

Test report No 12447A

Sponsor

GLAVERBEL SENEFFE
Rue Jules Bordet
Parc Industriel Zone C
B-7180 SENEFFE

Test specimen

A glazed partition.

Nature of the tests

Test concerning the fire resistance of this test specimen in accordance with the European standard EN 1364-1: 1999.

In the rooms of the laboratory and under its control, the firm GLAVERBEL SENEFFE S.A., Rue Jules Bordet, Parc Industriel Zone C, B-7180 SENEFFE set up, on 14, 15 and 16 November 2006, a glazed partition in a concrete frame for a test concerning its fire resistance.

This test specimen was prepared in accordance with the requirements of the standard stated hereinafter.

1 DESCRIPTION OF THE TEST SPECIMEN

1.1 Name and address of the sponsor of the fire resistance test:

GLAVERBEL SENEFFE
Rue Jules Bordet
Parc Industriel Zone C
B-7180 Seneffe

1.2 Name and address of the manufacturer:

GLAVERBEL SENEFFE
Rue Jules Bordet
Parc Industriel Zone C
B-7180 Seneffe

1.3 Description of the test specimen (annexes 1 through 5):

In the following description, all dimensions and material properties are the nominal values communicated by the sponsor.

The conformity of the test specimen with these communicated values was verified by the laboratory insofar as the structure of the test specimen and the form in which it was delivered allowed this verification.

The present test specimen was fully assembled in the laboratory so that all the outer dimensions could be verified.

The measured values (MV) are only mentioned if they differ significantly from the nominal values (NV).

In this description, the numbers of the parts between rectangular brackets [] refer to the numbering in the parts legend, viz. in the key to the drawings (annexe 5). Listed in that legend are the dimensions and material properties of every element of structure.

The test specimen is an a non loadbearing glazed partition. The partition is constructed inside a vertical concrete frame of the furnace [1] with inner dimensions of 3000 mm x 3000 mm.

The glazed partition consists of a window framework made of steel sections and glass panels.

Dimensions of the partition:

height: 3000 mm;

width: 3000 mm;

thickness: 50 mm.

1.3.1 The framework:

The window framework consists of two types of steel sections [2] and [3]. Section [2] is used to build up the vertical and horizontal edges. Section [3] is used to construct the inner frame. At the intersections the sections are welded together.

One vertical edge section has been attached to the furnace frame each 860 mm from the threshold by averages of welded steel plates and anchor bolts [4]. The two horizontal sections have been attached to the furnace frame every 857 mm by averages of welded steel plates and anchor bolts [4]. One vertical section has not been attached to the furnace frame. It is called the free edge. The gap between this section and the furnace frame is stuffed with mineral wool [5]. The gaps between the

two horizontal sections and the other vertical section and the furnace frame have been stuffed with mineral wool [6].

1.3.2 The glass elements:

Each glass element consists of a 16 mm thick PYROBEL 16.

The glazed partition has twelve glass elements, [7] to [18], with six different dimensions.

All glass elements have been placed the same way. A ceramic tape [19] is placed on the inner side of the frame and on the inner side of the steel windowpane beads [20]. Three small glass fibre blocks [21] are placed on the lower horizontal section of each frame opening. On these blocks, the glass elements are placed. The glass element is pressed between the frame and the windowpane beads. The metal windowpane beads are pressed onto screws [22] which are screwed in the sections every 140 mm.

1.4 Drawings:

The present drawings are not to scale.

Annexe 1: front view – positions of the thermocouples – observations.

Annexe 2: front view – unexposed side.

Annexe 3: section AA, BB and CC.

Annexe 4: section DD, EE and FF.

Annexe 5: legend.

1.5 Trade name of the test specimen:

PYROBEL 16 in Jansen Economy 50.

1.6 Number of test specimens received by the laboratory:

One.

2 TEST PROCEDURE

2.1 Sampling done by:

Warringtonfire Certification Limited WCL (Notified Body Number: 1121), on 11th July 2006. Reference Number. 152845.

