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TEST REPORT

Report no.: 06111303-1
Date: 08. January 2007
IBS-SJ/gk

APPLICANT:
VETROTECH SAINT-GOBAIN International AG
Stauffacherstraße 128, CH-3000 Bern, Switzerland

TEST INSTITUTE:
IFTS – International Fire Testing + Services AG
Stauffacherstraße 122, CH-3014 Bern, Switzerland
Accreditation number: STS 469
Accredited for carrying out fire tests according to the standard series EN 1363 and EN 1364 by the Swiss accreditation body SAS according to ISO/IEC17025:2005

TEST SPECIMEN:
Non-load-bearing glazed wall construction, made of a thermally insulated system profile made of steel profiles, type: **"JANSEN VISS FIRE TV EI 30"**

TEST STANDARD:
ÖNORM EN 1363, part 1
ÖNORM EN 1363, part 2
ÖNORM EN 1364, part 1

TEST DATE:
05. December 2006

SIDE EXPOSED TO FIRE:
Outside (covering strip)

TESTING TIME:
62 minutes

TEST RESULTS:
Integrity (E): 62 minutes
Thermal radiation (W): 62 minutes
Insulation (I): 43 minutes

EXECUTED BY:
Josef STOCKINGER

This test report contains:
14 pages and **26** enclosures

Enclosures:
A: Photographic documentation (12 pictures, 6 pages)
B: test protocol (16 pages)
C: Construction drawing (4 pages)

CONTENT

1. Test basis

ÖNORM EN 1363, part 1:
"Fire resistance tests – part 1: General requirements"
Edition: 01.01.2000

ÖNORM EN 1363, part 2:
"Fire resistance tests – part 2: Alternative and further methods"
Edition: 01.01.2000

ÖNORM EN 1364, part 1:
"Fire resistance tests for non-bearing components – part 1: walls"
Edition: 01.04.2000

2. Goal of the fire test/ test program

In order to determine the fire resistance period of a non-load-bearing glazed wall construction, made of a thermally insulated system profile made of steel profiles a fire test has been carried out on 05. December 2006 at the test laboratory IFTS – International Fire Testing + Services AG, Stauffacherstraße 122, CH-3014 Bern, Switzerland (Accreditation number: STS 469). The test specimen was made of the system profile "JANSEN VISS FIRE TV EI 30". This construction has been tested and judged regarding its integrity, thermal radiation and insulation from the outside (covering strip side).

The choice of the test specimen and the side exposed to fire is based on the elaborated test program of the VKF.

3. Producer of construction

- **Frame element**
  Producer: JANSEN AG, Industriestraße 34, CH-9463 Oberriet, Switzerland
  Type profile system: "VISS FIRE TV EI 30"

4. Producer of the used materials

- **System profile and accessories**
  Insulated steel profile system
  Producer: JANSEN AG, Industriestraße 34, CH-9463 Oberriet
  Type: "VISS FIRE TV EI 30"

- **Glazing**
  Insulated glass construction
  Producer: VETROTECH SAINT-GOBAIN International AG, Stauffacherstraße 128, CH-3000 Bern
  Type: "CONTRAFLAM N2", Thickness: 34 mm
  Construction: ESG 6 mm, SZR 10 mm, CONTRAFLAM 18 mm

5. Selection of materials for test specimen

The applicant constructed the test specimen and it accordingly got marked. Because the glazing elements first got inserted into the test specimen at the test laboratory of IFTS no further test specimen has been requested by the test institute IFTS and the IBS Linz for examination (examination of used materials and their measurements). The material thickness and its measurements have been checked before the fire test. Thereby no deviations according to the specifications of the applicant and the design drawings have been recognized. These drawings were taken over by the test institute and are enclosed to this test report (attachment C).

