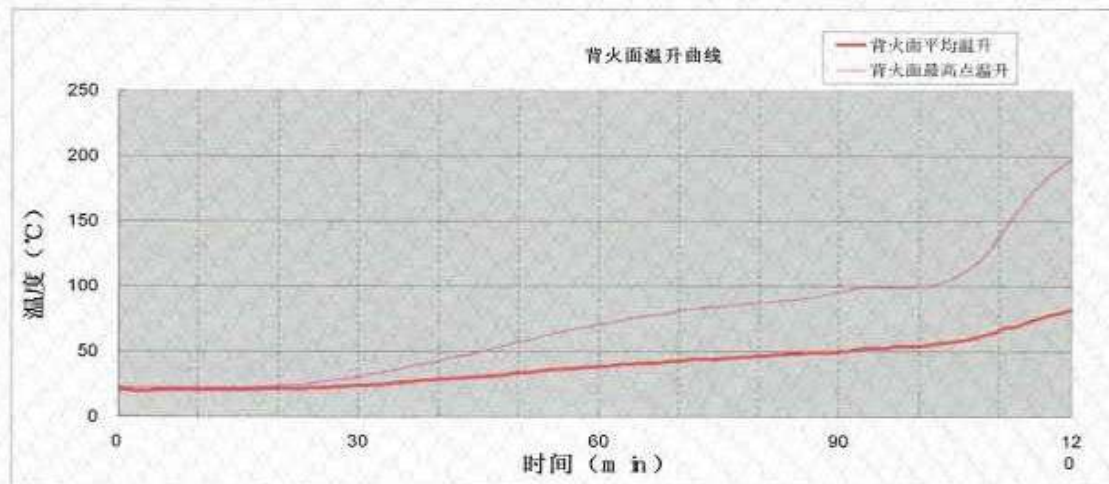
№: XJ2018C03C00657

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Heating curve



Temperature curve of Unexposed surface



Remarks: (Blank)

