

FIRE RESISTANT ALUMINIUM PRODUCTS MOUNTING AND TECHNICAL DOCUMENTATION

INTRODUCTION

This publication was made for the purposes of providing the most important aspects related to fire resistant system technical properties, mounting/installation and maintenance.

The information provided in this publication ensures long-term and trouble-free usage of our fire-resistant products.

IN GENERAL

The fire resistant aluminum products offered by our company are known for their quality and durability as well as for their aesthetic properties and flawless functionality. These properties we can ensure thanks to the use of the highest grade materials and professional equipment during the production process.

Our system is the newest system in the market of fire resistant displays, windows and doors and complies with the fire resistant class requirements EI15, EI30, EI45, EI60, and EI120.

Fire resistant products comply with all requirements defined under all standards and regulations applicable for such modern fire resistant products.

Fire resistant system is made from aluminum profiles with 6.6 polyamide thermal liners and armored glass fiber. Into these profiles and gaps between the profiles, filling elements are introduced which are made of fire resistant gypsum boards or silicate-cement boards.

Additionally, in the fire resistant system, liners expanding at high temperatures, are used. These liners ensure additional sealing in case of fire; they protect from smoke and flames from entering the partition.

For the purpose of ensuring the durability of the products for many years and their fluent functioning, and for meeting the client's needs for their proper use, correct installation is of crucial importance.

If the client decided to mount and install fire resistant system products by own means, it is necessary to know and ensure the following:

- The legal responsibilities of the persons performing mounting and installation of fire resistant products;
- Proper transportation and storage conditions;
- Specifics of fire resistant products mounting and installation;
- Glass pushing specifics.

This publication contains an overview of technical conditions for mounting and installation of fire resistant products: doors, windows, and partition segments. Using the information from this publication you can avoid many mistakes related to the lack of basic knowledge for proper mounting and installation of fire resistant products.

IDENTIFYING FIRE RESISTANT PRODUCTS

Glass panels are marked with irremovable signs as in the samples below:



Signs on glass panels indicate:

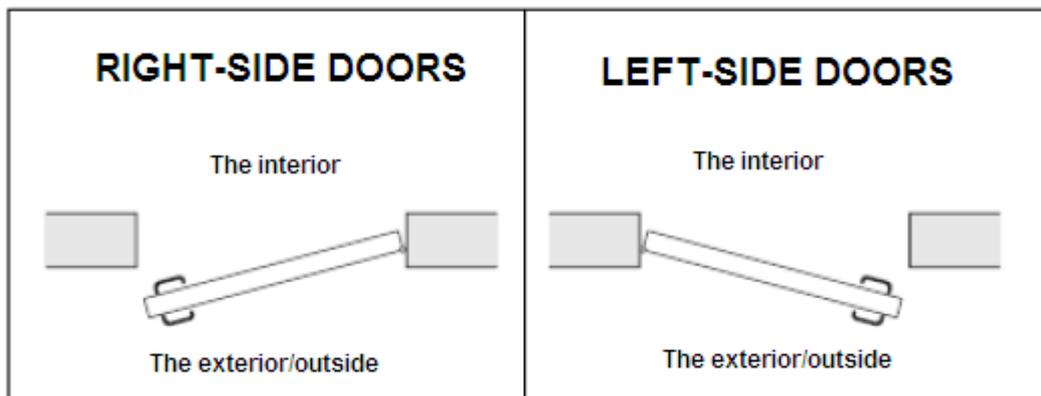
- fire resistance class;
- title of the glass.

DEFINING THE DIRECTION OF DOOR PANEL OPENING

Right-side door – if we look into the door panel from the side where it is mounted in the door casing, we shall see the hinges on the right side of the door casing.

Left-side door – if we look into the door panel from the side where it is mounted in the door casing, we shall see the hinges on the left side of the door casing.

If the door consists of two parts, the same simple rules apply, but regarding the direction of door opening and closing, we have in mind the direction of the active door panel as the primary element.



SAFETY OF MOUNTING AND INSTALLATION WORKS

The regulations of the building construction define that such products shall be mounted and installed into the building in the way not causing any danger to the life and safety of people, and following relevant public safety requirement.

