

Industrial Estate Valdeconsejo, Aneto St., 8-A, 50410
Cuarte de Huerva (Zaragoza)

22AH05073 REPORT

TESTS ON PREFABRICATED BOARDS

<ul style="list-style-type: none">CLIENT
<ul style="list-style-type: none">- Name: ANDARAGON, S.L.U.- Address: Las Norias Industrial Estate, 19-A, Muel (Zaragoza)
<ul style="list-style-type: none">QUOTATION
<ul style="list-style-type: none">- Name: MECHANICAL CHARACTERISTICS OF FIBRE-REINFORCED BOARDS- Quotation No.: 21AH0428
<ul style="list-style-type: none">SPECIMENS
<ul style="list-style-type: none">- Specimen reference: 2022/01292- Date of entry: 19/05/2022
<ul style="list-style-type: none">TESTS CARRIED OUT
<ul style="list-style-type: none">- Bending strength (ambient conditions), UNE EN 12467- Behaviour under punctual loads, UNE EN 12430- Date of test: 02/06/2022
<ul style="list-style-type: none">STANDARDS USED
<ul style="list-style-type: none">- UNE-EN 12467. Flat boards of fibre-reinforced cement. Product specifications and test methods.- UNE EN 826. Thermal insulation products for building applications. Determination of compression behaviour.

Industrial Estate Valdeconsejo, Aneto St., 8-A, 50410
Cuarte de Huerva (Zaragoza)

1.- PRECEDENTS

The applicant provides the laboratory with a TABIHAUS® prefabricated panel of 2,600 X 1,200 X 60 mm for a flexural strength test.

The test panel consists of an 8 mm TABIHAUS board and a 14 mm extruded polystyrene (XPS) core.

TABIHAUS® panel: *Composed of TABIHAUS® boards of 8 mm on both sides, composed of Epsom salt reinforced with double mesh of fibreglass, natural longitudinal fibres dispersed in orientation, spherical foam particles, retardants, and liquid waterproofing, adhered to high density XPS (XPS-EN-13164-T3-CS(10/Y)300 DS(70,90)), leaving it in its inner core, by means of the manufacturing process of ANDARAGÓN S.L.U., with bicomponent glues, and double pressing in vacuum and mechanical pressure, in a controlled process in air-conditioned rooms - temperature and humidity.-.*

2.- BENDING STRENGTH

2.1.- Test methodology

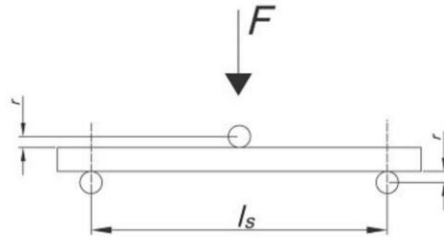
Before the test is carried out, the specimens are conditioned and kept in laboratory conditions for 7-14 days.

Rectangular specimens of suitable dimensions are prepared for the test. These are cut in both longitudinal and transverse directions.

The specimens are placed with their underside resting on two supports and the load is applied by means of a central bar.

The load is applied steadily and is carried out in such a way that breakage occurs between 10 and 30 seconds after the start of the load application.

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Cuarte de Huerva (Zaragoza)



Charging device

The Modulus of Rupture MOR, in megapascals, is calculated by the following expression:

$$\text{MOR} = \frac{3Fl_s}{2be^2}$$

Where

- F is the breaking load, in newtons
- L_s is the support spacing, in mm
- b is the width of the specimen, mm
- e is the thickness of the specimen, in mm

The specimen value is calculated as the arithmetic mean of the values, in both directions, of the specimens tested.

Industrial Estate Valdeconsejo, Aneto St., 8-A, 50410
Cuarte de Huerva (Zaragoza)

2.2.- Results obtained

The test was carried out with the board facing down and with the board facing up.

Transversal direction. Board down						
Specimen	L (mm)	b (mm)	e (mm)	Load (kg)	Bending Strength (MPa)	Breakage d. (mm)
T1	560	198	22,52	25	2,0	31,6
T2	560	200	22,57	25	2,0	30,7
T3	560	198	22,45	21	1,7	30,9
T4	560	199	22,57	20	1,6	29,0
T5	560	199	22,47	21	1,7	32,2
Average				22	1,8	30,1

Longitudinal direction. Board down						
Specimen	L (mm)	b (mm)	e (mm)	Load (kg)	Bending Strength (MPa)	Breakage d.(mm)
L1	560	197	22,52	22	1,8	29,8
L2	560	200	22,70	22	1,8	30,0
L3	560	200	22,46	21	1,7	32,8
L4	560	199	22,42	20	1,6	29,1
L5	560	200	22,40	20	1,6	24,9
Average				21	1,7	29,3

