

Technical Description

1. DESCRIPTION OF CONSTRUCTION

The system of fire-proof walls MB-78 EI can be used to execute internal or external partitions with single and double doors of fire-proof class EI15, EI30, EI45 or EI60 or EI90, as provided under the following standards: PN-B-02851-1, PN-EN 13501-2, PN-EN 1363-1, PN-EN 1634-1, PN-EN 1364-1. The system has been classified as non-fire propagating (NFP). It may also be applied for the purpose of building smoke-proof constructions.

The application of glazed fireproof barriers in building industry should be subject to the technical documentation of the building, designed in accordance with Technical Approval awarded by the ITB Institute [Building Research Institute], applicable standards and relevant regulations.

The construction of the system is based on aluminium profiles with thermal spacers. The constructional depths of profiles is 78 mm.

The MB-78 EI features a low value of heat transfer coefficient U_f due to the application of specially moulded thermal spacers 34 mm wide and gaskets.

Depending on the required fire resistance class, elements of insulation resistant to fire – GKF or CI are inserted in the inside chambers of profiles and in the insulation space between the profiles.

Working required in connecting of profiles is reduced to minimum thanks to the use of provided with the system aluminium connecting members and auxiliary accessories. Corner connections of “L” type are executed by trimming the ends of the frame or leaf profiles at the angle of 45°, followed by crimping or pinning and gluing (with CORALGLUE® - two-component glue) to aluminium corner cleats embedded in the inner chambers of profiles. Crosswise joints of the “T” type are performed by pinning of crosspieces to embedded corner cleats and gluing with CORALGLUE®.

Window panes or other types of infills are mounted in steel holders with glued on ceramic gaskets and masked with glazing beads and EPDM gaskets. Such technique of installation of infills enables easy replacement of damaged glass panes and secures good tightness to water infiltration. The system allows for the application of any standard fireproof glazing of a relevant class (thickness of glazing, depending on the holder option, ranges between 6 and 49 mm or between 8 and 45 mm). Shims are made of a fireproof material.

Each construction of the MB-78 EI system, designed to be fitted in external developments, must be equipped with an efficient drainage and ventilation system deflecting water from the pane chamber. The working and the diagram with the layout of drainage and ventilation holes are presented on the pages of the section “Working”. The performed tests have also proved that products based on this system feature very good sound-proof performance.

Allowable height of walls is 4 m while doors must not be higher than 2.5 m.

The system of fireproof walls is compatible, to a large degree, with the MB-45, MB-59S, MB-60 and MB-70 systems (a large number of common profiles, details, hardware, workings, etc.).

The MB-78 EI system has been awarded Technical Approval of the ITB Institute **AT-15-6006/2010**.

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2. TECHNICAL DESCRIPTION OF RAW MATERIALS AND MATERIALS**2.1. ALUMINIUM PROFILES**

Aluminium profiles (frames, leaves, crosspieces, mullions strips and other) are made in the process of mechanical working of the aluminium alloy **EN AW-6060** or **EN AW-6063** as per **PN-EN 573-3**, version **T66** or **T6** as per **PN-EN 515** or from the alloy **AlMgSi0,5 F22** as per **DIN 1725 T.1**. The profiles are conformant with the provisions contained in the standard **PN-EN 755-1**.

Mechanical properties of profiles are compliant with **PN-EN 755-2**.

Dimensional deviations of profiles conform to **PN-EN 12020-2**.

The surface of profiles should be finished with anodic oxide coating or polyester powder coating, applied as the protection against corrosion.

Anodic oxide coating should be compliant with the following standards:

- thickness of the layer as per PN-EN ISO 2360 or PN-EN ISO 2808 - 20-30 µm,
- external appearance compliant with PN-EN 12373-1
- degree of tightness of coating as per PN-EN 12373-1, the admittance value lower than 20 µS
- coating resistance to corrosion as per PN-76/H-04606/03.