2.2 Date of the delivery of the test specimen:

14 November 2006.

2.3 Set-up date of the test specimen:

14 to 16 November 2006.

2.4 Set-up conditions for the test specimen:

The unloaded glazed partition is erected in a vertical concrete frame with inner dimensions 3000 mm x 3000 mm. The dimensions of the concrete frame are invariable regardless of the actions of the test specimen during the test. The whole unit is placed up against the furnace so that it constitutes one of the outer walls thereof.

2.5 Conditioning:

From the receipt to the test, the test element was kept in the laboratory under normal conditions.

2.6 Date of the test:

28 November 2006.

2.7 Test method:

This report contains the construction details and the boundary conditions of, as well as the results that were obtained as per the procedure of the European standard EN 1364-1:1999.

2.6 Overpressure inside the oven:

Annexe 6: shows the overpressure in the oven in function of time. It was set to $12 \text{ N/m}^2 \pm 3 \text{ N/m}^2$ at a height of 2 metres. This is $20 \text{ N/m}^2 \pm 3 \text{ N/m}^2$ at a height of 3 metres.

3 OBSERVATIONS DURING THE TEST

Time in minutes	Observations
0	Start of the test.
1	The windowpanes crack.
2	Cracks observed in all the windowpanes. The windowpanes in the upper half of the test element have become nontransparent.
3	All the windowpanes are fully nontransparent.
6	The upper half of the test element is discolouring brown.
7	Light smoke and water vapour is observed in zone 1 out of a crack.
8	Light smoke and water vapour is observed in zone 2.
10	The maximum rise in temperature of the test specimen exceeds 180° C, measured with thermocouple n° 34.
11	The crack in zone 1 is discolouring brown.
12	Cracking noises are observed. Small pieces of glass are shattering of the test element at the non exposed side.
14	A large piece of glass brakes of the test element at zone 3.
15	A large piece of glass brakes of the test element at zone 4.
16	Very light smoke and water vapour is observed at the entire test element.
29	The maximum rise in temperature of the test specimen is 110° C , measured with the roving thermocouple at 15 mm from the frame in zone 5.
34	The average rise in temperature on the test specimen exceeds 140° C, measured with thermocouples n° 3, n° 8, n° 14, n° 17 and n° 22.
35	Zone 6 is discolouring black.
41	Brown discoloration is observed at the windowpane edges.
61	The furnace glow is visible at zone 3.

66	The furnace glow is visible at zone 7.
68	Windowpane no 8 falls out of the frame. Flames are observed lasting longer than 10 seconds at windowpane n° 8. The gap gauge with a diameter of 6 mm can be put through the test element and be moved over a distance of 150 mm. The gap gauge with a diameter of 25 mm can be put through the test element. End of the test.

Remark: the ambient temperature in the test room during the test was 16,2°C.

4 MEASUREMENTS DURING THE TEST

Annexe 7: gives the deformation in the places indicated in annex 1, in relation to time.

Annexe 8: gives the radiation intensity, measured at a distance of one metre from the centre of the test element, in relation to time.

The following annexes show the rise in temperature of the thermocouples in the places indicated in annex 1, in relation to time.

Annexe 9: thermocouples 1 and 2 on windowpane [11] and their average temperatures.

Annexe 10: thermocouples 3 and 4 on windowpane [12] and their average temperatures.

Annexe 11: thermocouples 5, 6 and 7 on windowpane [13] and the average temperatures of 5 and 6.

Annexe 12: thermocouples 8 and 9 on windowpane [14] and their average temperatures.

Annexe 13: thermocouples 10 and 11 on windowpane [15] and their average temperatures.

Annexe 14: thermocouples 12 and 13 on windowpane [7] and their average temperatures.

Annexe 15: thermocouples 14, 15 and 16 on windowpane [8] and the average temperatures of 14 and 15.

Annexe 16: thermocouples 17 and 18 on windowpane [9] and their average temperatures.

Annexe 17: thermocouples 19, 20 and 21 on windowpane [10] and the average Temperatures of 19 and 20.

Annexe 18: thermocouples 22 and 23 on windowpane [18] and their average temperatures.

