

TEST REPORT

CLIMATIC BEHAVIOUR. ICE/FREEZE

TEST STANDDARD
Test standard

UNE EN12467:2013+A2 Fibre-cement flat sheets - Product specification and test methods

REPORT NR:
Número informe

263447ENG

APPLICANT
Peticionario

**ANDARAGÓN S.L.
P.I. LAS NORIAS, PARCELA 19A
50450 – MUEL. (ZARAGOZA)**

DATE OF ISSUE
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UNE EN12467:2013+A2 Fibre-
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PRODUCT¹
Producto

PREFABRICATED PLATE

Section and/or photograph

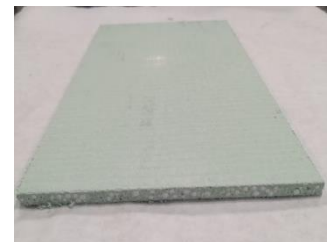
REFERENCIA¹
Referencia

PLACA TABIHAUS

DATE/S OF TETS
Fecha de ensayo

Start date 27/01/2025

End date 06/03/2025



RESULTS
Resultados

CATEGORY B

R_L: ≥0,75

Luis García Viguera
Director Técnico Departamento
Department Director

The result of the present test(s) only concerns the tested object(s). Electronically signed reports in digital form are an original document, as are electronic copies thereof. Their printing on paper has no legal validity. (1) The information provided by the client is outside the scope of ENAC accreditation. ENSATEC, S.L.U., declines all responsibility for this information.

Summary

1	OBJETO	¡ERROR! MARCADOR NO DEFINIDO.
2	DOCUMENTOS APLICABLES	¡ERROR! MARCADOR NO DEFINIDO.
3	MÉTODO DE ENSAYO	¡ERROR! MARCADOR NO DEFINIDO.
4	MUESTRA ENSAYADA	¡ERROR! MARCADOR NO DEFINIDO.
5	RESULTADOS DE ENSAYO	¡ERROR! MARCADOR NO DEFINIDO.
	ANEXO I. ANEXO FOTOGRÁFICO	¡ERROR! MARCADOR NO DEFINIDO.
	ANEXO II DOCUMENTACION DE REFERENCIA	¡ERROR! MARCADOR NO DEFINIDO.

1 SCOPE

The purpose of this report is to determine the durability against freeze-thaw cycles according to the test standard UNE-EN 12467:2013+A2:2018. Fibre-cement flat sheets - Product specification and test methods

TABIHAUS prefabricated slab 8 mm thick

2 REFERENCE

- UNE-EN 12467:2013+A2:2018. Fibre-cement flat sheets - Product specification and test methods
- ENSATEC internal procedure.

3 TEST METHOD

The test method is based on sections 7.4.1 and 7.3.2 of the UNE-EN 12467:2013+A2:2018 standard. The specimens are divided into two batches of ten units each. The first batch is subjected to the bending test, including the conditioning procedure. Meanwhile, the second batch is immersed in water at room temperature (> 5 °C) for 48 hours. Subsequently, the second batch is subjected to 25 freeze-thaw cycles:

- **Cooling:** Freezing within a range of 1 to 2 hours until reaching (-20 ± 4) °C, maintaining this temperature for an additional hour.
- **Heating:** Thawing in a water bath within a range of 1 to 2 hours until reaching (20 ± 4) °C, maintaining this temperature for an additional hour.

After completing the prescribed cycles, the bending strength test is performed again, including the conditioning process.

For each pair of specimens, the individual MR_i ratio is calculated as follows:

$$MR_i = \frac{MOR_{fi}}{MOR_{fci}}$$

Where:

MOR_{fi} is the modulus of rupture after the freeze-thaw cycles

MOR_{fci} is the modulus of rupture tested for reference

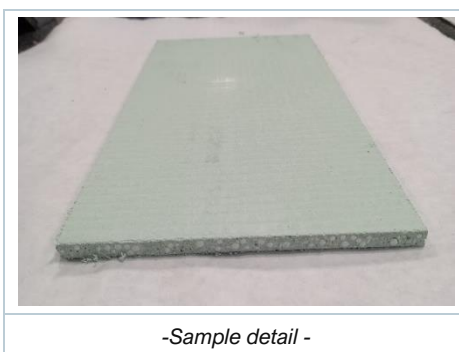
The mean, R, and the standard deviation, s, of the individual MR_i ratios are calculated, and the lowest estimate, RL, which must not exceed the following specification for category B: RL <0.75

