

CLASSIFICATION OF FIRE RESISTANCE

FIRES-CR-171-24-AUPE

**Single leaf window, type S77 FR Alumil
(turn window)**

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CLASSIFICATION OF FIRE RESISTANCE IN ACCORDANCE WITH EN 13501-2: 2023 with direct field of application FIRES-CR-171-24-AUPE

Name of the product: Single leaf window, type S77 FR Alumil
(turn window)

Sponsor: Alumil SA
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1. INTRODUCTION

This classification report defines the resistance to fire classification assigned to element Single leaf window, type S77 FR Alumil (turn window) in accordance with the procedures given in EN 13501-2: 2023.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The element, Single leaf window, type S77 FR Alumil (turn window), is defined as:

Product Technical Specifications: EN 16034: 2014

Product family: pedestrian doorsets and/or openable windows and/or inspection hatches which are hinged or sliding, intended for the installation in areas in the reach of persons, and for which the main intended uses are giving safe access for persons

Mode of operation: normally maintained locked in the closed position / permanently closed

Intended use: fire compartmentation

End-use application: for fire compartmentation uses

2.2 PRODUCT DESCRIPTION



DIMENSIONS

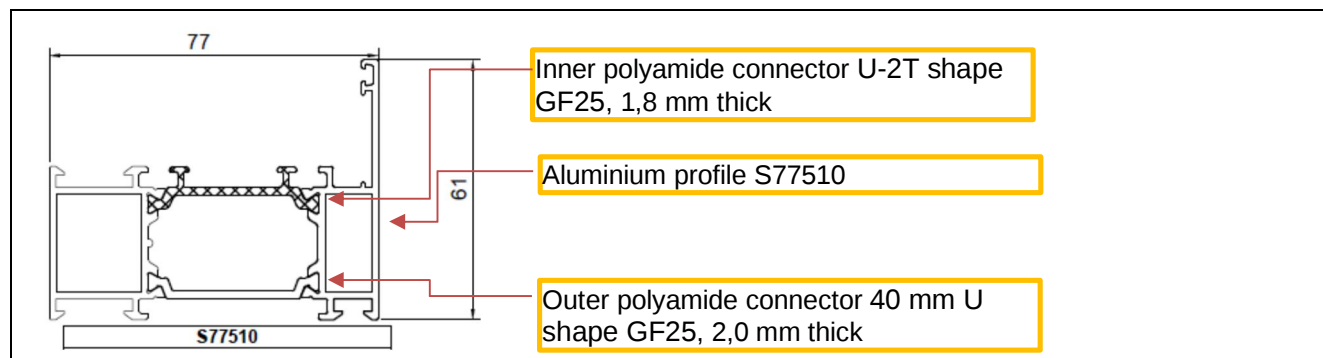
Overall dimensions of the window:	(1 000 x 1 650) mm (width x height)
Dimensions of the window leaf:	(940 x 1 590) mm (width x height)
Thickness of the window leaf frame:	85 mm
Thickness of the window frame:	77 mm
Weight of the window leaf:	89,4 kg

Art. numbers of components are delivered by the sponsor.



WINDOW FRAME

The frame of the window is made of 3-chamber system aluminium alloy profiles No. S77510 with dimensions of (61 x 77) mm and a profile wall thickness of 1,6 mm, with an interrupted thermal bridge made of polyamide type 40 mm U-2T shape GF25 with a wall thickness of 1,8 mm (inner polyamide) and 40 mm U shape GF25, with the wall thickness of 2,0 mm thick (outer polyamide) (manufacturer: Alumil SA, Greece).



The central chamber of the profile is filled with an insulation board from the phenolic foam, type KOOLTHERM K3 (manufacturer: Kingspan) art. No. 313-25-021-00, with dimensions of (34 x 20) mm and bulk density of 35 kg/m³.

The outer chambers are filled with plaster boards type B Knauf GKB (manufacturer: Knauf) with dimensions of (19 x 22) mm (2 x 9,5 mm) art. Nr. 680-77-512-00 and (9,5 x 22) art. Nr. 680-77-511-00, both having a bulk density of 700 kg/m³. Insulation boards are packaged in the plastic foil.

