

Fire Resistance

Test Report

Test no. F-399/03-02

Report requested by:

EMMEDUE IBERICA S.A.

Toledo, July 28th 2003



Razón Social:
Paseo de Recaredo, 1
925 / 22 00 50 - Fax: 925 / 21 00 65
45004 TOLEDO (España)

Instalaciones y Laboratorios:
c/. Río Estenilla, s/n. (Pol. Ind. Stª Mª de Benquerencia)
Tel.: 925 / 24 06 66-67 - Fax: 925 / 24 06 79
45007 TOLEDO (España)

E-mail: aimcm@fedeto.es
ctmadera@fedeto.es
Página Web: www.fedeto.es/ctm
Video-conferencia RDSI: 34 / 925 245 022

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TEST:

WALL FIRE RESISTANCE

Applicant: EMMEDUE IBERICA S.A.

Sampling process: Sample assembled by the applicant at the laboratory

Place and date of sample collection: CTM, June 12th 2003

Name and address of the sample supplier: EMMEDUE IBERICA S.A. c/Rafael Salgado, 7
Bajo Izquierda 28036 MADRID Phone: 91 345 91 60 Fax: 91 344 01 19

Sample description: ANNEX A (descriptive note)

Product registered name: Unknown

Identification marks on the samples: -

Date of the test: July 28th 2003

Technical Manager

Laboratory Engineer

Fdo.: Francisco Hernández Olivares

Fdo.: Juan Jesús Sánchez Rodríguez

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1. WALL FIRE RESISTANCE TEST

1.1 Test method: Internal laboratory methods agreed upon with the person applying for the test (see Annex C). Heating curve in compliance with the UNE Regulation 23.093-81. Test method to define the fire resistance of structures and elements of a building.

1.2 Equipment used:

1) Vertical furnace: made with firebrick internally covered with insulating material. With an opening of 3 x 3 mt. span and four burners supplying power of 1800 Kw to obtain the heating curve requested by the test:

$$\Delta T = T - T_0 = 345 \log (8t + 1)$$

where:

T: furnace internal temperature

t: test starting time

T₀: initial temperature (20°C)

2) Furnace overpressure measurement system

3) Control thermocouples of the furnace: 6 thermocouples having a diameter of 0.8 mm

4) Thermocouples for outdoor, with a copper disk having a diameter of 12 mm and 2 mm deep at the ends.

1.3 Test conditions

Date of test: July 15th 2003

1.3.1 Sample preparation

With reference to a telephone conversation with the representatives of the firm applying for the test, on June 12th 2003 the sample starts being constructed by a team of masons according to the instructions given by their firm (see Annex A); this sample is used to close the vertical furnace. The sample preparation is completed on July 9th 2003. The test is carried out within the terms fixed by the applicant; on July 9th 2003 the same applicant, thanks to one of its representatives, verifies the proper assembling of the sample and relevant operating process (see Annex C).