6. Description of test specimen

6.1. Dimensions

- **Complete construction**
  Wall intermediate space: 3000 x 4000 mm (W x H)
  Test specimen outside dimension: 2970 x 3970 mm (W x H)
  Profile thickness: 50 mm

- **Glazing 1 (top left)**
  Grid dimension: 1520 x 900 mm (W x H)
  Glazing dimension: 1380 x 880 mm (W x H)
  Glazing intermediate space: 1350 x 850 mm (W x H)

- **Glazing 2 (top right)**
  Grid dimension: 1400 x 900 mm (W x H)
  Glazing dimension: 1500 x 880 mm (W x H)
  Glazing intermediate space: 1470 x 850 mm (W x H)

- **Glazing 3 (bottom left)**
  Grid dimension: 1520 x 3020 mm (W x H)
  Glazing dimension: 1380 x 3000 mm (W x H)
  Glazing intermediate space: 1350 x 2970 mm (W B x H)

- **Glazing 4 (bottom right)**
  Grid dimension: 1400 x 3020 mm (W x H)
  Glazing dimension: 1500 x 3000 mm (W x H)
  Glazing intermediate space: 1470 x 2970 mm (W x H)

6.2. General description of specimen

The present non-load-bearing wall construction was made of pile- and interlock profiles consisting of cold-rolled steel profiles of the system "JANSEN VISS FIRE TV EI 30". The profiles showed corresponding patterns for the admission of the sealing elements. The connection of the single pile- and interlock profiles was carried out with edgeless weldings of the single profiles with each other.

The test specimen had four glazing openings whereby the fixation has been carried out in hidden form. For installation of the glass pane two glass blocks have been inserted into the interlocks at the bottom filling edge. Continuous system contact pressure profiles with the already installed sealings, which were screwed to the profiles with system-corresponding anchor screwings, were responsible for the four-sided anchorage of the glazing. The maximum distance between the screws amounted to 300 mm. A fire prevention strip has been glued to the contact pressure profile. The finally installed aluminium-cover bar has been clipped to the contact pressure profile.

Instead of the glass filling the product VERMIPAN-tiled paths has been installed into the wall connection area. The other continuous grooves between test specimen and test frame got filled with rock wool. The connection of the construction with the continuous parts of the structure has been carried out with a frame anchorage at the floor as well as the lintel area and one vertical longitudinal edge. Along the vertical longitudinal edge there was no fixation planned for the test specimen and the connection was carried out floating.

7. Conditioning

The test specimen has been delivered to the test institute in Bern/Switzerland one week before the test date, has been assembled to the test frame and stored in the test lab. The specimen has been stored in the laboratory at a temperature of 20 °C, relative humidity 60 %.

8. Supporting construction

The installation of the test specimen has been carried out directly into the test frame. A standard load carrying system was not used because of the size of the test specimen.

9. Installation of specimen

The installation of the specimen has been carried out one week before the fire test by personnel of the client and has been installed directly into the test frame.

After connection of the single frame parts with the load carrying system the glass fillings got installed. After mounting and screwing the test specimen into the test frame the glazing got inserted and the corresponding settings were carried out. The occurred gaps between test specimen and test frame have been closed with rock wool.

The construction, consisting of test specimen and test frame, forms the front side completion of the test furnace. At the contact surface with the test frame 30 mm strong rock wool strips (density approx. 90 kg/m³) have been inserted all around the surface.

10. Description of fire test

Fire test: 05. December 2006

10.1. Specimen side exposed to fire

The outside of the test specimen was exposed to fire.

10.2. Ambient temperature

The ambient temperature was measured during the test run with a Ø 3 mm type K thermocouple and was located near the data acquisition instrumentation with enough space to the furnace. See also the attached drawings (enclosure B).

10.3. Heating of the test furnace

The heating of the test furnace has been carried out with natural gas.

10.4. Temperature in the test furnace

Temperature graph according to the standard ÖNORM EN 1363-1, para 5.1.1.

10.5. Temperature measurement in the furnace

8 thermocouples according to ÖNORM EN 1363-1, para 4.5.1.1, using NiCr-Ni thermocouples (type K) with Ø1 mm were used. The thermocouples have been inserted into the furnace so that the side of the test specimen exposed to fire got covered.

Distance between test specimen and thermocouple: approx. 100 mm.

10.6. Furnace pressure

The pressure inside the furnace chamber was controlled in such a way, that the neutral height (0 Pascal) was located at a level of 500 mm above the floor and does not rise upon 20 Pa. The test results are documented in the test protocol.