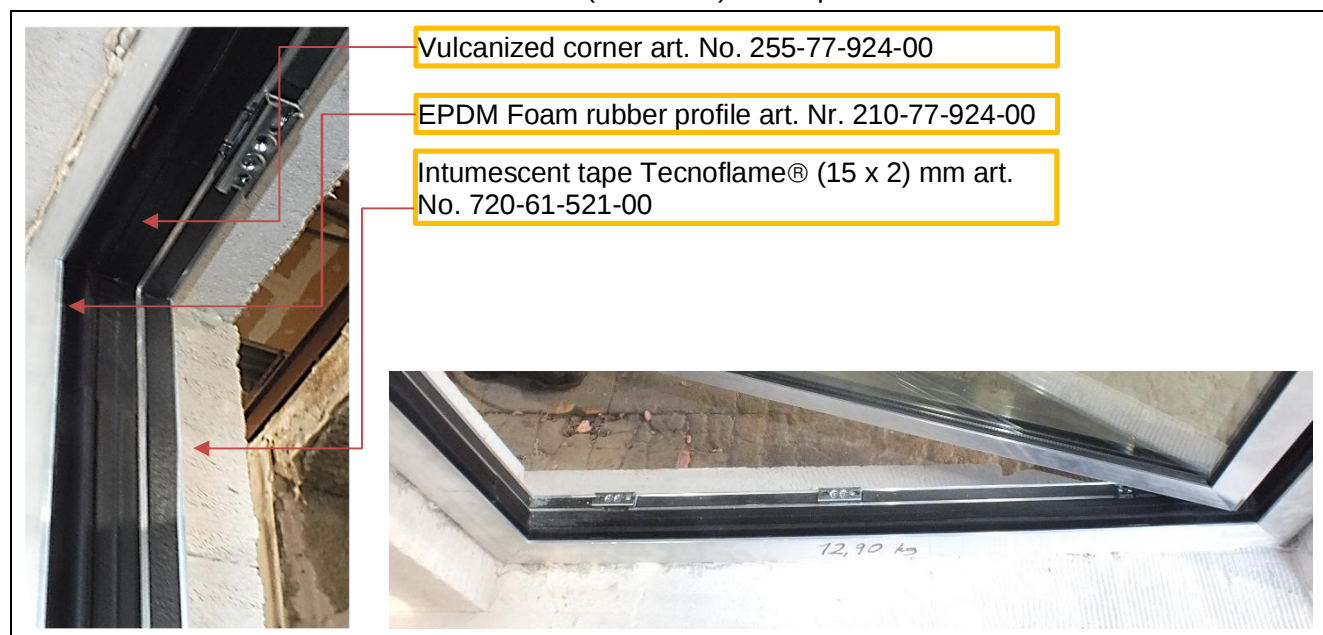
Individual profiles are connected using double corner inserts made of aluminium alloy 6060 connectors art. No. 113-23-102-00 and art. No. 113-23-196-00. The connectors are placed into the outer chambers of the profiles and are insulated with mastic type Fire acrylic B1 art. Nr. 770-01-414-00.

The profiles are reinforced with an aluminium alignment corners pieces art. No. 180-77-280-00 with dimensions of (22,2 x 1,5) mm at the frame corners.

The EPDM foam profile (central sealing profile) art. Nr. 210-77-924-00 with dimensions of (46 x 21) mm (manufacturer: Semperit) is self-glued around the inner perimeter of frame width.

The EPDM rubber profile art. No. 220-11-001-01 (manufacturer: BPM) is fixed around the inner perimeter of frame as a sealing window-stop profile.

The vulcanized corner art. No. 255-77-924-00 (100 x 100) mm is placed at each inner corner of the frame.