When performing mounting and installation works, it is necessary to follow all applicable labor safety requirements. Only such electric tools and accessories, scaffolds and other devices that fully ensure safe work and operation, can be used for mounting and installation works.

TRANSPORTATION AND STORAGE OF FIRE RESISTANT PRODUCTS

Fire resistant system components are delivered to the customer in a non-glazed condition. Glazing of the products is carried out in the place of mounting and installation because of big weight of glass panels and the necessity to fix them to the wall. If the producer transports the products, the products are delivered on special stands. Accessories, liners, and other items are delivered in boxes.

Product delivery does not include: mineral wool, foams, inserts, anchors.

Transportation and storage of glass panels:

Glass panels must be transported and stored on special stands made for their transportation, in vertical position, with 6-10° angle inclination from the vertical position, fully supported from the back in a 90° angle, protected from possible moving. Fire resistant glass panels shall be separated from each other using soft separators. When carrying these glass panels, it is prohibited to rest them on their edges – because of the impact, the glass can be broken.

It is necessary to protect the fire resistant glass panels from: water, temperatures, and UV rays. They shall be stored in dry, well-ventilated areas, protected from direct sunlight and other heat sources.

Resistance of the fire resistant glass panels against cold/heat:

- glass of AGC company: from -40 up to +40°C
- glass of Pilkington company: from -40 up to +50°C
- glass of Glassolution company: from -10 up to +45°C

The aluminum strip covering glass edges shall not be damaged.

Transportation and storage of aluminum elements:

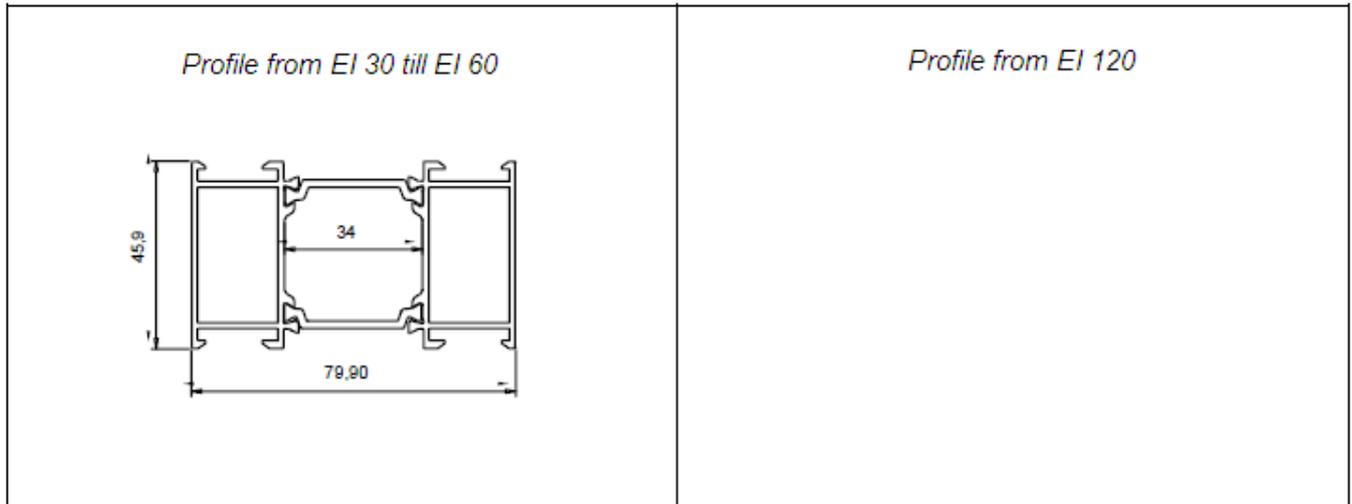
Elements of doors, displays, and other aluminum elements shall be transported and stored under the same conditions as glass panels. Stands shall ensure a good support of the products as to avoid their deformation. Aluminum constructions shall be separated from each other using soft separators, and protected from moving and vibrations.

FIRE RESISTANT SYSTEM PRODUCTS CONSTRUCTION

Fire resistant products are made from aluminum profiles connected with thermal liner made from glass fiber.

Depending on the needed resistance to fire and place of mounting, there can be various configurations of profiles. Because the main profile for products with fire resistance up to EI60 is the same, different slats and glass inserts are used.