Polyester powder coating:

- thickness of coating as per PN-EN ISO 2360 or PN-EN ISO 2808 - 75±15µm,
- relative hardness of the coating as per PN-EN ISO 1522 – min. 0.7,
- resistance of paint coatings to separation from substrates PN-EN ISO 2409 – level 0,
- resistance to salt spray (fog) as per PN-EN ISO 9227,
- resistance to liquids as per PN-EN ISO 2812.

There are over 180 colours to choose from the RAL standard.

2.2. THERMAL SPACERS

Thermal spacers are made of polyamide strips strengthened with fibreglass PA 6.6 GF25 as per DIN 16941 T.2 (manufacturer's certificate).

Thermal spacers feature very high resistance and their thermal expansion is similar to aluminium, which fact excludes the risk of joint deformation and prevents tearing of joints on the polyamide / aluminium border when the face of buildings is exposed to significant changes in temperature during the normal use.

Properly crimped thermal spacers ensure such resistance of compound profile as provided under the relevant standard.

2.3. ELEMENTS OF FIRE INSULATION

Infills are made of GKF plasterboards or interchangeably of cooling inserts CI and silicate-cement panels manufactured by PROMATECT-H. Fire-resistant expanding strips are cut off from boards or supplied in rolls. These elements are performed in accordance with the applicable standards and relevant technical approvals.

2.4. GASKETS

Glazing and brush gaskets are made of synthetic rubber EPDM as per DIN7863 and working standard DIN7715 E2 or ISO3302-1. The gaskets are joined in the process of gluing. Ceramic gaskets are fitted between the glass pane and steel handles.

2.5. GLASS PANES

Transparent fields are glazed with special panes, selected to meet the requirements provided for the fire-proof safety EI15, EI30, EI45, EI60 or EI90 and thermal and acoustic insulation performance of rooms.

The following types of glass may be used as infills in doors and walls of fire resistance class EI15:

- Pyrobel – single panes or glass units for internal and external applications, min. 8 mm thick,
- Swissflam – single panes or glass units for internal and external applications, min. 14 mm thick,
- Contraflam - single panes or glass units for internal and external applications, min. 13 mm thick,
- Polflam - single panes or glass units for internal and external applications, min. 21 mm thick.

The following types of glass may be used as infills in doors and walls of fire resistance class EI30:

- Contraflam – single panes or glass units for internal and external applications, min. 16 mm thick,
- Swissflam – single panes or glass units for internal and external applications, min. 17 mm thick,

- Fireswiss - single panes or glass units for internal and external applications, min. 15 mm thick,
- Pyrostop – single panes or glass units for internal and external applications, min. 15 mm thick,
- Pyrobel – single panes or glass units for internal and external applications, min. 16 mm thick,
- Promaglas – single panes or glass units for internal and external applications, min. 17 mm thick,
- Pyranova – single panes or glass units for internal and external applications, min. 15 mm thick,
- Polflam – single panes or glass units for internal and external applications, min. 25 mm thick.

The following types of glass may be used as infills in doors and walls of fire resistance class EI45:

- Pyrobel – single panes or glass units for internal and external applications, min. 17 mm thick,

The following types of glass may be used as infills in doors and walls of fire resistance class EI60:

- Contraflam – of single panes or glass units for internal and external applications, min. 25 mm thick,
- Swissflam – single panes or glass units for internal and external applications, min. 25 mm thick,
- Pyrostop – single panes or glass units for internal and external applications, min. 23 mm thick,
- Fireswiss - single panes or glass units for internal and external applications, min. 23 mm thick,
- Pyrobel – single panes or glass units for internal and external applications, min. 25 mm thick,
- Promaglas – single panes or glass units for internal and external applications, min. 25 mm thick,
- Polflam – single panes or glass units for internal and external applications, min. 32 mm thick.

The following types of glass may be used as infills in doors and walls of fire resistance class EI90:

- Contraflam – of single panes or glass units for internal and external applications, min. 36 mm thick,
- Pyrostop – single panes or glass units for internal and external applications, min. 37 mm thick,
- Pyrobel – single panes or glass units for internal and external applications, min. 35 mm thick.