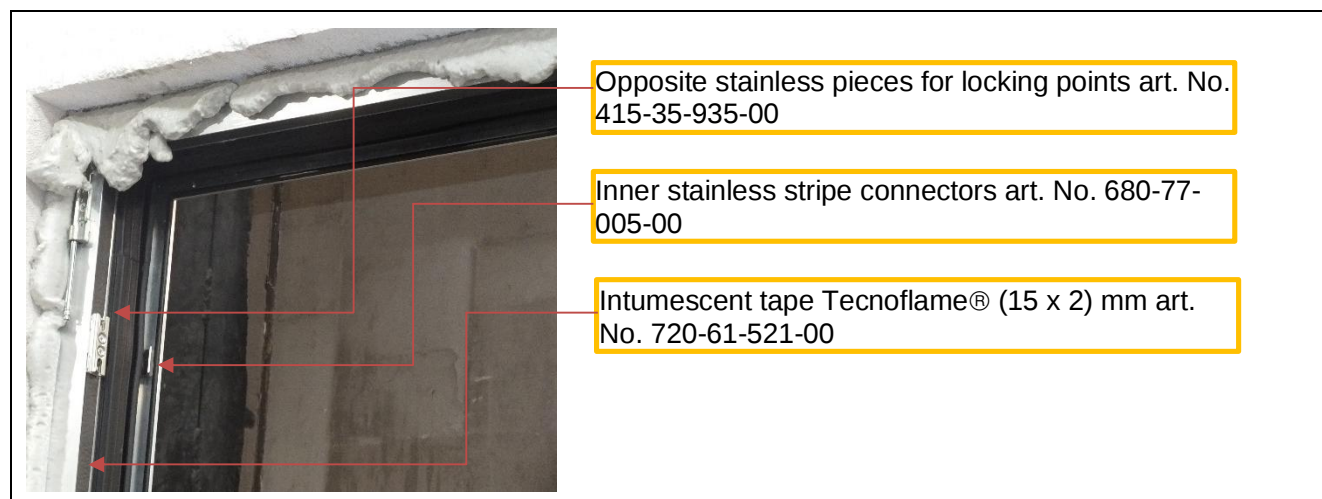




There are fixed to the frame of window also connectors-anchoring pieces as follows:

- outer stainless stripe connectors-anchoring pieces art. No. 680-77-510-00 with dimensions of (75 x 16 x 1,5) mm – 3 pcs at the vertical edges and 4 pcs at the horizontal edges (in position of the frame fixation);
- inner stainless stripe connectors art. No. 680-77-005-00 with dimensions of (25 x 73 x 24) mm (in position of the frame fixation). These pieces are placed under the EPDM rubber profile art. No. 210-77-924-00 and the locking plate art. Nr. 415-35-935-00.

Two layers of **intumescent tape** art. No. 720-61-521-00 with dimensions of (15 x 2) mm type Tecnoflame® (manufacturer: Marvon Srl.) is placed around the perimeter of the frame.