4 TESTED SAMPLE

4.1 Description of the sample provided by the petitioner

Sample characteristics ¹	
Description:	Prefabricated plate
Composition¹:	Magnesium sulphate cement, vegetable fibres, glass fibres and EPS foam particles.
thickness (mm):	8 mm
Density¹ (kg/m³):	<900
Colour and appearance:	Smooth on one side, slightly rough on the other side

(1) Information provided by the customer.



4.2 Pre-conditioning

Type of test	Reference conditions	dates
category B	Before the bending test: 7 to 14 days at ambient laboratory conditions, followed by 24 h of immersion in water for plates of thickness ≤ 20 mm.	17/01/2025 to 31/01/2025
	After the 25 freeze-thaw cycles, it must be subjected to the same conditioning period.	20/02/2025 to 06/03/2025

5 TEST RESULTS

Results obtained in bending strength tests before and after 25 cycles

SAMPLE NR	Inicial Test Max load(N)	Final Test Max load (N)
1	315	224
2	380	262
3	321	259
4	372	216
5	337	265
6	319	277
7	356	229
8	345	228
9	372	256
10	332	266

Results obtained from the calculation of the modulus of ruptura

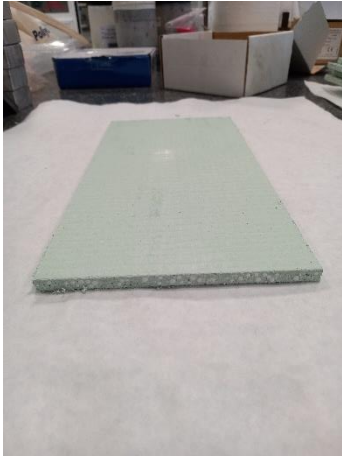
SAMPLE NR	MORfci	MORfi	MRI
1	0,041	0,029	1,406
2	0,049	0,034	1,450
3	0,045	0,036	1,239
4	0,048	0,028	1,722
5	0,044	0,035	1,272
6	0,038	0,033	1,152
7	0,046	0,030	1,555
8	0,045	0,030	1,513
9	0,047	0,032	1,453
10	0,042	0,034	1,248

With these values, the lowest estimate of the means of the ratios is calculated, with a confidence level of 95%:

$$R_L = 1,3052$$

The result is compared with the specification of paragraph 5.5.2 of UNE-EN 12467:2013+A2:2018 and it is observed that the criterion for category B is met.

ANNEX I. PHOTOGRAPHIC ANNEX



- Sample detail after cycles -



- Sample detail after cycles -



- Detail of bending test specimen -



- Detail of bending test specimen -

ANNEX II REFERENCE DOCUMENTATION

Information provided by the customer ⁽¹⁾



FICHA TÉCNICA PLACA TABIHAUS

Materia Prima	Cemento de sulfato de magnesio, fibras vegetales, fibras de vidrio y partículas de espuma EPS.
Revestimiento impermeable	Alta calidad de impermeabilización líquida.
Tamaño	2600 mm x 1200 mm y 3000 mm x 1200 mm. Espesor 8 mm.
Contenido de iones cloruro	0%
Liberación de formaldehído	0%
Contenido de amianto	0%
Incombustibilidad de la placa	Class A1 s1, d0. Según UNE EN 13501-1:2023.
Densidad	$\leq 900 \text{ Kg/m}^2$
Absorción de agua	$\leq 2,7\%$
Resistencia al impacto	$\geq 1.5 \text{ Kj/m}^2$
Retención de capacidad de clavado	16 N/mm
Resistencia difusión vapor agua	$\mu = 2,1$ (EN ISO 12572)
Conductividad Térmica K	$\lambda \leq 0,18 \text{ W/mK}$
Aislamiento acústico	$\geq 22 \text{ dB}$
Aumento peso por humedad	$\leq 0.12\%$
Tasa de contracción térmica lineal	$\leq 0.5 \%$
Congelación- descongelación	Sin distorsión dimensional después de 100 ciclos repetidos de congelación/ descongelación. (EN 12467).