Cross-sections of the profiles are depicted in the table below.



Fire resistant glass used for the products is made of two or more glass sheet layers, separated with thin, around 1 mm thickness, fire resistant gel fillings. In case of fire, when the temperature reaches +120°C, the gel filling expands, becomes opaque, and absorbs the heat energy produced by fire. This process is repeated at every layer till the gel filling finally deteriorates.

Opaque fillings are made from GFK or PROMATECT panels glued in layers and are sheathed with aluminum or steel tin from both sides.

REQUIREMENTS FOR WALLS

Seeking to ensure the required resistance class to fire, fire resistant system doors and walls shall be mounted to the following partitions:

1. In case of **EI 15** fire resistance class products to:

- No less than 65 mm thickness solid brick walls;
- No less than 60 mm thickness concrete or reinforced concrete walls;
- No less than 120 mm thickness perforated bricks or porous concrete blocks walls;
- No less than 100 mm thickness gypsum boards walls.

2. In case of **EI 30** fire resistance class products to:

- No less than 65 mm thickness solid brick walls;
- No less than 60 mm thickness concrete or reinforced concrete walls;
- No less than 120 mm thickness perforated bricks or porous concrete blocks walls;
- No less than 100 mm thickness gypsum boards walls.

3. In case of **EI 45** and **EI 60** fire resistance class products to:

- No less than 125 mm thickness solid brick walls;
- No less than 150 mm thickness concrete or reinforced concrete walls, in case of EI45 doors and walls; but no less than 175 mm thickness concrete or reinforced concrete walls in case of EI60 doors and walls;
- No less than 120 mm thickness perforated bricks or porous concrete blocks walls;
- No less than 100 mm thickness gypsum boards walls.

Each product and mounted element must be installed into already prepared brickwork opening.

Brickworking of the jamb is not allowed during product mounting. For installation of the products a simple rule shall be followed that during wall construction, openings shall be left with the size a little bit bigger than the size of the products. Specifically, the opening in brickwork shall be 20-30 mm wider and 10-30 mm higher than the exterior dimensions of the products. Angles of the openings shall be of 90 degrees, and diagonal difference shall not exceed 1 cm. All interior surfaces of the openings shall be even, without holes, and the insulating layer shall not protrude from

the surface of the wall at the place of the opening. The lower (bottom) part of the opening shall be uniform, even, made from incombustible materials on which a stable mounting of the products can be ensured.

It is necessary to fill the space between the opening and the element(s) of the mounted product using mineral wool the density of which shall be at least 70 kg/m³ or with protective polyurethane foam.

The exterior finish shall be covered with fire resistant gypsum board, brickwork mixture, tin or some other fire resistant materials available and permitted to use.

Fire insulation is ensured by expanding linings located in the perimeter of the doors, jamb, and inner side of the transoms.

MOUNTING AND INSTALLATION OF FIRE RESISTANT SYSTEM PRODUCTS

All materials and accessories used for mounting and installation (such as mineral wool, foam, rivets, etc.) shall be included into the list of permitted elements for mounting and installation of fire resistant products and they shall have all necessary documents of proof (certificates, certifications, conformity documents, etc.).

Fire resistant system aluminum products mounting and installation summarized procedure is the following:

1. Control of the opening

- height and width of the opening shall be at least 30 mm bigger than of the products;
- the diagonal difference shall not exceed 1 cm;
- proper control of the base;
- wall and base surfaces shall be properly fastened and shall not have loose elements.

2. Preparation of the products

- Drilling of openings in the jamb or in the middle chamber of the frame through stainless steel plates – preparation of holes through which, during the procedure of mounting, anchor screws will be screwed;



- It is necessary, before drilling the openings, to remove temporarily the interior sealing of the doors that goes along the perimeter.