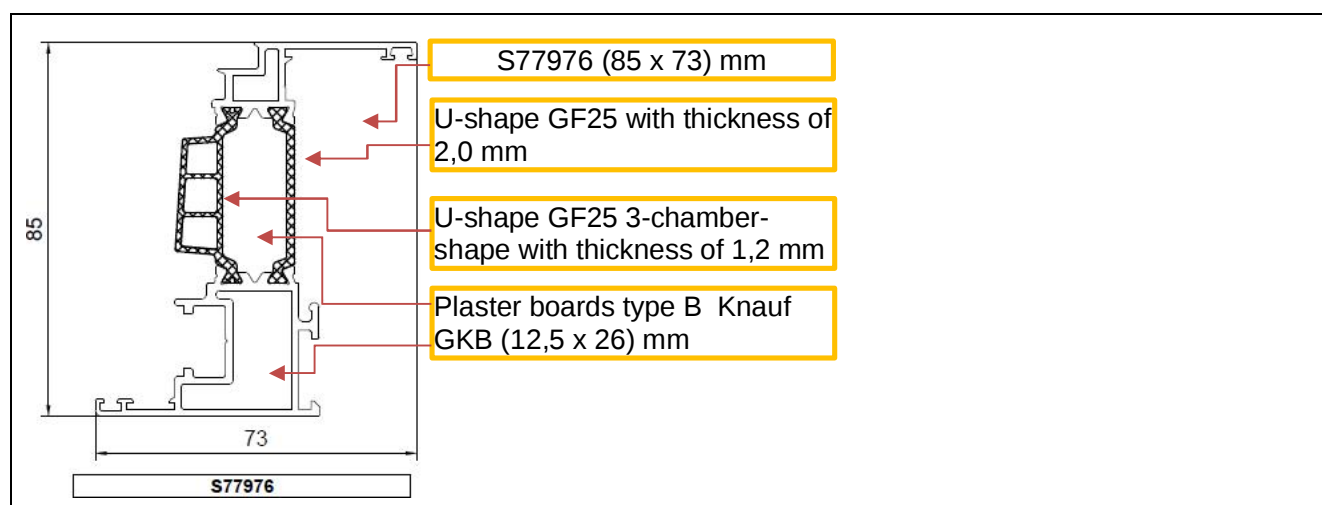


WINDOW LEAF

The frame of the window leaf is made of the window system aluminium alloy profiles S77976 with dimensions of (85 x 73) mm and a profile wall thickness of 1,6 mm, with an interrupted thermal bridge made of polyamide type 40 mm U-shape GF25 with a wall thickness of 2,0 mm and 40 mm 3-chamber-shape with a wall thickness of 1,2 mm (manufacturer: Alumil SA, Greece).

Two (inner) chambers are filled with plaster boards type B Knauf GKB (manufacturer: Knauf) with dimensions of (12,5 x 26) mm and bulk density of 700 kg/m³ (art. No. 680-77-976-00).

Strips of the GKB boards are packaged in the plastic foil.



Individual profiles are miter-cut and connected (in angle 45°) together by means of:

: insulated inner corner inserts aluminium alloy 6060 T6 connectors art. No. 113-13-274-00 with dimensions of (12,6 x 26,4) mm, and cast corner inserts aluminium connectors art. No. 165-77-116-00 with dimensions of (9,8 x 70) mm.

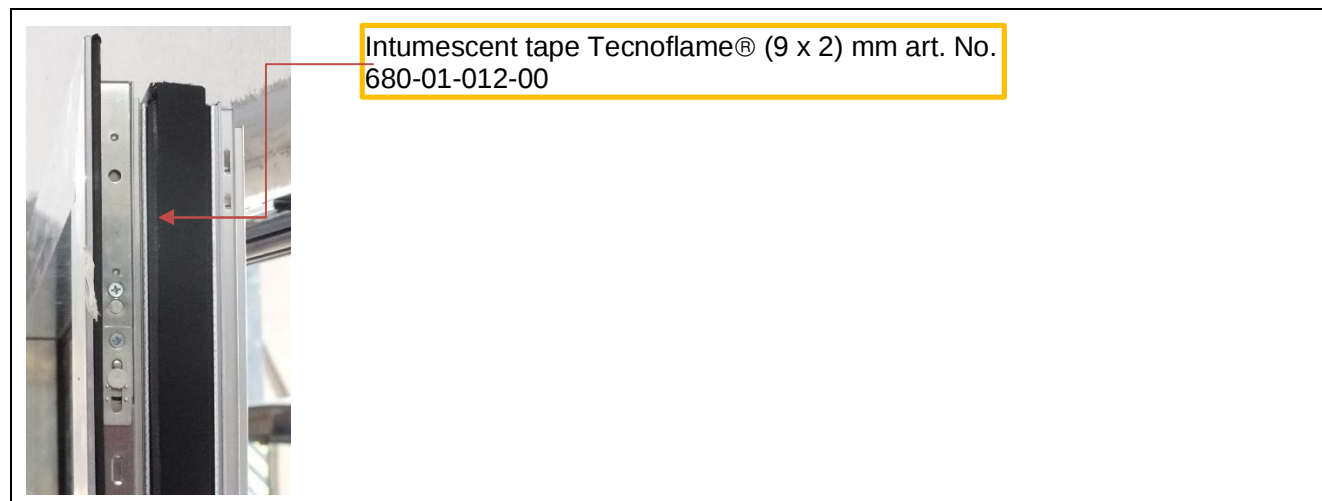


Connectors art. No. 113-13-274-00 are used in pairs for each joint of the profiles (the connectors are inserted into the outer chambers of the profiles). The connectors are insulated by mastic type Fire acrylic B1 art. No. 770-01-414-00.

The EPDM rubber sealing profile art. Nr. 220-60-002-01 (7,2 x 7,7) mm (manufacturer: Alumil) is placed around the perimeter of the window leaves frame.