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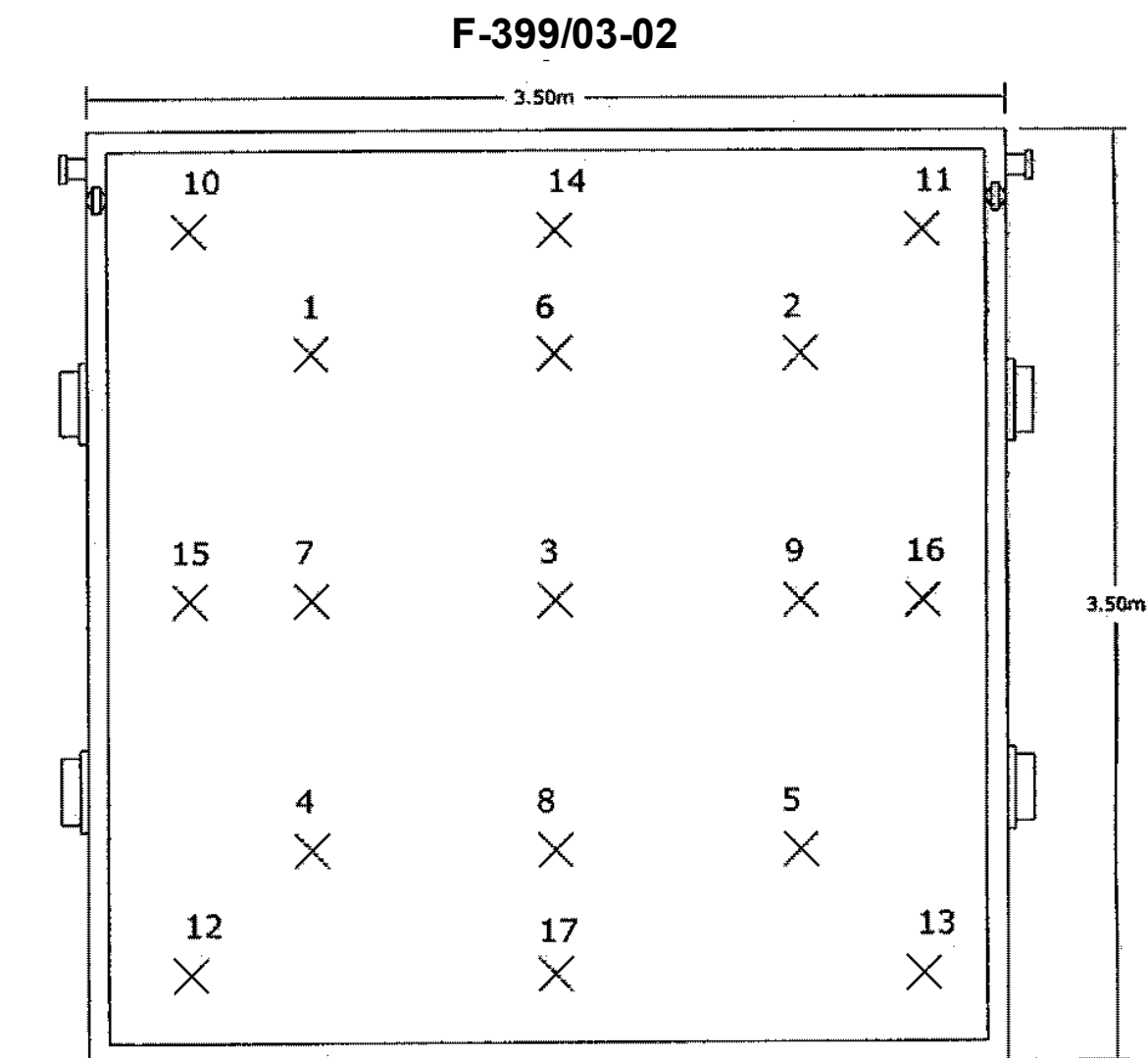
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1.3.2 Thermocouple position

The thermocouples controlling the internal temperature of the furnace have been placed at the relevant measuring zones and equally arranged inside of it. The thermocouples taking the outside temperature and placed on the unexposed face of the sample have been positioned according to instructions taken from illustration no.1.



X Position of each themocouple

Picture 1

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1.3.3 Test conditions:

Date of test: July 15th 2003

Environmental conditions: 29°C, 42% R.H.