2.6. INFILLS OF NON-TRANSPARENT FIELDS

Infills of non-transparent sections are built as sandwiched elements arranged as follows:

Doors and walls of class EI15:

- A sandwich element, made of a GKF plasterboard of thickness 12.5 mm, covered on both sides with aluminium sheet (anodized or paint coated) of thickness $1.5 \div 3$ mm or steel sheet (stainless or paint coated) of thickness $0.8 \div 1.25$ mm.
- A sandwich element, made of a Promatect H board 10 mm thick, covered on both sides with aluminium sheet (anodized or paint coated) of thickness $1.5 \div 3$ mm or steel sheet (stainless or paint coated) of thickness $0.8 \div 1.25$ mm or a pane of tempered glass min. 6 mm thick.

Doors and walls of class EI30:

- A sandwich element, made of a GKF plasterboard of thickness 15 mm, or two boards 12.5 mm thick, covered on both sides with aluminium sheet (anodized or paint coated) of thickness $1.5 \div 3$ mm or steel sheet (stainless or paint coated) of thickness $0.8 \div 1.25$ mm.
- A sandwich element, made of two Promatect H boards 12 mm thick each, covered on both sides with aluminium sheet (anodized or paint coated) of thickness $1.5 \div 3$ mm or steel sheet (stainless or paint coated) of thickness $0.8 \div 1.25$ mm or a pane of tempered glass min. 6 mm thick.

Doors and walls of class EI45 or EI60:

- A sandwich element, made of two GKF plasterboards of thickness 15 mm each, or three boards 12.5 mm thick, covered on both sides with aluminium sheet (anodized or paint coated) of thickness $1.5 \div 3$ mm or steel sheet (stainless or paint coated) of thickness $0.8 \div 1.25$ mm.
- A sandwich element, made of three Promatect H boards 12 mm thick each or two Promatect H boards 15 mm thick, covered on both sides with aluminium sheet (anodized or paint coated) of thickness $1.5 \div 3$ mm or steel sheet (stainless or paint coated) of thickness $0.8 \div 1.25$ mm or a pane of tempered glass min. 6 mm thick.

Doors and walls of class EI90:

- A sandwich element, made of two GKF plasterboards of thickness 15 mm each and one board 12.5 mm thick, covered on both sides with steel sheet (stainless or paint coated) of thickness $0.8 \div 1.25$ mm.

- A sandwich element, made of two Promatect H boards 15 mm thick each and one board 12 mm thick, covered on both sides with steel sheet (stainless or paint coated) of thickness $0.8 \div 1.25$ mm.

To increase thermal insulation performance of infills of non-transparent sections applied in external developments, a layer of mineral wool of the density 70 kg/m^3 may be additionally applied inside.

2.7. FIXATION ELEMENTS

Joining elements (self-tapping screws, screws, rivets, nuts, washers) used to make connections are made of stainless or zinc-coated steel according to the standards referred to in the system documentation.

2.8. HARDWARE

Hardware should be mounted onto door profiles in accordance with the system documentation or documentation of hardware manufacturer. The type of hardware should be adjusted to the dead weight of leaves and their operational load and dimensions. All the hardware fitted in the MB-78 EI system must be certified as admitted for use in relevant fireproof constructions, according to regulations applicable in a particular country.

3. SUPPLEMENTARY INFORMATION

3.1. PROFILE CONSTRUCTION

The profiles applied in the MB-78 EI system have three-chamber construction, the core of which is an insulating chamber placed between thermal spacers 34 mm wide.

The system of connections by means of a thermal spacer allows dual-colour profiles to be applied – different on the inside and different on the external part of the façade of the building. The shape of thermal spacers guarantees good thermal insulation performance and proper drainage of the internal chambers of profiles.

3.2. STRENGTH CALCULATIONS

Proper selection of optimal profiles of structures should be made on the basis of guidelines contained in the section “Structural Analysis”. This section also contains information on the maximum allowable dimensions of walls and door leaves.