Intumescent tape around the window leaf

The intumescent tape, type Tecnoflame® art. No. 680-01-012-00 with dimensions of (9 x 2) mm, (manufacturer: Marvon Srl) is self-glued on the side edge of the U-shape GF25 3-chamber-shape sealing around the perimeter of the leaves.



Glazing of the window leaf

Window leaf is glazed by insulation double glass (glass code: 4+4.2 EVO/6 AL/ PYROBEL 16) consists of PYROBEL EI 30, 16 mm thick (manufacturer: AGC) + 6,0 mm air cavity (ALU) + 4+4.2 EVO hardened glass with 2 x 0,38 mm PVB foil (manufacturer of double insulating glass: Patsis Glass, GR).

Dimensions of the glass pane: (609 x 1 478) mm (width x height), 31 mm thick.



The glass pane is fixed to the window leaf using L- shaped glass holders art Nr. 680-77-001-00 with dimensions of (30 x 60 x 17,5) mm – at exterior glazing side and L-shaped glass holders art. No. 680-77-002-00 with dimensions of (30 x 22,5 x 16) mm – at interior glazing side.

These L- shaped glass holders are fixed to the profiles using steel screws (4,2 x 13) mm (2 pcs per one bracket). Position of brackets acc. to drawings (2 pcs at the horizontal edges, 6 pcs at the vertical edges).

The distance setting blocks (Palstop P Ax, with bulk density of 1 700 kg/m³) with dimensions of (70 x 30) mm with thickness of 4 mm art. Nr. 680-10-014-00 are at the corners of the glass.



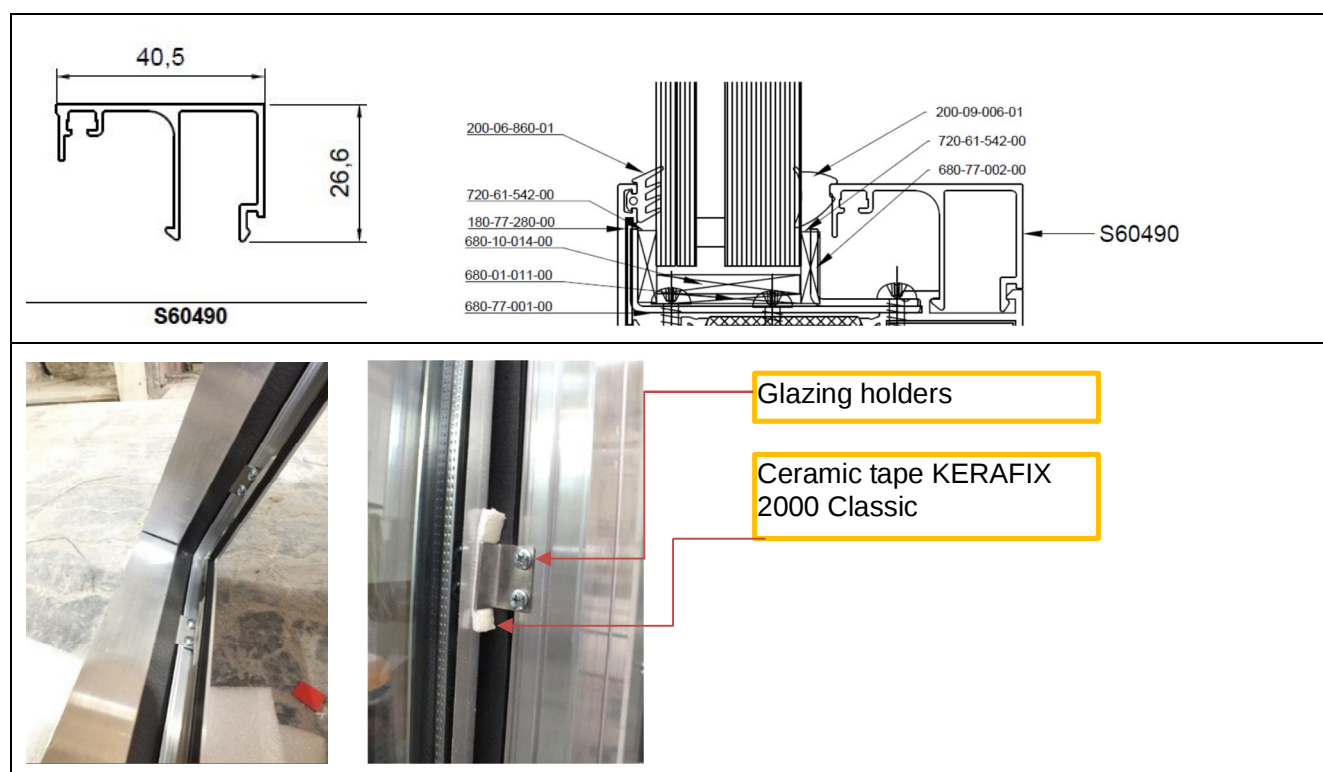
The strips of the ceramic tape KERAFIX 2000 Classic (mix of calcium magnesium silicate (15 x 2 x 50) mm art. No. 720-61-542-00 are on the glazing L-shaped glass holders in joint with the glass.