10.7. Temperature measurement at unexposed surface of the test specimen

The rise of temperature of the unexposed surface of the test specimen was measured with thermocouples of type K according to the standard ÖNORM EN 1363-1, para 4.5.1.2, with a wire diameter of 0,5 mm, located as seen in the test protocols "thermocouple at the unexposed surface".

Each thermocouple has been covered with an inorganic, heat insulating cover (density approx. 900 kg/m³) with the measures 30 x 30 mm and glued to the specimen (special glue type: "Furtol Kernkleber").

The increase of temperature at the unexposed surface compared with the original values at the beginning got recorded by the data acquisition instrumentation and is documented in the enclosure B.

10.8. Deformation measurements at the side not exposed to fire of the test specimen

For determination of the deformation at the test specimen three thermocouples have been connected according to the Austrian standard ÖNORM EN 1364, part 1 at the points, were the biggest deformation was expected. The location of the measuring points and the test results are written down in enclosure B.

10.9. Radiation measurements at the side not exposed to fire of the test specimen

The measurements in the area of the heat radiation at the glazing has been carried out according to the Austrian standard ÖNORM EN 1363, part 2 parallel on one level and in a distance of 1000 mm to the unexposed side of the test specimen. The position of the heat flux instrument is documented in enclosure B.

11. Observations made during and after the fire test

11.1. Test protocol – 05. December 2006

The following observations were made at the side not exposed to fire:

23. Test second:
The prefixed glass pane of glazing 2 and glazing 3 showed first cracks.

35. Test second:
The prefixed glass pane of glazing 1 and glazing 4 showed first cracks and appearance of haze.

1. Test minute and 50 Seconds:
The prefixed glass pane of glazing 3 dropped into the burning chamber.

2. Test minute and 30 Seconds:
The prefixed glass pane of glazing 4 dropped into the burning chamber.

3. Test minute and 51 Seconds:
The fire prevention glass of glazing 3 showed a first lifting and a first appearance of haze.

5. Test minute and 29 Seconds:
Crack of ESG-glass of the fire prevention glass at glazing 4. Glass falls into burning chamber.

5. Test minute and 39 Seconds:
Crack of ESG-glass of the fire prevention glass at glazing 3. Glass falls into burning chamber. Thereupon every glazing shows an appearance of haze.

6. Test minute and 21 Seconds:
The lintel area at the upper points of the frame showed first emission of smoke out of the glazing sealing.

10. Test minute:
In the area where the prefixed glass stood still respectively has not fallen off the fire prevention glass showed no haze.

12. Test minute:
All burners of the furnace failed.

15. Test minute and 45 Seconds:
Burners start again.

23. Test minute:
Lower smoke emission and the glazing still showed complete and constant haze.

30. Test minute:
The frame elements only showed few deformations.

41. Test minute:
The upper edge of glazing 3 showed strong smoke emission.

45. Test minute:
The lintel area of each glazing showed black and brown colouring as well as a draining off of condensate. The pane lifted from the frame system towards the side exposed to fire in the lintel area. At the left vertical edge of glazing 3 a lifting was obvious on half level and a bulge at the edge towards the side exposed to fire.

50. Test minute:
A first glowing-trough is obvious- but no flame formation in the lintel area of glazing 3. A cotton pad test has been carried out in test minute 55 at glazing 3 in the lintel area underneath measuring point 30. The cotton pad did not glow or burn.

57. Test minute:
The second cotton pad test has been carried out in the same area like in test minute 55. The cotton pad did not glow or burn.

60. Test minute:
Strong smoke emission out of the glazing edges.

61. Test minute:
Continuous smoke emission (> ten seconds) in the lintel area of glazing 4.

62. Test minute:
End of fire test.

11.2. Observation after the fire test

On the side not exposed to fire:

In the lintel area of each glazing it was obvious that a flame formation developed at the sealings in the lintel area as well as in the area of the lifting of the glazing. The interlayer partly showed a brown colouring.

On the side exposed to fire:

The cover bar has fallen down or melted at the side exposed to fire. Partly scalling of the contact pressure profiles as well as black colouring and light deformation. Partly expanding fire prevention strips were obvious.