3.3. SMOKE-PROOF CONSTRUCTIONS

The system allows putting up the following smoke-proof structures classified as per PN EN 13501-2:

- Single and double door in individual and display window developments with a doorsill K518140X
- Single and double door in individual and display window developments without a doorsill and with a sealing strip 80004327

The above smoke-proof structures may be executed to meet the requirements set for the fireproof class EI15, EI30, EI45, EI60 or EI90.

3.4. EXTERNAL DEVELOPMENT

External structures must be equipped with drainage and ventilation holes and the gap under the pane must be sealed with fire-proof silicone 14614967 (see section “Working”).

3.5. WORKING

Decorative surfaces of profiles should be covered with a protective foil in order to protect them against any damage during working.

Linear and angular dimensional tolerance, disregarding individual designation of tolerance, as per PN-EN 22768-1, Class of tolerance – m (medium accuracy level)..

Any splinters which occur in the process of working should be deburred.

3.6. STORAGE AND TRANSPORTATION

- Storage

Aluminium profiles, details, filling elements, glass panes, windows and doors should be stored in dry rooms in order to protect elements against mechanical damage and damage to anodised or painted coatings.

Elements of fire insulation GKF and CI should be stored in original packaging in a vertical position. Where re-packing is required, the following principles should be followed:

- the inserts must lie in a horizontal position on a firm and flat surface (e.g. on a chipboard),
- subsequent layers should be interleaved with PE foil (e.g. thin drop sheet),
- maximum number of layers - 25 in one packaging, but the stack must not be higher than 600 mm.

Products should be stored in warehouses in normal weather conditions, i.e. in the temperature between 5° and 25°C and humidity ranging between 50 and 80%.

After opening the package and taking the required number of inserts, the package should be covered with protective foil. It should be protected against dampness and excessive drying up. The inserts should be carefully carried to avoid any possible damage – breakage.

The principles of storage and application of an expanding tape 120656 are contained in the section “Working”.

- Transportation

Aluminium profiles, details, filling elements, glass panes, windows and doors may be transported by any means of transport provided they are protected against soiling, dust, weather conditions and exposure to any damage during transportation.

3.7. ASSEMBLY GUIDELINES AT THE BUILDING SITE

Walls and doors in the MB-78 EI system, class EI15 and EI30 may be fitted in:

- walls built of solid, perforated or chequer brick of thickness at least 12 cm,
- concrete and reinforced concrete walls of thickness at least 8 cm,
- cellular brick or cellular concrete walls of thickness at least 12.5 cm,
- light plasterboard walls featuring fire-proof class not lower than EI30.

Walls and doors in the MB-78 EI system, class EI45, EI60 and EI90 may be fitted in:

- walls built of solid, perforated or chequer brick of thickness at least 12 cm,
- concrete and reinforced concrete walls of thickness at least 10 cm,
- cellular brick or cellular concrete walls of thickness at least 17.5 cm,
- light plasterboard walls featuring fire-proof class not lower than EI60 or EI90.

The doors of this system May be also built in MB-78EI walls featuring fire resistance not lower than the fire resistance of doors.

The MB-78EI walls may be erected in a vertical position or at the angle $\pm 10^\circ$ out of plumb, the doors, however, may be fitted only in a vertical position.

The installation of walls and doors on a building site should be conducted in the temperature not lower than 5° C. During its installation, the structure should be protected against exposure to weather conditions, such as water, snow and any type of mortar and dust.

The walls and door frames must be fitted with steel expansion bolts min. $\varnothing 10$ mm, steel system anchors, bolts or screws min. $\varnothing 5$ mm (M5), spaced up to 600 mm but their distance from the corners must not exceed 250 mm and 200 mm from the wall mullions.

The gaps formed between the wall or door and masonry should be filled with non-flammable mineral wool of min. density 70 kg/m³ or with any other fire-proof filling, admitted for use in fire-proof structures and then closed with non-flammable material (e.g. plasterboard, concrete-lime plaster, fire-proof caulk, aluminium profile, steel profile or metalworking).

Detailed information regarding the assembly of products is contained in the section “Examples of Development”.