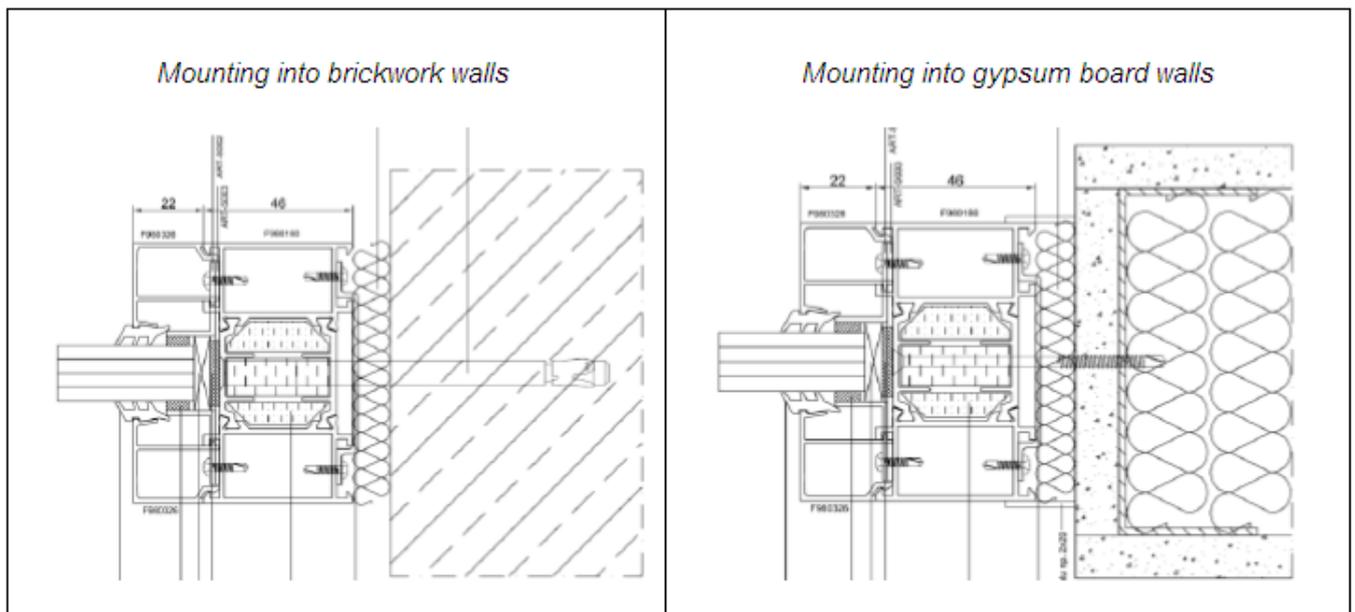


3. Putting the products into the opening

- Control of vertical and horizontal alignment of the products;
- Temporal fixation of the products in the opening by using wedges;
- Control of door panel opening.

4. Mechanical mounting of the products

- Product fixing / anchoring elements shall go through the middle chamber of the main profile and through stainless steel plates located along all perimeter of the product;



- Product fastening / anchoring elements must be selected on the basis of wall type and depending on space between the opening of the brickwork and the fire resistant product to be mounted;