12. Comparison of test results with the criteria according to regulations

	Line	Regulation reference	Required criteria		VISS FIRE TV EI 30
1	---	---	---	Complete testing time	62 minutes
2	ÖNORM EN 1363-1, para 11.2	E	Ignition of cotton pad	Was given	no
3			Passing through of space gauge 6 mm	Space gauge could be moved into test specimen for a length of > 150 mm	Not possible
4			Passing through of space gauge 25 mm	Space gauge moved trough test specimen	Not possible
5			Flames on side not exposed to fire	Flames lasting > 10 seconds	61. minute
6	ÖNORM EN 1363-2 para 8	W	Exceeding of maximum radiation level	Over a value of 5 kW/m²	Not applied

	Line	Regulation reference	Required criteria		VISS FIRE TV EI 30
7	ÖNORM EN 1363-1, para 11.3	I	Exceeding the allowed average temperature increasing over the temperature at the beginning on the not exposed surface of the test specimen. **Glazing 1: max. allow. average value = 140 K**	Test minute	52
8				max. Δ T – medium in K	143,0
9			Exceeding the allowed average temperature increasing over the temperature at the beginning on the not exposed surface of the test specimen. **Glazing 2: max. allow. average value = 140 K**	Test minute	48
10				max. Δ T – medium in K	142,0
11			Exceeding the allowed average temperature increasing over the temperature at the beginning on the not exposed surface of the test specimen. **Glazing 3: max. allow. average value = 140 K**	Test minute	51
12				max. Δ T – medium in K	145,4
13			Exceeding the allowed average temperature increasing over the temperature at the beginning on the not exposed surface of the test specimen. **Glazing 4: max. allow. average value = 140 K**	Test minute	45
14				max. Δ T – medium in K	146,4
15			Exceeding the allowed average temperature increasing over the temperature at the beginning on the not exposed surface of the test specimen. **max. allow. Single value= 180 K**	Test minute	44
16				At measuring point	G24
17				Δ T in K	184,0
18	ÖNORM EN 1363-1, para 5.6		Ambient temperature	in °C	19,8
19			Δ T max. = +20 K; Δ T min. = -5 K	Δ T in K	-2,0
20	ÖNORM EN 1363-1, para 9.2	Furnace pressure	Pressure in furnace. Measurement taken on top of the specimen	in Pa	-49,5 - +43,2

A loss of integrity was given at test minute 61. A loss of heat insulation was given at test minute 44.

13. Validity of test

Because of the failure of the burners between test minute 12 and test minute 15, 45 seconds, the furnace temperature decreased underneath the allowed furnace temperature mentioned in the standard. After the burners had started again the temperature was in the range of tolerance within 4 minutes. But the curve area was outside the range of tolerance until the end of the test. Because of the long duration of the test (62 minutes) and the fact, that the heat insulation finally got lost in test minute 44 (in consideration of the fact that the burners failed and therefore a displacement of the power criteria for the heat insulation was given backwards) it can be assumed that a classification up to EI 30 according to EN 13501, part 2 (edition: 01/2004) is possible. A higher classification over 30 minutes is not possible.

14. Field of direct application

Because the test was part of a test series and because of the former positive tests of the profile series „JANSEN VISS FIRE TV EI 30" the following field of direct application can be stated. The result of this fire test can be applied to other constructions, as far as they fulfil the following conditions:

- Reduction of height is allowed.
- The test specimen can be broadened as far as the glass panel dimensions not get overstepped.
- Reduction of the measurements of the glass panel, but not thicker.
- Changing the aspect ratio of the glazing is allowed, as far as the biggest glazing measurement and its surface area stay the same.
- Increasing the measurements of the frame elements is allowed.
- A reduction of the distance between pile and / or bar is allowed.
- A reduction of the distance of the fixing elements is allowed.
- A change of the assembling angle up to 10° of the vertical side is allowed.

15. Final remarks

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in ÖNORM EN 1363-1, ÖNORM EN 1363-2 and ÖNORM EN 1364-1. Any significant deviation with respect to size, construction details other than those allowed under the field of direct application in the relevant test method is not covered by this report.

Because of the nature of fire resistance testing and consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

This test report may be published and used only in the total volume together with named attachments.