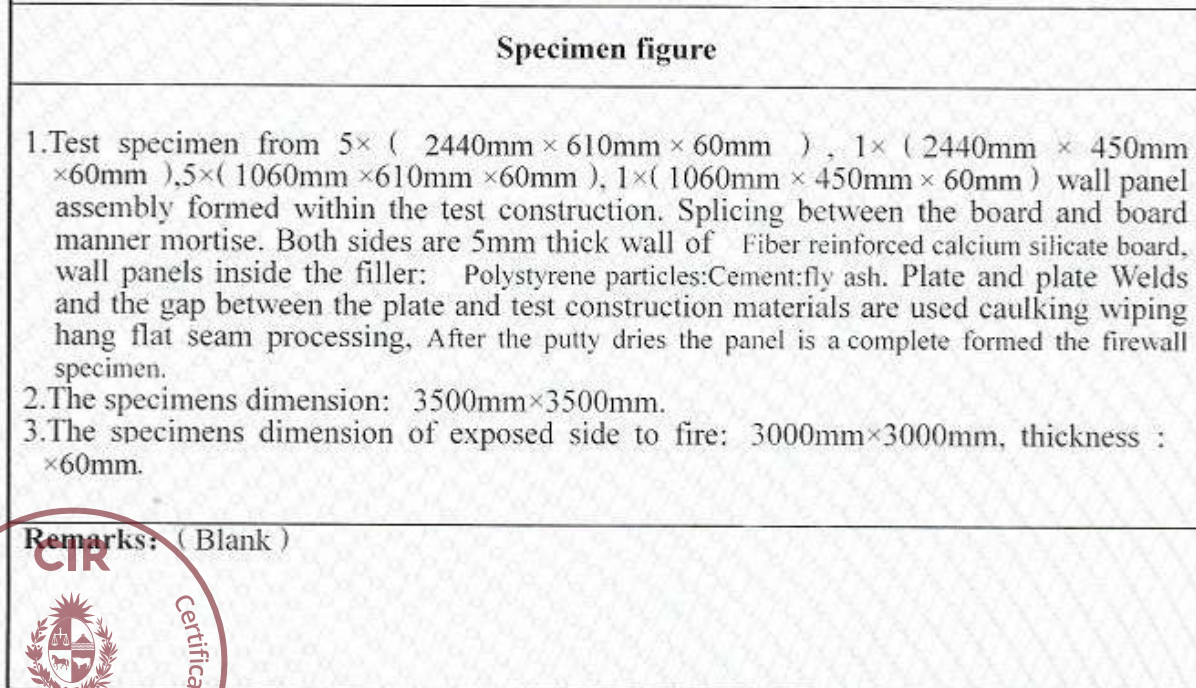
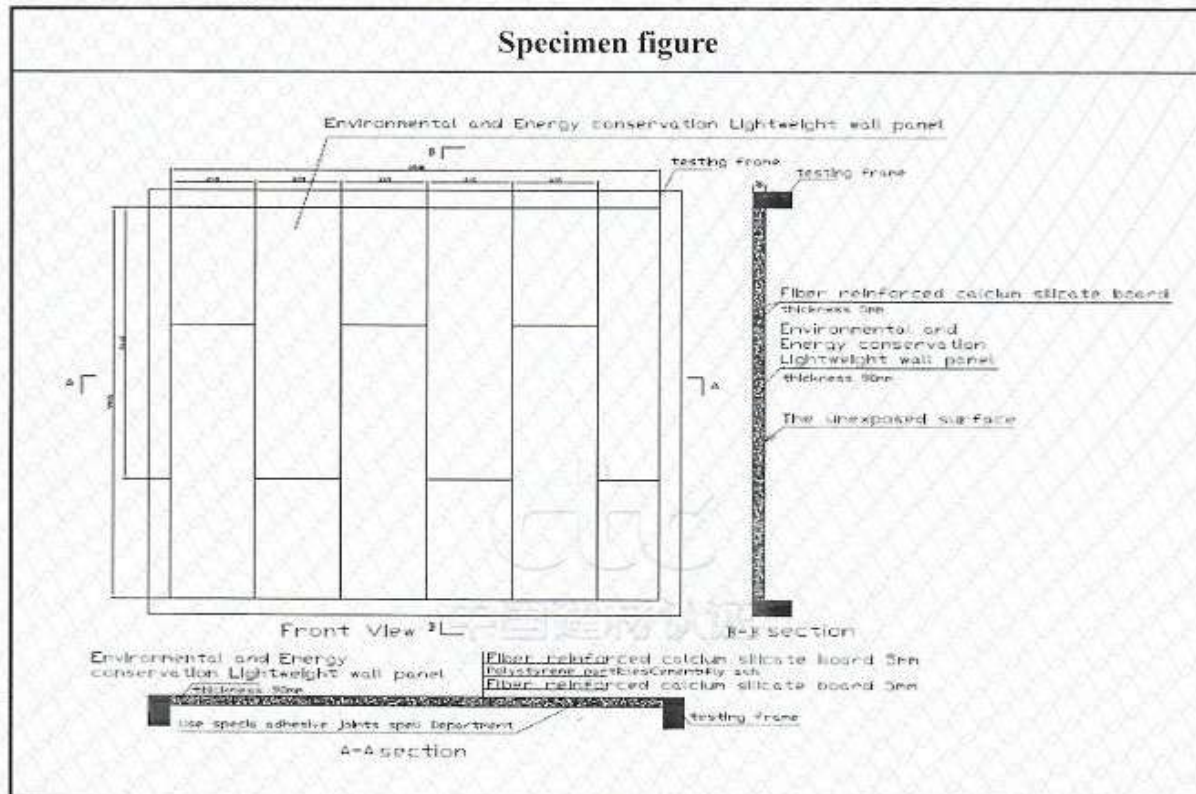


Test Institution Address: The South Mansion of China Building Materials Academy, Guangzhou,
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National Center of Quality Supervision & Test for Building Materials Test Report

№: XJ2018C03C00657

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MVQT

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National Center of Quality Supervision & Test for Building Materials Test Report

Nº: XJ2018C03C00657

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before of test	after testing
 <p style="text-align: center;">The view of the exposed surface of specimen</p>	 <p style="text-align: center;">The view of the exposed surface of specimen</p>
 <p style="text-align: center;">The view of the unexposed surface of specimen</p>	 <p style="text-align: center;">The view of the unexposed surface of specimen</p>
<p>Remarks: (Blank)</p>	

Test Institution Address: The South Mansion of China Building Materials Academy, Guanzhuang,
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TEST REPORT

No: XJ2018C03C00659



Applicant OBON Fujian Building Materials Co.,Ltd.