WARNING:

Lime, cement, alkaline and cleaning substances (e.g. bleaches, abrasive pastes) have particularly harmful effect on aluminium profiles, especially on decorative protective surfaces. Thus any “wet” works must be limited to the minimum. Should mortar be brought into contact with the surface of aluminium, it must be immediately washed off (its hardening must not be allowed). Failure to wash off the mortar will result in permanent discolouring and will damage the surface.

In places of contact between aluminium and other metals or their alloys, electrochemical oxidation of aluminium occurs. The process of this kind of corrosion is particularly quick when there is a lot of moisture in the surrounding atmosphere. Therefore aluminium should be separated from other metals with an insulating layer.

3.8. MAINTENANCE Anodised or coated aluminium profiles should be washed with a soft cloth and mild cleaning agents (pH between 5 and 8). No alkaline-based liquids or acids are allowable as they may damage the oxide coating. Abrasive materials, cloths with metal fibres, etc. are not allowed, either. The surface subjected to washing should thoroughly rinsed with clean water. Regular washing prevents forming stubborn dirt. The frequency of cleaning depends on the location of the building and aggressiveness of the environment.

3.9. CATALOGUE UPDATES

The catalogue should be updated by downloading PDF files at <http://www.aluprof.eu> in the authorized section “Catalogues”.

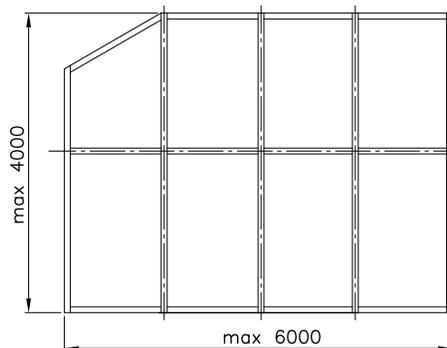
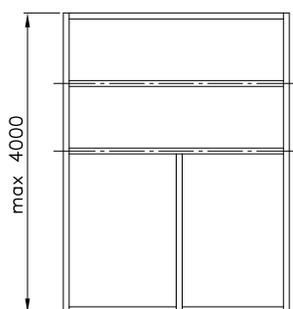
MB-78EI

EI 15, EI 30, EI 45, EI60, EI90. Maksymalne wymiary ścianek i drzwi.

EI 15, EI 30, EI 45, EI60, EI90. Maximum dimensions of wall segments and door.

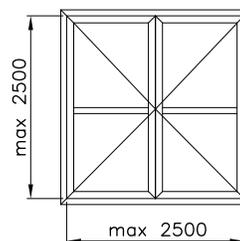
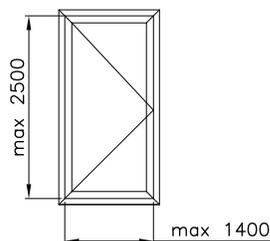
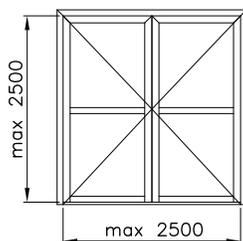
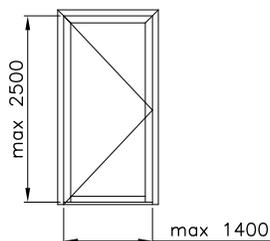
EI 15, EI 30, EI 45, EI60, EI90. Максимальные размеры стеновых панелей и двери.

EI 15, EI 30, EI 45, EI60, EI90. Maximale Abmessungen von Wand und Flüglige.



Okno techniczne

Technical window
Техническое окно
Technische Fenster



MB-78EI

EI 15, EI 30, EI 45, EI60, EI90. Maksymalne wymiary ścianek i drzwi.
EI 15, EI 30, EI 45, EI60, EI90. Maximum dimensions of wall segments and door.
EI 15, EI 30, EI 45, EI60, EI90. Максимальные размеры стеновых панелей и двери.
EI 15, EI 30, EI 45, EI60, EI90. Maximale Abmessungen von Wand und Flüglige.