IBS-INSTITUTE FOR TECHNICAL FIRE PROTECTION AND SAFETY RESEARCH GmbH
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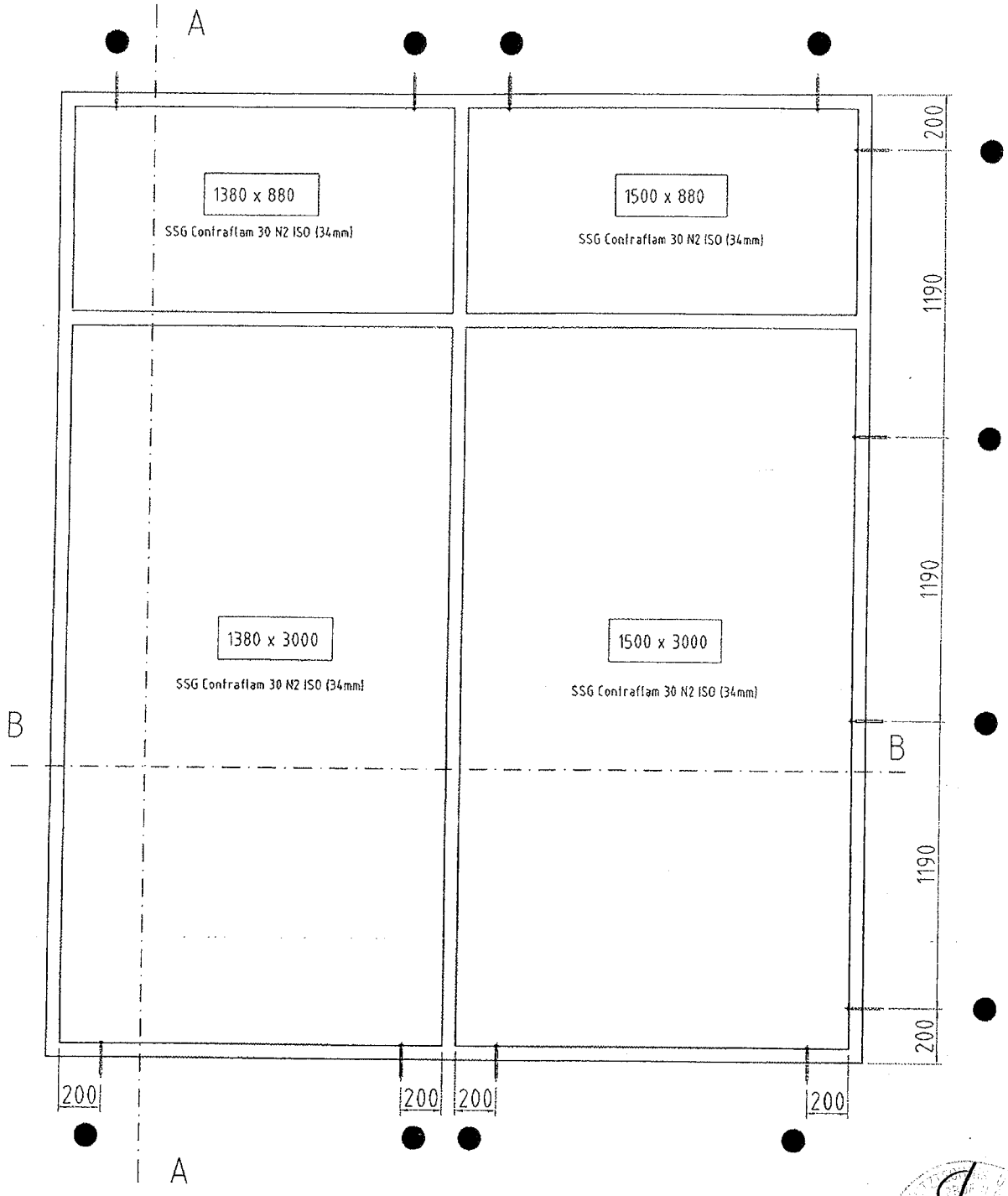

● Befestigungspunkte

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VISS Fire TV EI30

Ansicht Prüfelement (Kaltseite)