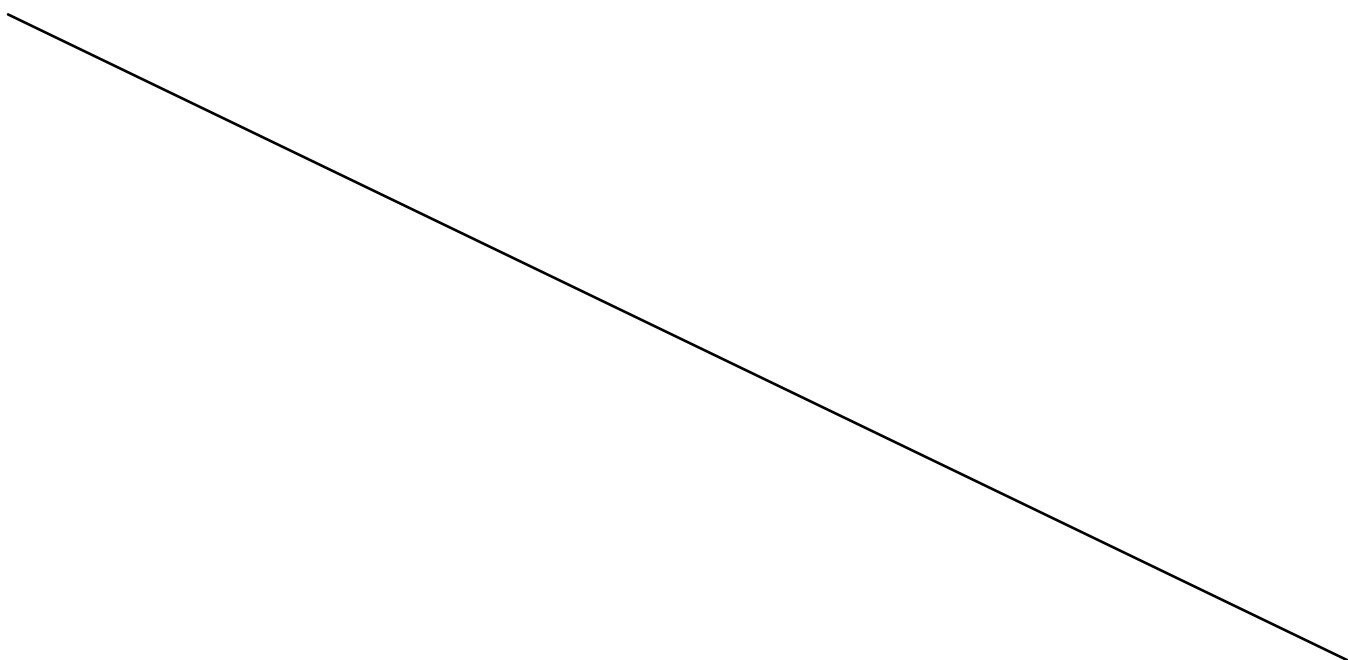
Test piece:

For the test, a wall, 3,37 m wide and 3,5 m high has been realized according to the descriptive note about assembling carried out by the firm applying for the test (see Annex A).

1.4 Remarks during the test

1.4.1 Heat schedule

During the test, the heating curves of the furnace and that of the average temperature of the same furnace have been those shown in the diagram below:



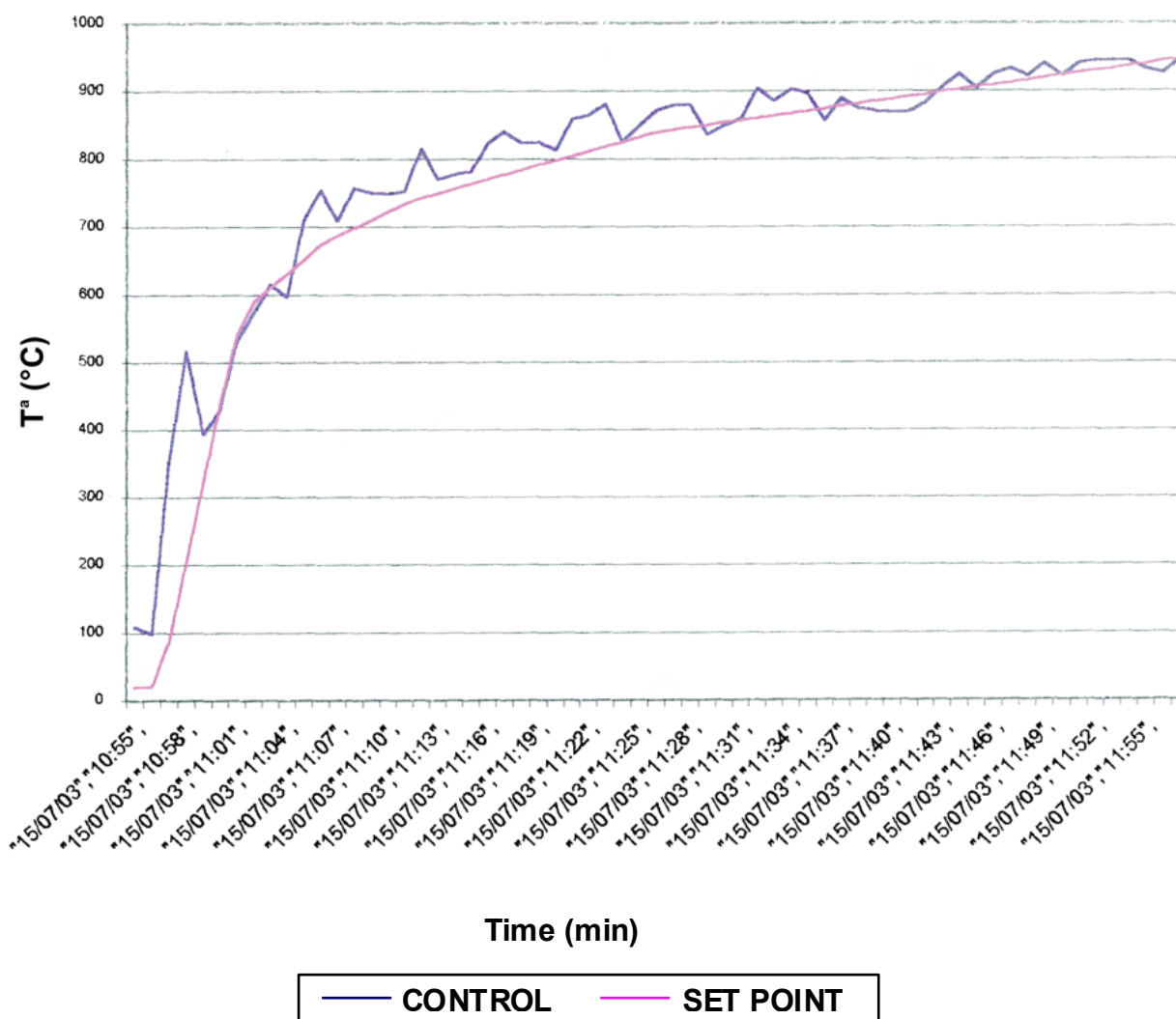
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NOTE: The sample tested has been pre-heated at about 100 °C prior of the test beginning upon applicant's request.