Fastening element

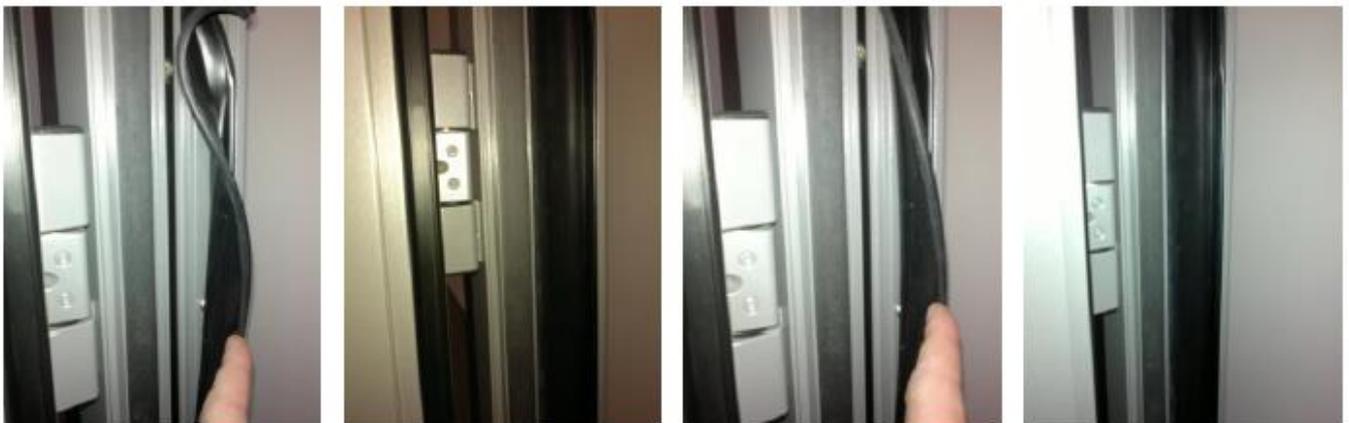


Serial No.	MARKING	DIAMETER d [mm]	LENGTH L [mm]
1.	10 x 72	10	72
2.	10 x 92	10	92
3.	10 x 112	10	112
4.	10 x 132	10	132
5.	10 x 152	10	152
6.	10 x 182	10	182
7.	10 x 202	10	202

Frames of segments and door jambs shall be fastened using 10 mm diameter steel studs spaced no more than 500 mm from each other, and their distances between corners and wall column axes shall not exceed 190 mm.

For gypsum board walls, the places where the doors and wall segments will be mounted, must be reinforced with UA 75 or UA 100 type jamb profiles to which door and wall segment frames shall be mounted using at least 6 mm diameter steel screws at distances not exceeding 500 mm.

- After the mechanical mounting, it necessary to place back the interior sealing of the doors that goes along all perimeter;



- Control of product placement in the opening (horizontal, vertical, diagonal);
- Mounting of the fire resistant system aluminum products shall be made of mechanical type, i.e. foam, mineral wool or similar materials cannot be used for the purposes of mounting.

5. Insulation of the products

- The space between the brickwork opening and elements of mounted products shall be filled with fire resistant mineral wool with the density of at least 70 kg/m³.

6. Installation of fire resistant glass, glass panels and fillings into the products

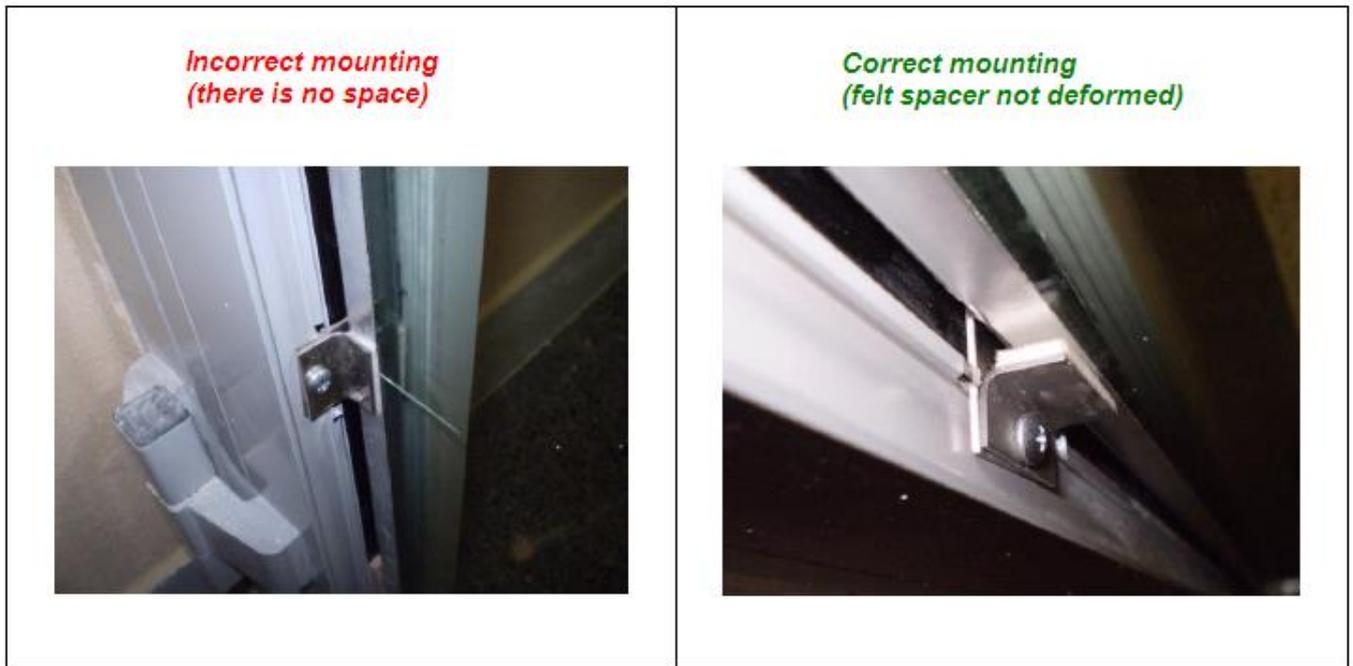
Please note that during mounting and installation of glass and glass panels you must be very cautious and careful. Incorrect installation of glass into transom or the use of improper mounting tools and materials can cause the damage to the glass. If the glass is damaged because of breach of these rules, the provided warranty will be void.