Massstab			
	Gezeichnet	05.09.06	DHU
	Geprüft		
	Projekt		

JANSEN

JANSEN AG CH-9463 Oberriet
Entwicklung / Stahlröhrenwerk

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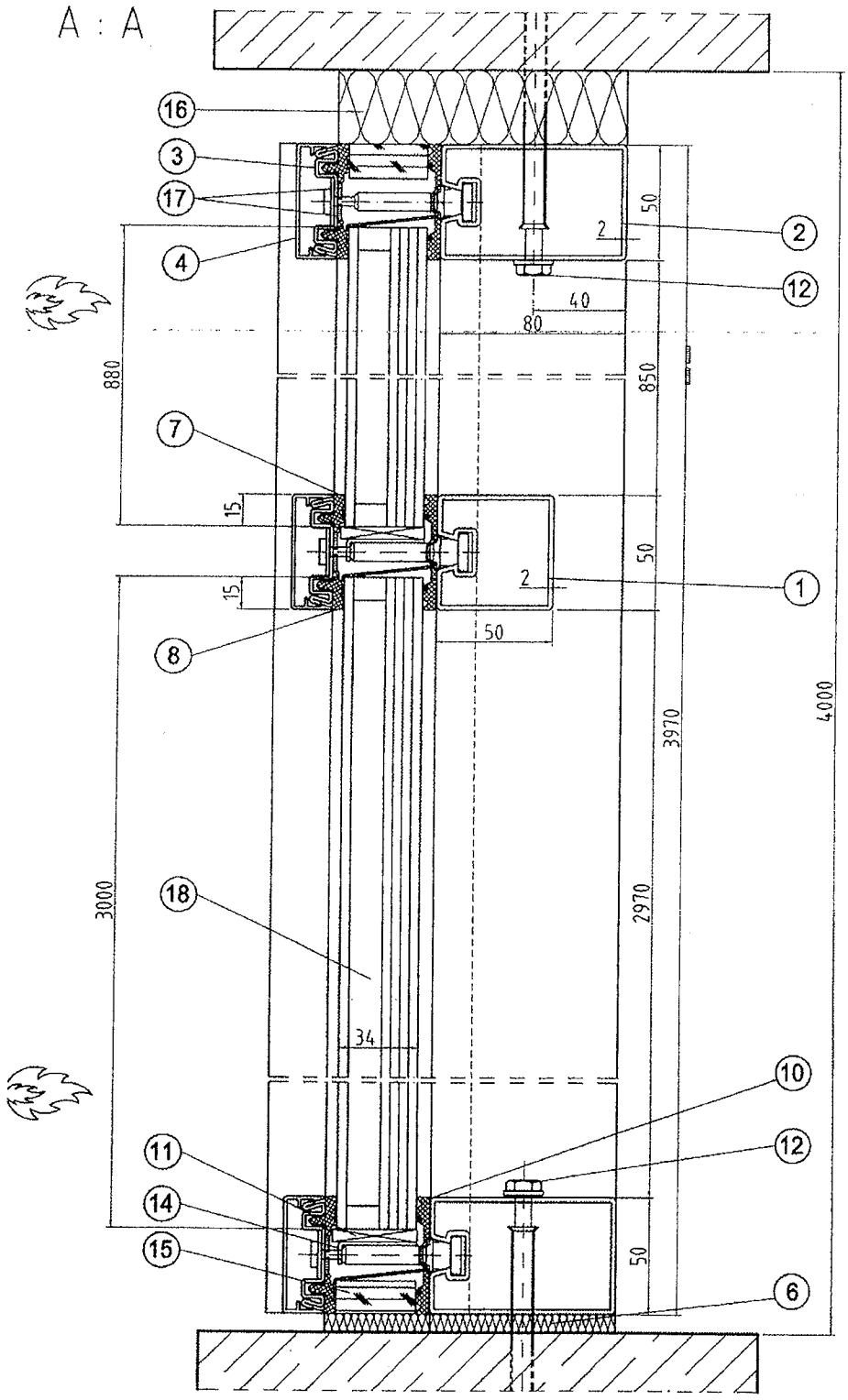

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VISS Fire TV EI30

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