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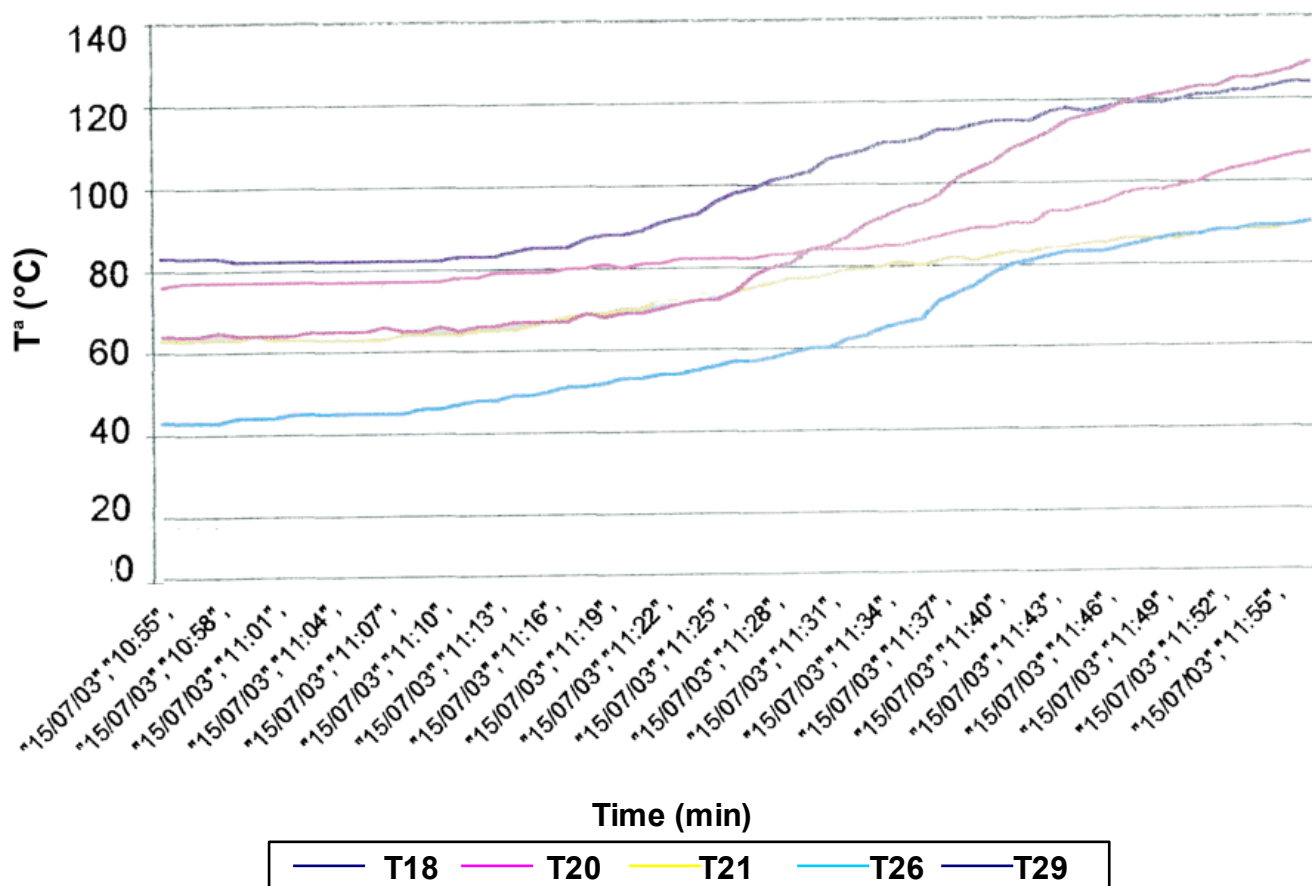
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1.4.2 Temperature of the unexposed face of the samples

As for the unexposed face, the diagrams referred to the temperatures registered by the thermocouples are the following:

T^a Thermocouple register F399/03-02



Thermocouple no.21 ≈ Thermocouple no.1 of the thermocouple position diagram at the test piece
 Thermocouple no.29 ≈ Thermocouple no.2 of the thermocouple position diagram at the test piece
 Thermocouple no.18 ≈ Thermocouple no.3 of the thermocouple position diagram at the test piece
 Thermocouple no.20 ≈ Thermocouple no.4 of the thermocouple position diagram at the test piece
 Thermocouple no.26 ≈ Thermocouple no.5 of the thermocouple position diagram at the test piece