During the process of glass and glass panels mounting and installation, the information on glass and glass panels must be followed. Glass panels have stickers with the text “inner side” (“strona wewnętrzna”) what defines the position of the fire resistant glass. They also have stickers with the text “the lower part of the glass” (“dół szyby”) which defines the lower part of the fire resistant glass.



The edges of the glass are protected with aluminum tape. It is strictly prohibited to damage this tape because this will result in leakage of fire resistant gel and loss of fire-proof properties.

Glasses are fixed to the frame with screws using angled profiles. The surfaces of the angled profiles have felt spacers protecting the glass from direct contact with metal. Space shall be maintained between the glass and the angled profile. This is necessary because the glass expands during fire and the possibility of damage when performing mounting and installation works.



Positioning of the glass shall be made by using wooden pieces beneath the glass.

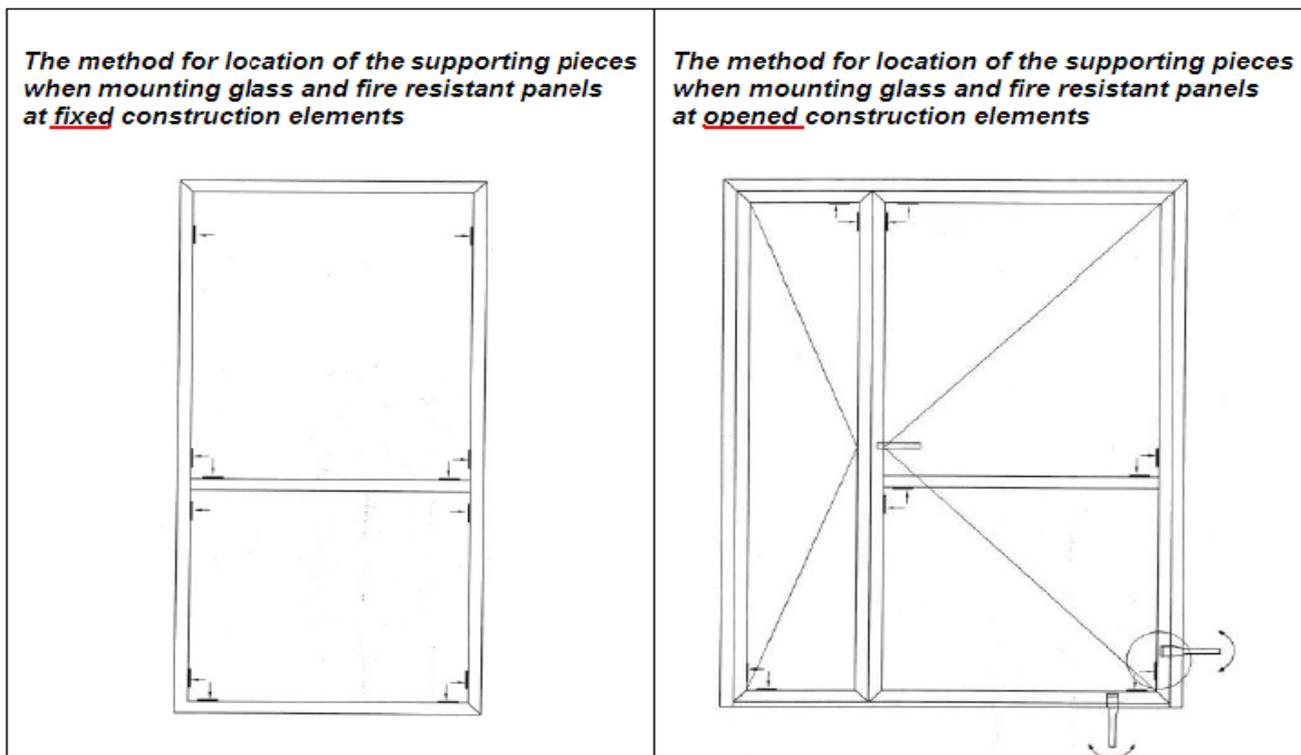
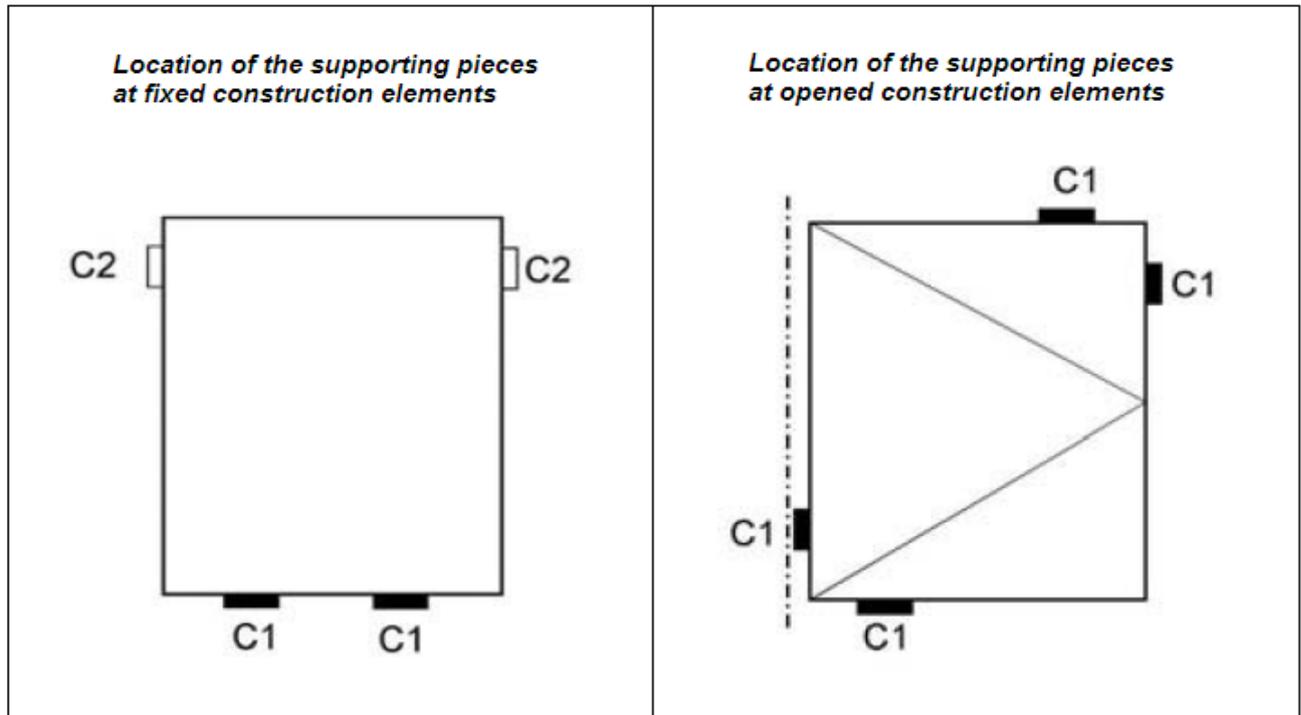
The glass shall not be in contact with the frame or any other hard materials.

Sizes and types of the wooden pieces are defined under technical requirements. Pieces made of hard wood or similar pieces made of glass must be used and the hardness of them shall be at least A 75 based on Shore hardness scale.

Because glass does not perform the function of holding elements, this function is provided by distance keeping pieces. They:

- Distribute the weight of the glass in the frame;
- Ensure a good horizontal position of the glass;
- Ensure proper movement of the panel;
- Provide a direct contact of glass with the frame.