Annexe 19: thermocouples 24 and 25 on windowpane [16] and their average temperatures.

Annexe 20: thermocouples 26, 27 and 28 on windowpane [17] and the average Temperatures of 26 and 27.

Annexe 21: thermocouples 29 to 34 on windowpane [15] the window framework.

Annexe 22: the average temperature of the test element.

Annexe 23: the plate thermometers in the oven and the ISO 834 curve.

Annexe 24: allowed deviation of the plate thermometers with respect to the ISO 834 curve.

5 PHOTOGRAPHS OF THE TEST SPECIMEN BEFORE, DURING AND AFTER THE TEST

Annexes 25 till 27 included.

6 RESULTS

Observations*	Exceeded
$\Delta T_m = 140^\circ\text{C}$	34 minutes
$\Delta T_M = 180^\circ\text{C}$	10 minutes
Ignition of a cotton pad	Not applicable
Radiation intensity = 15kW/m^2	Not during the test
Sustained flaming	68 minutes
Failure with a 6 mm gap gauge	68 minutes
Failure with a 25 mm gap gauge	68 minutes

(*) Summary of the observations which might affect the classification of the test element.

The test duration was 68 minutes

The radiation intensity was $7,7\text{ kW/m}^2$ after 67 minutes.

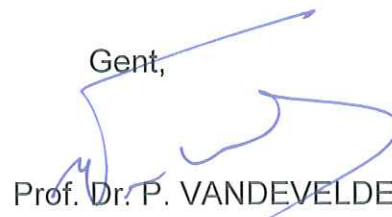
Any appreciable deviation from the key dimensions, construction details, stresses and/or boundary and end-of-test conditions which is not within the immediate scope of the test method, is not covered by this report. Owing to the inherent nature of fire resistance tests and the difficulties arising therefrom as to qualifying parameter uncertainty when measuring the fire resistance, it hasn't been possible to establish the degree of accuracy of these test results.

7 DIRECT FIELD OF APPLICATION OF TEST RESULTS

The direct field of application of the test results for these test specimens is set forth in paragraph 13 of the European standard EN 1364-1:1999.