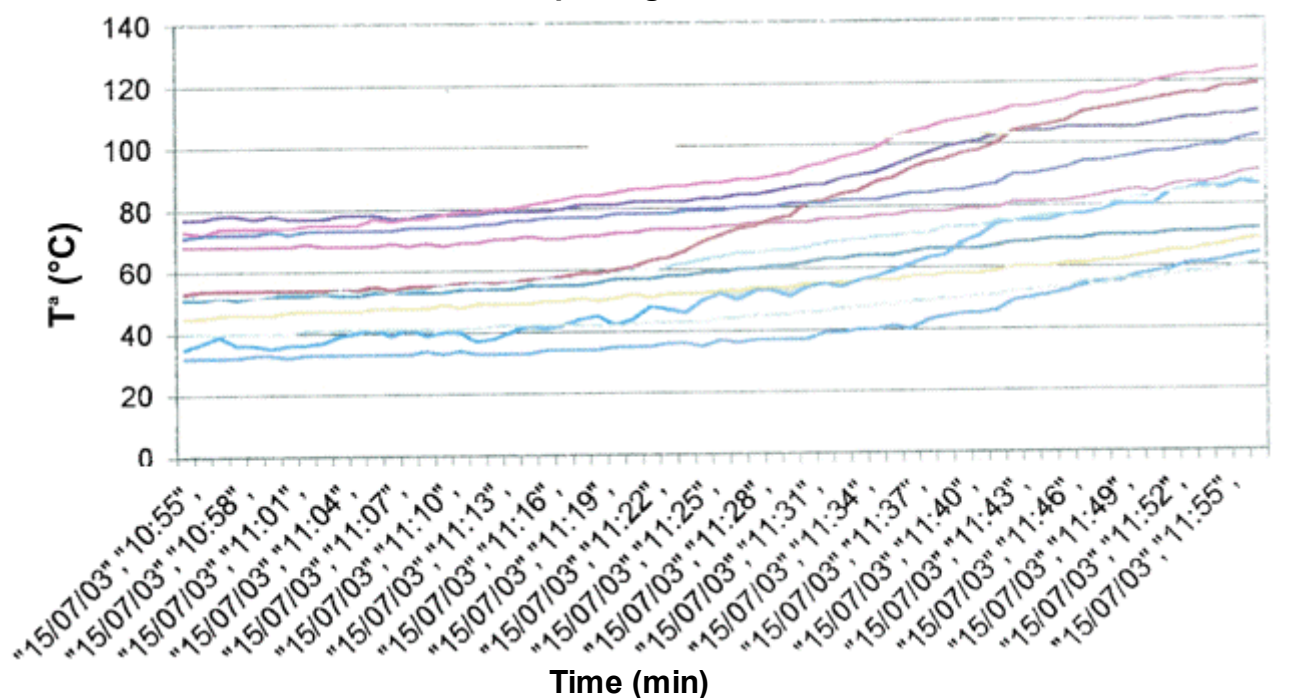
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T Thermocouple register F399/03-02



— T8	— T9	— T10	— T11	— T15	— T16	— T17	— T19	— T23
— T24	— T27	— T28						

Thermocouple no.24 ≈ Thermocouple no.6 of the thermocouple position diagram at the test piece
 Thermocouple no.19 ≈ Thermocouple no.7 of the thermocouple position diagram at the test piece
 Thermocouple no.08 ≈ Thermocouple no.8 of the thermocouple position diagram at the test piece
 Thermocouple no.09 ≈ Thermocouple no.9 of the thermocouple position diagram at the test piece
 Thermocouple no.10 ≈ Thermocouple no.10 of the thermocouple position diagram at the test piece
 Thermocouple no.11 ≈ Thermocouple no.11 of the thermocouple position diagram at the test piece
 Thermocouple no.23 ≈ Thermocouple no.12 of the thermocouple position diagram at the test piece
 Thermocouple no.27 ≈ Thermocouple no.13 of the thermocouple position diagram at the test piece
 Thermocouple no.28 ≈ Thermocouple no.14 of the thermocouple position diagram at the test piece
 Thermocouple no.15 ≈ Thermocouple no.15 of the thermocouple position diagram at the test piece
 Thermocouple no.16 ≈ Thermocouple no.16 of the thermocouple position diagram at the test piece
 Thermocouple no.17 ≈ Thermocouple no.17 of the thermocouple position diagram at the test piece