Glass pieces shall be located diagonally, at about 80 – 100 mm from frame angles. As to enable a full support of the glass or glass panel, the width of the pieces shall not be less than the width of the glass or glass panel. The thickness of the pieces shall depend on the size of space between glass or glass panel and the profile. The pieces shall be protected against moving with glue or insulation mass. The pieces beneath the glass keep the glass or glass panel in the frame and shall exactly fill the space between the glass and frame profile.



The last process act of glazing is pressing on of the tapes and mounting of seals between the filling and glass tapes, what ensures fixation of the glass.

7. Installation of the accessories

Installation of handles, door pushing latches, and other elements depends on the specification of the order.

For door handles:

- Put the square handle core into the opening of the lock;
- Put the handle with the trim cover base and fasten it with screws;
- Lock the square core in the handle holder by tightening the screws with Allen key;
- Put on brushed steel covers.

The handles shall be fastened well; their plates shall not bend from the surface of the doors.

The cylinder:

- Put the key into the cylinder;
- Turn the key by a 30° degree till it becomes possible to put the cylinder into the opening of the lock;
- Screw the fastening screw of the cylinder into the front side of the main lock;
- Turn the key to test the correct mounting of the cylinder – the key shall turn without any obstacles.

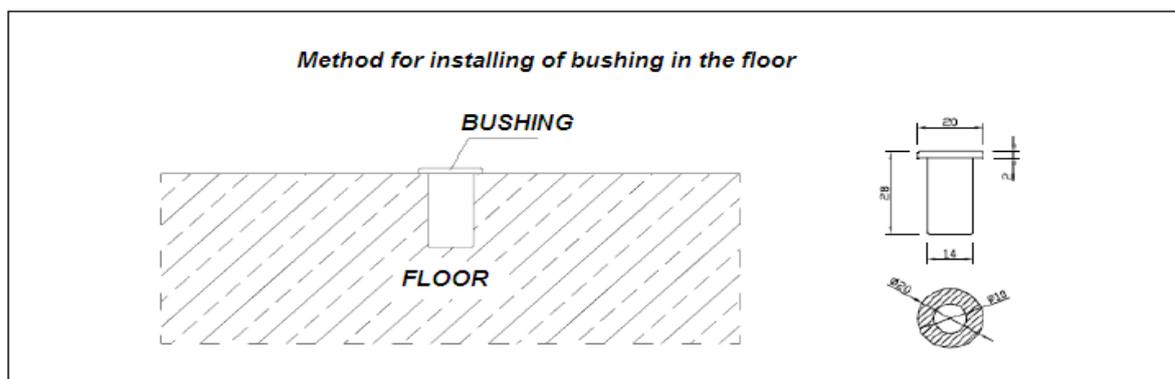
The cylinder of the door lock shall be adjusted to the main profile of the door panel. After completion of mounting, the cylinder shall not protrude more than 2-3 mm out from the plate. The casing of the cylinder both after closing the door and after opening of it, shall not be tense or be blocked.

Do not use excessive force when mounting the cylinder or turning the key. Do not open or close the door by using the key for pulling or pushing. Do not insert damaged or bended keys into the cylinder.

Catch bushing of passive door panel

After installation of double-panel door, it is necessary to mount catch blocking bushing which needs to be fixed exactly in the place of the passive panel axis spindle.

To be able to mount the bushing, it is necessary to close the passive door panel and to close the catch. Then it is necessary to mark the contact point of catch with the floor, to drill a hole of 15 cm diameter and to glue the catch bushing. Then it is necessary to check the correctness of catch and door closing.



Door closing mechanism

Fire resistant doors protect from fire spreading at separate premises and they make a reliable protection against flames, temperature, and smoke. To meet the established requirements, the doors have closing mechanisms.

It is prohibited to block opened door panel by putting stopping elements or any other materials.

Under special situations, when the door shall be kept permanently opened, it is allowed to use door panel blocking device to keep the door in open position. The use of such a device will automatically free the door panel allowing it to close in case of fire emergency.

Mounting of the closing mechanism:

- On door panel from the side of hinges;
- In jamb – on the side opposite to the hinges.

Mounting of the closing mechanism must be made following the instructions of the producer and using the template for mounting. For mounting of the closing mechanism to frame profiles, it is necessary to use nuts or rivets.