The intumescent tape, type Tecnoflame® (manufacturer: Marvon Srl.) with dimensions of (27 x 2) mm art. Nr. 680-01-011-00 is self-glued around the perimeter of the glass on the frame of the window leaves.

Clips-on aluminium glazing beads art. No. S60490 with dimensions of (26,6 x 40,5) mm, are clicked to the profile of the window leaf installed at the end of glass fixation from interior door face.

Glazing EPDM sealing profiles catalogue No. 200-06-860-01, 9,0 mm thick (4,0 mm in compressed state), are placed around the perimeter of glass pane, at exterior window side.

Glazing EPDM sealing profiles catalogue No. 200-09-006-01, 9,0 mm thick (6,0 mm in compressed state), are placed around the perimeter of glass pane, at interior window side.



WINDOW LEAF HARDWARE

Hinges

One opening window hinge and one opening and tilting window hinge type Unijet Mechanism (manufacturer: G-U) are screwed to the window leaf at the top and bottom edge of the leaf using screws (3,9 x 19) mm.





Lock

The perimeter window locking system type UNI-JET D RC2 (manufacturer: G-U) is screwed to the window leaves using steel screws (3,9 x 19) mm which are part of the lock system packaging.

Opposite stainless pieces for locking points art. No. 415-35-935-00 are fixed to the frame by means of steel screws (4,2 x 13) (art. Nr. 798-41-242-13) (2 pcs per each piece).



Opening system

Opening of the window is ensured by chain electric engine type KS2 300 S12 R (art. Nr. 415-21-630-00), stroke 300 mm (manufacturer: Aumüller, Germany) with operational unit type art. Nr. 415-13-860-00.

The chain engine KS2 300 S12 R, is installed vertically to the vertical window frame and operational unit with the opposite piece for chain is installed vertically to the vertical window leaf frame.