P. TACK
Project manager

Gent,


Prof. Dr. P. VANDEVELDE
Director

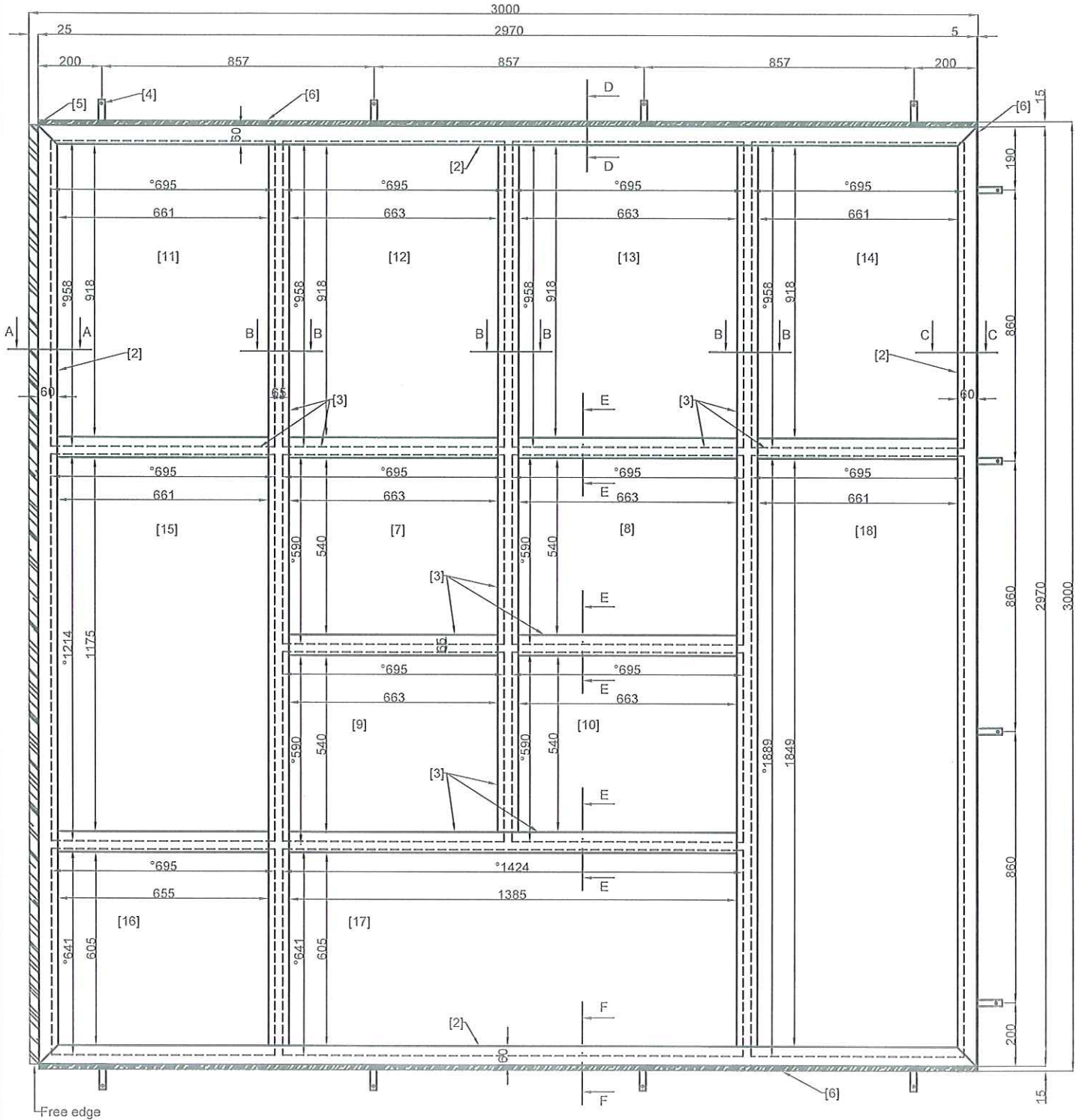
The present report includes: 8 pages;

27 annexes, 3 of which contain photographs.

This document is the original version of this test report and is written in English.

This report may be used only literally and completely for publications. - For publications of certain texts, in which this report is mentioned, our permission must be obtained in advance.