Sample Name LIGHT AND ENERGY SAVING WALL MATERIALS

Test Type Type test

**National Center of Quality Supervision &
Test for Building Materials**



XJ2015C03C00659





National Center of Quality Supervision & Test for Building Materials Test Report

№: XJ2018C03C00659

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Sample Name	LIGHT AND ENERGY SAVING WALL MATERIALS	Test Type	Type test
Applicant	OBON Fujian Building Materials Co., Ltd.	Application No.	CTC-CY-2018-0110
Manufacturer	OBON Fujian Building Materials Co., Ltd.	Brand	OBON
Sampling Body	National Center of Quality Supervision & Test for Building Materials	Model/Size	2440 × 610 × 90 unit: mm
Production Date	——	Sampling Base	70000m ²
Sampling Date	Aug. 15th,2018	Sampling Size	30 m ²
Sample Received Date	Sep. 20th,2018	Sampled by	Baoyanan
Sampling Method	Random sampling	Sealed by	Liuzhanqing
Sampling Site	Quanzhou luojiang warehouse	Sample Description	Seal good
Test Standard	JG/T 169 - 2005 《Light weight panels for partition walls used in buildings》		
Test Items	Appearance quality, size deviation, etc. A total of 14, see page 2 ~ 4.		
Conclusion	<div>* On inspection, By sampling inspection by all project inspection results accord with JG/T 169-2005 medium plate thickness is90 mm technical requirements, sampling for qualified products. *</div> <div><div><div>国家建筑材料质量监督检验中心</div><div>检验专用章</div></div><div>Date of issued: Nov.02nd,2018 (Seal)</div></div>		
Remarks: (Blank)			

Date of issued: Nov. 02nd, 2018
(Seal)

CIR

Approved by: 李建平

Verified by: 李建平

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No.	Test items		Requirements of standard (90mm)	Test results	Individual conclusion
1	Appearance quality	With fiber.burr outside	Not allowed	pass	pass
		Cracks on board face, Length: 50mm~100mm, Width: 0.5mm~1.0mm	≤ 2/sheet	pass	pass
		Honeycomb air holes, Width:5mm~30mm	≤ 3/sheet	pass	pass
		Angles coming off , Width×Length:10mm×25mm~20mm×30mm	≤ 2/sheet	pass	pass
		Board face come off	Not allowed	pass	pass
2	Size deviation	Length, mm	±5	3	pass
		Width, mm	±2	0	pass
		Thickness,mm	±1	0	pass
		Board face smoothness,mm	≤ 2	0.30	pass
		Diagonal deviation,mm	≤ 6	0	pass
		Side direction bending,mm	L/1000 = 2.44	0.20	pass
3	Impact resistance,times		≥ 5	10 no craze	pass
4	Flexural Load, multiples of panel weight		≥ 1.5	4.6	pass
Remarks : (Blank)					

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No.	Test items	Requirements of standard (90mm)	Test results	Individual conclusion
5	Planar density, kg/m ²	≤ 90	59.5	pass
6	Percentage of moisture, %	≤ 12	4.4	pass
7	Dry shrinkage, mm/m	≤ 0.6	0.38	pass
8	Handing load, N	≥ 1000	1000 no craze	pass
9	Compress strength, MPa	≥ 3.5	4.4	pass
10	Soften coefficient	≥ 0.80	0.86	pass
11	Air sound insulation value, dB	≥ 35	43	pass
12	Limit of yadionuclides	Internal exposure index $I_{Ra} \leq 1.0$	0.23	pass
		External exposure index $I_r \leq 1.0$	0.26	pass
13	Heat transfer coefficient, W/(m ² · K)	≤ 2.0	1.58	pass
Remarks: (Blank)				