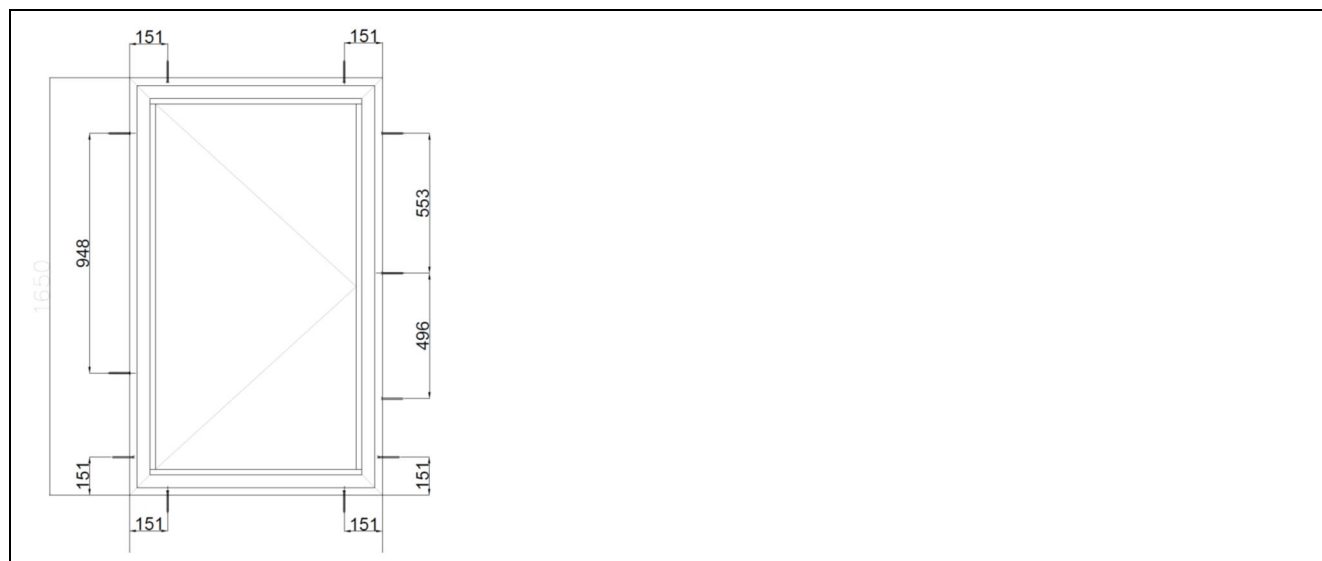
2.3 INSTALLATION OF THE PRODUCT

Window is installed to the standard rigid supporting construction made by aerated concrete blocks 200 mm thick with bulk density in according to EN 1363-1: $650 \text{ kg/m}^3 \pm 200 \text{ kg/m}^3$ (the manufacturer's stated value in the dried steady-state is 450 kg/m^3). Individual blocks are joined by thin layer of gypsum plaster for aerated concrete blocks.

Window is fixed in mid-thickness of the supporting construction by means of steel screws ($\varnothing 7,5 \times 112$) mm using of stripes of the connector-anchoring art. No.680-77-510-00 the around the perimeter of window frame.



Position of screws as follows:



The gap, 10 mm wide, between the door frame and supporting construction is filled by one component polyurethane foam, type Marvon TECNO-F 240 (manufacturer: Marvon Srl), covered by adhesive mastic Fire Acrylic sealant B1 art. Nr. 770-01-414-00 (manufacturer: Elastotet).

More detailed information about product construction and its installation is shown in drawings which are part of [1].

3. TEST REPORTS IN SUPPORT OF CLASSIFICATION

3.1 TEST REPORTS

No.	Name of laboratory	Name of sponsor	Test report No.	Date of the test	Test method	Type of the test
[1]	FIRES, s.r.o., Batizovce, SR	Alumil SA, Thessaloniki, Greece	FIRES-FR-272-24-AUNE	27. 11. 2024	EN 1634-1:2014+A1:2018	A

Type of the test: A – accredited, N – non-accredited

[1] Test specimens were conditioned according to EN 1363-1 before the fire resistance test

3.2 TEST SPECIMENS

Test report No.	Samples information	Conditioning	Pre-fire tests
[1]	FIRES, s.r.o., Certification Body for Products carried out sampling by supervision of production. Sampling data are specified in Sampling report No. FIRES-SR-066-24	The specimen was stored in the hall of testing laboratory and conditioned according to EN 1363-1.	Operability test: EN 16034 A.2.2: 25 cycles Self-closing test according to EN 16034 A.4: 1 cycle Durability of self-closing test according to EN 1191: 1 cycle Ability to release according to EN 16034 clause 5.3: 3 cycles Final settings: EN 1634-1: 1 cycle Opening and closing by the electric actuator.