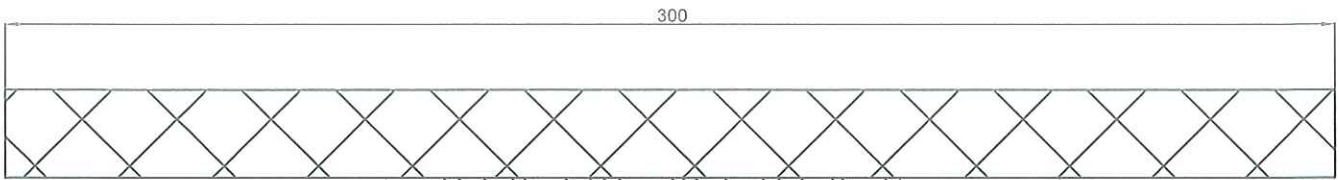
Unexposed side



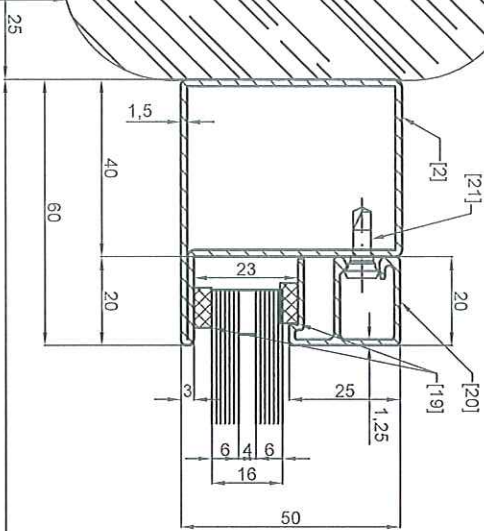
Free edge

° = Glass dimensions

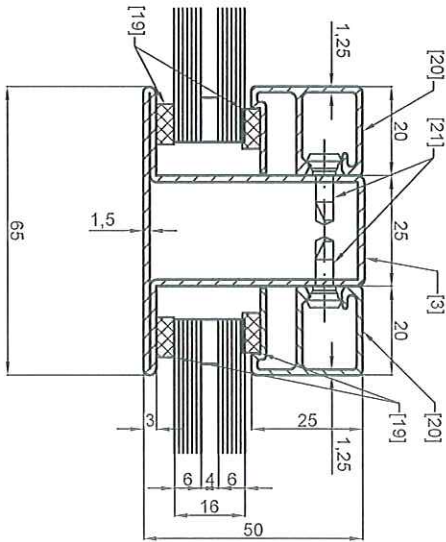




Free edge

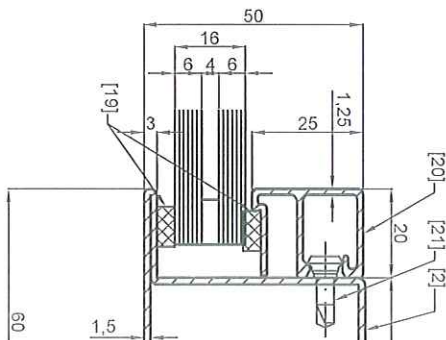


Section AA

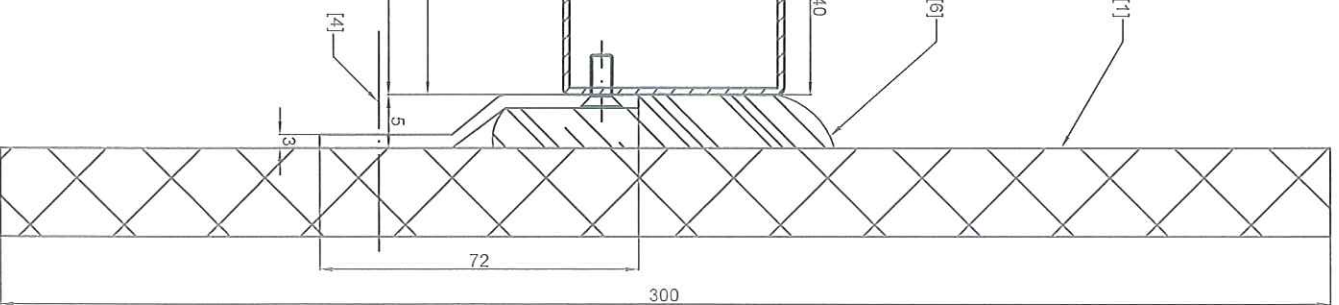


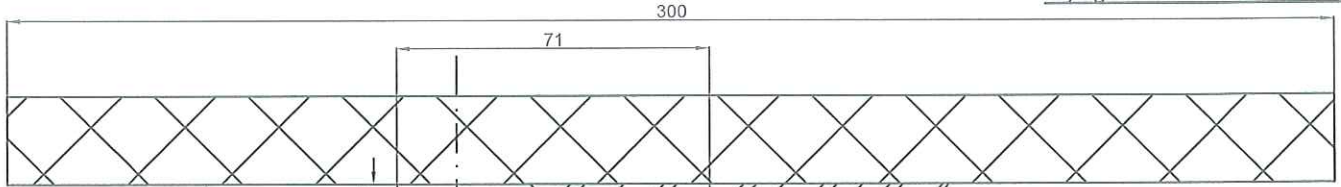
Section BB

Exposed side

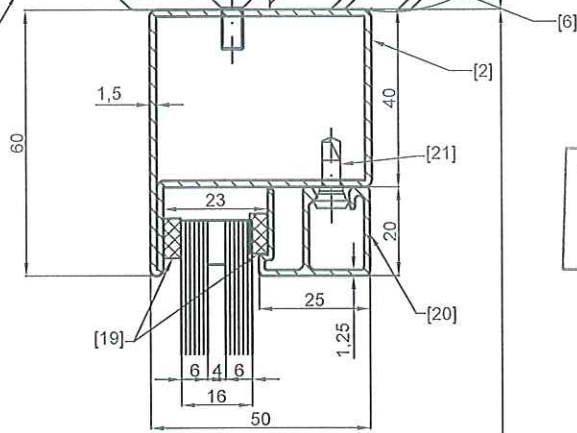


Section CC

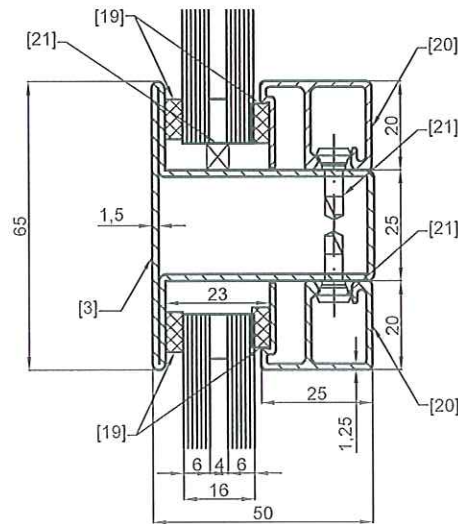




Section DD

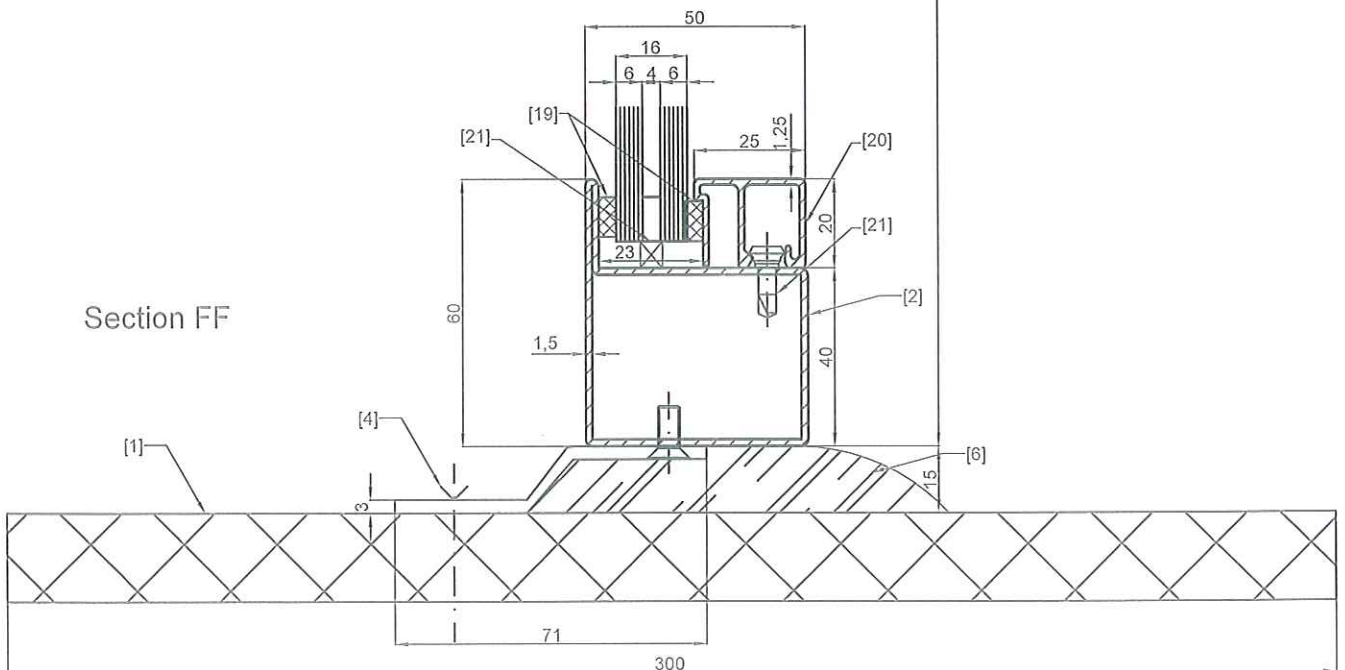


Section EE



2970
Exposed side

Section FF



LEGEND

- [1] Concrete frame – inner dimensions: 3000 mm x 3000 mm.
- [2] Section – steel – trade and type: Jansen Economy 50 – outer dimensions of the section: 60 mm x 50 mm –
thickness : 1,5 mm.
- [3] Section – steel – trade and type: Jansen Economy 50 – outer dimensions of the section: 65 mm x 50 mm – thickness: 1,5 mm.
- [4] Anchor bolt – steel – trade name: DRILFIX – length: 75 mm – diameter: 10 mm.
- [5] Mineral wool – volumetric weight: 96 kg/m³ (NV).
- [6] Mineral wool – trade name and type: Thermal Ceramics Superwool[®] SW 607 HT – uncompressed thickness: 13 mm or 19 mm - volumetric weight: 128 kg/m³ (NV).