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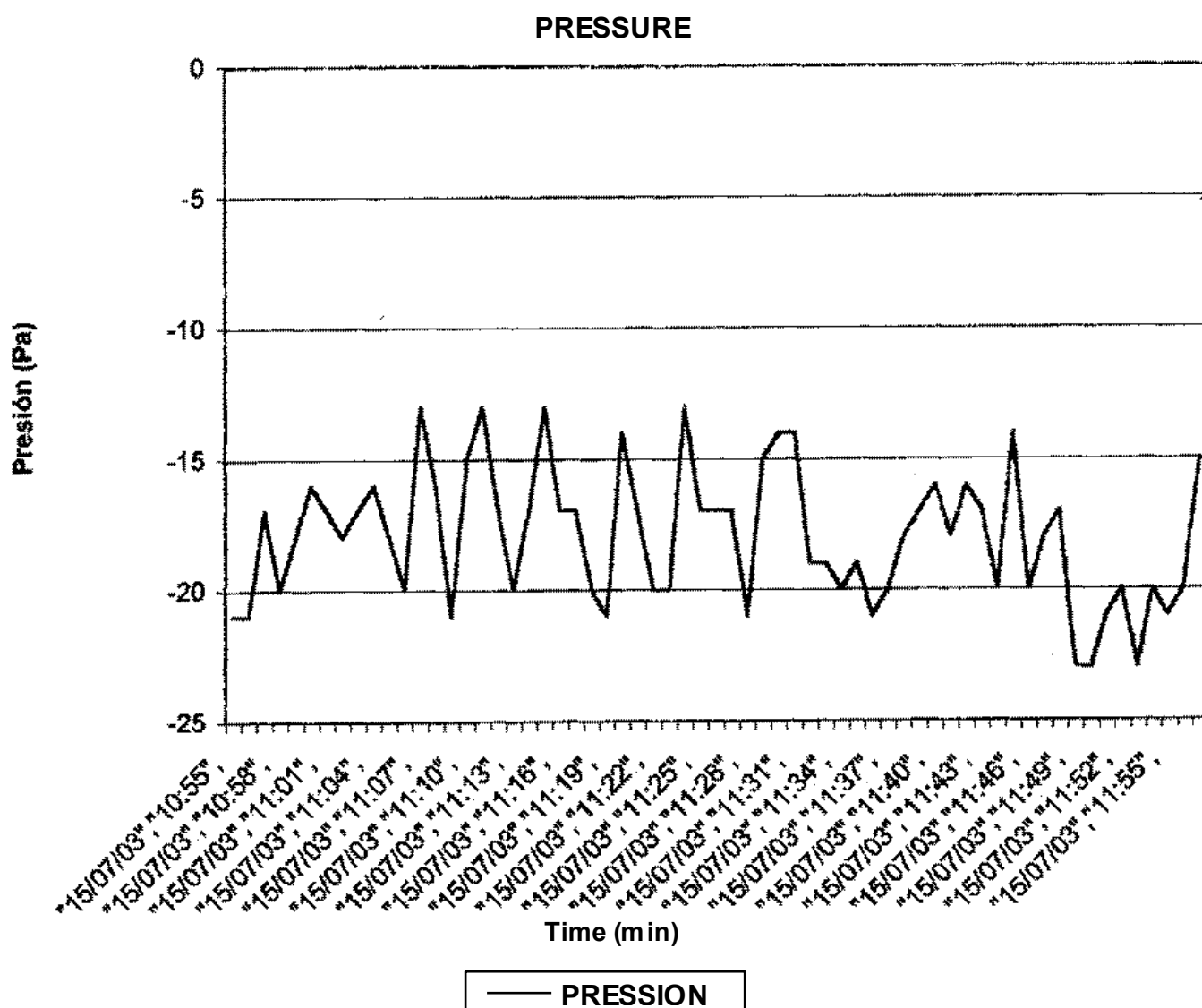
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1.4.3 Furnace internal pressure diagram:

The furnace internal pressure obtained during the test is shown by the pressure diagram below:



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1.4.4 Events during the test

FILE f399-03

EVENTS

* Slight gypsum detachment at the right upper angle of the sample.

2. RESULTS

2.1 Fire Resistance Results

The results obtained by the test mentioned at paragraph 1.1, with no consideration of the connections between the lateral walls of the furnace and the floor, have been:

RESULTS	
Total duration of the test:	62 min.
CRITERIA	UNEXPOSED FACE
a) mechanical stability	Time to reach the criteria > 60 minutes
b) flame resistance	Time until ignition of cotton tampon > 60 minutes
c) emission of inflammable gas	Time until ignition of pilot flame > 60 minutes
d) heat insulation	-
unexposed side average temperature	Time at which the average temperature is equal to 140°C + initial temp. > 60 minutes
unexposed side maximum temperature	Time at which the average temperature is equal to 180°C + initial temp. > 60 minutes
Radiation temperature	-