3.3 TEST RESULTS

No./ Test method	Parameter		Results
[1] EN 1634-1:2014+A1:2018 Specimen No. 1 Opening of the window out of the test furnace (out of the heating); Fire resistance glass outside the fire.	supporting construction		standard rigid supporting construction made by aerated concrete blocks 200 mm thick with bulk density in according to EN 1363-1: 650 kg/m ³ ±200 kg/m ³
	temperature curve		standard temperature time curve
	integrity	sustained flaming	54 minutes no failure
		gap gauges	54 minutes no failure
		cotton pad	54 minutes no failure
	thermal insulation	l ₁	42 minutes
		l ₂	42 minutes
	radiation 15 kW.m ⁻²		54 minutes no failure
	mechanical action		-
	operability		passed (25 cycles)
	self closing		1 cycle
	other parameters		installation by means of screws (7,5 x 112) mm, gap between the frame and supporting construction filled with polyurethane foam, type Marvon TECNO-F 240, covered by adhesive mastic Fire Acrylic sealant B1 art. nr 770-01-414-00
[1] EN 1634-1:2014+A1:2018 Specimen No. 2 Opening of the window towards the test furnace (towards the heating); Fire resistance glass inside the fire.	supporting construction		standard rigid supporting construction made by aerated concrete blocks 200 mm thick with bulk density in according to EN 1363-1: 650 kg/m ³ ±200 kg/m ³
	temperature curve		standard temperature time curve
	integrity	sustained flaming	54 minutes no failure
		gap gauges	54 minutes no failure
		cotton pad	54 minutes no failure
	thermal insulation	l ₁	43 minutes
		l ₂	54 minutes no failure
	radiation 15 kW.m ⁻²		54 minutes no failure
	mechanical action		-
	operability		passed (25 cycles)
	self closing		1 cycle
	other parameters		installation by means of screws (7,5 x 150) mm, gap between the frame and supporting construction filled with polyurethane foam, type Marvon TECNO-F 240, covered by adhesive mastic Fire Acrylic sealant B1 art. nr 770-01-414-00

[1] The fire test was terminated in the 55th minute because of the risk of the specimens collapse.



4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 7.5.5 of EN 13501-2: 2023.

4.2 CLASSIFICATION

The element, **Single leaf window, type S77 FR Alumil (turn window)**, is classified according to the following combinations of performance parameters and classes as appropriate.

Fire resistance classification:
E 45-C0; EI₁ 30-C0; EI₂ 30-C0; EW 45-C0

4.3 FIELD OF APPLICATION

This classification is valid according to EN 1634-1:2014+A1:2018 for the following end use applications:

Materials and construction	- the materials and construction of the window shall be the same as that tested; in addition to the changes stated in following text those described in cl. 2.2 of this document are permitted; - the number of leaves and the mode of operation shall not be changed;
Glazing	- the type of glass and the edge technique, incl. type and number of fixings per meter of perimeter, shall not be changed; - the number of glazed apertures within a window leaf shall not be increased; - the distance between the edge of glazing and the perimeter of the window leaf shall not be changed;
Decorative finishes	- alternative paints may be added to the frames; - decorative laminates and timber veneers up to 1,5 mm thickness may be added to the faces of door but not to the edges;
Building hardware	- the number of hinges Unijet Mechanism (minimal 2 pcs of hinges) and bolts of the locking mechanism (UNI-JET D RC2) may be increased but shall not be decreased;
Dimensions	- increase of the window dimensions is not allowed;



	- reduction of window dimensions is allowed to 50% width and 75% height of dimensions stated in clause 2.2; - reduction of glass pane dimensions only proportionally with reduction of the window is allowed; - for smaller window sizes the relative positioning of movement restrictors (e.g. hinges, bolts of locking system) shall remain the same as tested or any change to the distances between them will be limited to the same percentage reduction as the decrease of window size;
Gaps	- the maximum size of the gaps in joint with framing members is restricted to the following sizes in practice: - hinged edge of the window leaf max. 6,7 mm; - top of the window leaf max. 5,4 mm; - lock edge of the window leaf max. 6,1 mm; - bottom edge of the window leaf max. 5,3 mm; - the size of the gaps can be reduced on condition that the movement of the window sashes does not have any restrictions;
Product fixation and supporting construction	- the product is fixed to a rigid supporting construction with minimal thickness of 200 mm; - bulk density of supporting construction may be increased as described in clause 2.3; - position of the window – bottom edge of the window at least 500 mm above the floor level;
Fixings	- the way of fixing and the number of fixings per unit length used to attach window to the supporting constructions may be increased, but shall not be decreased and the distance between fixings may be reduced;

5. LIMITATIONS

This classification document does not represent type approval or certification of the product.

The classification is valid provided that the product, field of application and standards and regulations are not changed.

Approved by:

Ing. Marek Gorlický
Head of the Testing Laboratory

Prepared by:

Michaela Gorlická
Technician of the Testing Laboratory