- [7] Glass – trade name and type: Glaverbel[®] PYROBEL 16[®] – outer dimensions: 695 mm x 590 mm – thickness: 16 mm – weight: 16,4 kg – reference: BX06980-02-502.
- [8] Glass – trade name and type: Glaverbel[®] PYROBEL 16[®] – outer dimensions: 695 mm x 590 mm – thickness: 16 mm – weight: 16,4 kg – reference: BX06980-02-501.
- [9] Glass – trade name and type: Glaverbel[®] PYROBEL 16[®] – outer dimensions: 695 mm x 590 mm – thickness: 16 mm – weight: 16,4 kg – reference: BX06980-02-504.
- [10] Glass – trade name and type: Glaverbel[®] PYROBEL 16[®] – outer dimensions: 695 mm x 590 mm – thickness: 16 mm – weight: 16,4 kg – reference: BX06980-02-503.
- [11] Glass – trade name and type: Glaverbel[®] PYROBEL 16[®] – outer dimensions: 958 mm x 695 mm – thickness: 16 mm – weight: 26,8 kg – reference: BX06980-01-504.

- [12] Glass – trade name and type: Glaverbel® PYROBEL 16® – outer dimensions: 958 mm x 695 mm – thickness: 16 mm – weight: 26,8 kg – reference: BX06980-01-501.
- [13] Glass – trade name and type: Glaverbel® PYROBEL 16® – outer dimensions: 958 mm x 695 mm – thickness: 16 mm – weight: 26,8 kg – reference: BX06980-01-502.