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No.	Test items		Requirements of standard (90mm)	Test results	Individual conclusion
14	Fire resist-ance	insulation	$\geq 60\text{min}$ The average temperature rise value above the initial average temperature must not be more than 140°C or increase above the initial average temperature at measure spot not be more than 180°C .	180min,the average temperature rise value on unexposed sueface is 88.0°C , the max temperature rise value on unexposed sueface is 139.0°C .	The fireproof limit 180 min
		integrity	$\geq 60\text{min}$ Does not burn the test cotton pad or no more than 10 seconds flames penetrate through the unexposed side of the wall,or a 6mm diameter penetrating the joint to the fire side with movement of no more than 150mm along the joint ; or a 25mm diameter prodder is not able to go through the joint to the fir side.	180min The specimen remain integrity	
Remarks: (Blank)					

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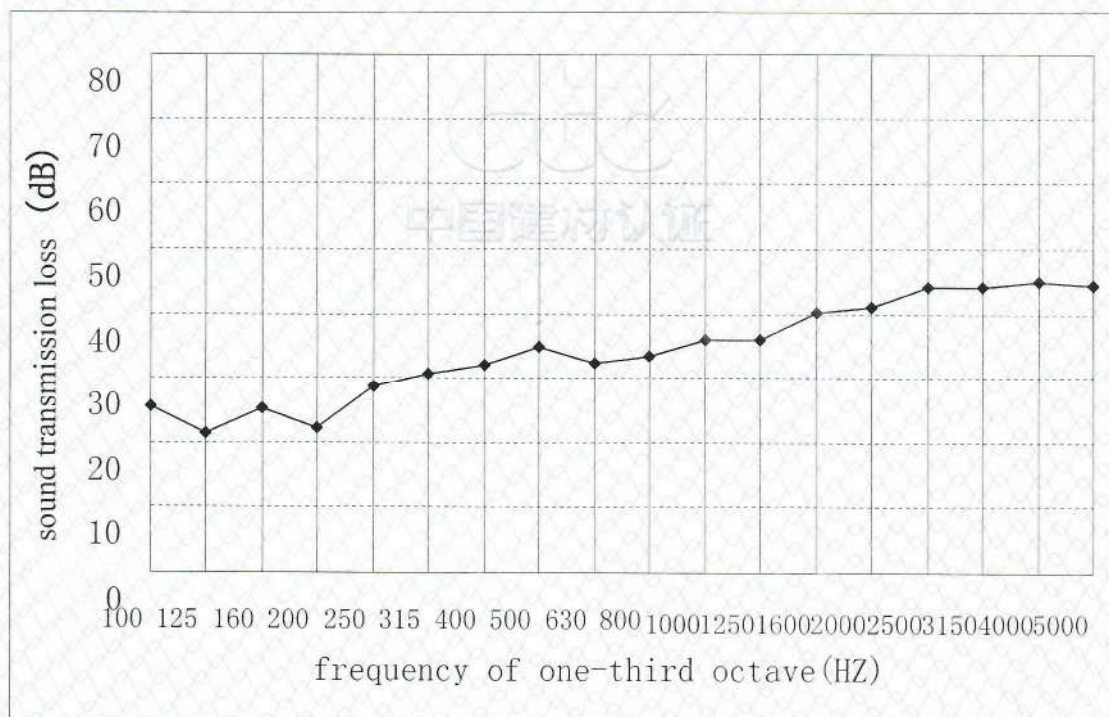
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Test Item	Test Result								
center frequency, Hz	100	125	160	200	250	315	400	500	630
sound transmission loss, dB	25.6	21.4	25.4	22.3	28.6	30.7	32.1	34.8	32.4
center frequency, Hz	800	1000	1250	1600	2000	2500	3150	4000	5000
sound transmission loss, dB	33.5	35.8	36	40.2	41.1	44.2	44.2	44.8	44.4
weighting sound transmission loss R_w	$R_w(C;Ctr)=43(0; -3)$ dB								



The chart of sound transmission loss curve

Remarks: (Blank)

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