Modulus of rupture MOR (Board down)	1,8 MPa
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Industrial Estate Valdeconsejo, Aneto St., 8-A, 50410
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Transversal direction. Board up						
Specimen	L (mm)	b (mm)	e (mm)	Load (kg)	Bending Strength (MPa)	Breakage d.(mm)
T1	560	200	22,37	42	3,5	36,53
T2	560	200	22,33	43	3,5	38,21
T3	560	200	22,40	42	3,4	37,11
T4	560	201	22,46	45	3,7	40,17
T5	560	200	22,50	44	3,6	40,24
Average				43	3,5	38,45

Longitudinal direction. Board up						
Specimen	L (mm)	b (mm)	e (mm)	Load (kg)	Bending Strength (MPa)	Breakage d.(mm)
L1	560	198	22,37	38	3,2	47,05
L2	560	200	22,28	39	3,2	46,73
L3	560	198	22,58	35	2,9	44,71
L4	560	195	22,53	29	2,4	46,81
L5	560	198	22,51	30	2,5	47,20
Average				34	2,7	46,50

Modulus of rupture MOR (Board on top)	3,1 MPa
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3.- COMPRESSION BEHAVIOUR

3.1.- Test methodology

Prior to the test, the specimens are conditioned for 6 hours at 23 ± 5 °C.

To carry out the test, three 100x100 mm square specimens are prepared with the original thickness of the board.

The test consists of applying a load, at a speed of 0.1-d/min, in a direction perpendicular to the face of the specimen until the specimen breaks, giving the compressive strength value, or until a relative deformation of 10 % is reached, thus determining the compressive stress at 10 % relative deformation.

The compressive strength in kilonewtons and the relative deflection in %, corresponding to the maximum achieved (breaking) force or the compressive strength in kilonewtons at 10% relative deflection, are calculated.

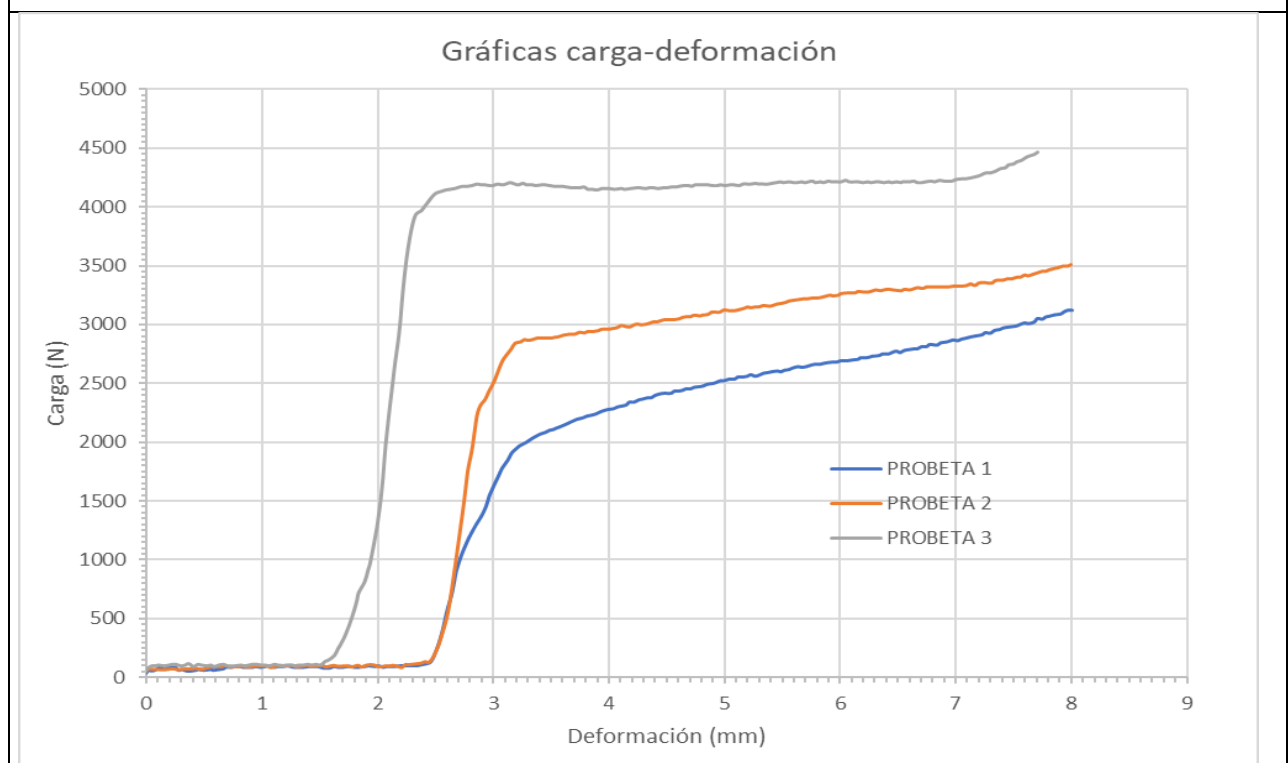
It is also possible to determine the strength and deformation at the elastic limit.