- [14] Glass – trade name and type: Glaverbel® PYROBEL 16® – outer dimensions: 958 mm x 695 mm – thickness: 16 mm – weight: 26,8 kg – reference: BX06980-01-503.
- [15] Glass – trade name and type: Glaverbel® PYROBEL 16® – outer dimensions: 1214 mm x 695 mm – thickness: 16 mm – weight: 33,6 kg – reference: BX06980-03-501.
- [16] Glass – trade name and type: Glaverbel® PYROBEL 16® – outer dimensions: 695 mm x 641 mm – thickness: 16 mm – weight: 18,0 kg – reference: BX06980-04-501.
- [17] Glass – trade name and type: Glaverbel® PYROBEL 16® – outer dimensions: 1424 mm x 641 mm – thickness: 16 mm – weight: 36,4 kg – reference: BX06980-05-501.
- [18] Glass – trade name and type: Glaverbel® PYROBEL 16® – outer dimensions: 1889 mm x 695 mm – thickness: 16 mm – weight: 52,4 kg – reference: BX06980-06-501.
- [19] Ceramic tape – trade name and type: ODICE Superwool® X607 – section dimension: 20 mm x 3 mm.
- [20] Glazing bead – steel – section dimensions: 25 mm x 20 mm – thickness: 1,25 mm.
- [21] Block – glass fibre – trade name and type: Promatect H – dimensions: 70 mm x 17 mm – thickness: 6 mm.
- [22] Screw – steel – length: 15,2 mm – diameter: 4,7 mm.