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Cuarte de Huerva (Zaragoza)

3.2.- Results obtained

Panel up (insulator down)						
Specimen	Strength 10% (N)	Tension 10% (KPa)	Elastic zone Strength (N)	Elastic zone tension (KPa)	Elastic zone def. (mm)	Relative deformation elastic zone (%)
1	2200	220	1900	190	0,8	5,7
2	2950	295	2330	233	0,4	2,9
3	4190	419	3900	390	0,5	3,6
Average	3113	311	2710	271	0,6	4,1

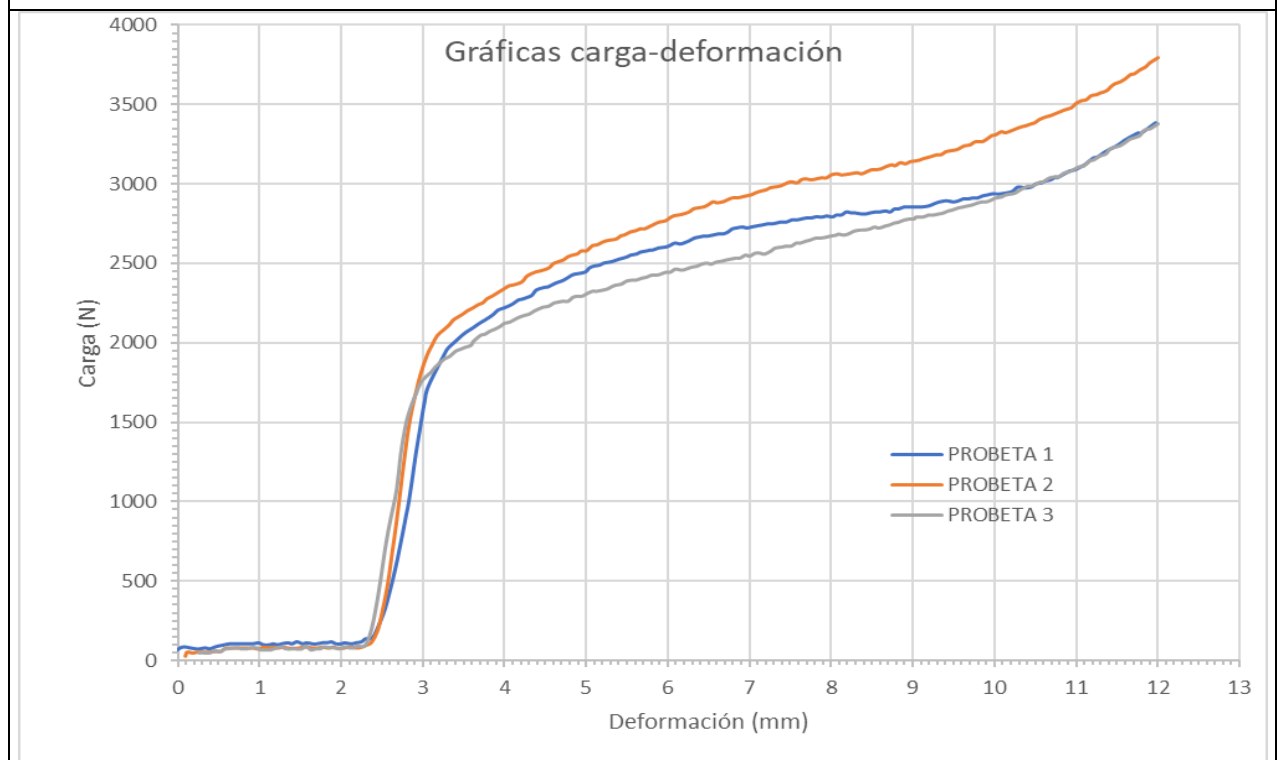
The relative deformation is calculated with respect to the 14 mm thickness of the insulation.



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Panel down (insulator up)						
Specimen	Strength 10% (N)	Tension 10 % (KPa)	Elastic zone strength (N)	Elastic zone tension (KPa)	Elastic Zone def. (mm)	Relative deformation elastic zone (%)
1	3800	380	3300	330	0,7	5,0
2	3900	390	3580	358	0,5	3,6
3	2260	226	1630	163	0,3	2,1
Average	3320	332	2837	284	0,5	3,6

The relative deformation is calculated with respect to the 14 mm thickness of the insulation.




Zaragoza, 3rd June 2022


Jefe de Ensayos de Materiales

Gustavo Royo Lantarón
Lcdo. C.C. Geológicas



Vº Bº del Director del Laboratorio


Arantxa Mendizábal Aguirre
Ingeniero Industrial