MB-78EI

OPIS TECHNICZNY
TECHNICAL DESCRIPTION
ТЕХНИЧЕСКОЕ ОПИСАНИЕ
TECHNISCHE BESCHREIBUNG

Technical Description

1. DESCRIPTION OF CONSTRUCTION

The system of fire-proof walls MB-78EI can be used to execute internal or external partitions with single and double doors and technical windows of fire-proof class EW15, EI15, EW30, EI30, EI45 or EW60, EI60 or EI90, as provided under the following standard: PN-EN 13501-2+A1.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 documents permitting the use of, applicable standards and applicable regulations.
The construction of the system is based on aluminium profiles with thermal spacers. The constructional depths of profiles is 78 mm.
The MP-78EI 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, 8 and 49 mm). Shims are made of a fireproof material.
Each construction of the MB-78EI 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.
The maximum height of the fix windows and door leaves are shown in the "Statics" section. The system of fireproof walls is compatible, to a large degree, with the MB-45, MB-59S, MB-60, MB-60E EI, MB-70, MB-78EI DPA and MB-118EI systems (a large number of common profiles, details, hardware, workings, etc.).

Each structure made from elements of the MB-78EI system must have authorization for use in accordance with regulations applicable in the country in which it is mounted. A reference document used by the manufacturer to declare conformity at the stage of marketing a fire protection product strictly defines the range of structures authorized for use in a particular country, including detailed solutions. Only solutions presented herein may be applied in the production of the product.

Solutions presented in this catalogue are subject to additional restrictions resulting from approvals for use applicable in the country where they are used. The said restrictions are specified in supplements, which form an integral part of this catalogue.

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 EW15, EI15, EW30, EI30, EI45, EW60, EI60 or EI90 and thermal and acoustic insulation performance of rooms. All the glass panes fitted in the MB-78EI system must be certified as admitted for use in relevant fireproof constructions, according to regulations applicable in a particular country. The maximum dimensions of the glass panes please consult with the glass supplier.

2.6. INFILLS OF NON-TRANSPARENT FIELDS

Infills of non-transparent sections are built as sandwiched elements selected to meet the requirements provided for the fire-proof safety EW15, EI15, EW30, EI30, EI45, EW60, EI60 or EI90. All the infills fitted in the MB-78EI system must be certified as admitted for use in relevant fireproof constructions, according to regulations applicable in a particular country.

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 and technical window 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-78EI 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-78EI 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, leaves of doors and technical windows.

3.3. SMOKE-PROOF CONSTRUCTIONS
The system allows putting up the following smoke-proof structures classified as per PN EN 13501-2+A1.

- Single and double door in individual and display window developments without a doorsill and with a sealing strip 80004327 and sealing details 80111320 and 80111350. Smoke-proof door build according to 3 point automatic lock .Smoke control class : S_a and S_{200}.

The above smoke-proof structures may be executed to meet the requirements set for the fireproof class EW15, EI15, EW30, EI30, EI45, EW60, EI60 or EI90. There is no need to use self-adhesive expanding gaskets in smoke-resistant doors without fireproof abilities. As a door panes of a smoke resistant doors of Aluprof MB-78 EI system without the fire resistance ability the minimum glass thickness is 6 mm of a hardened glass.

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.
Places of cuts, drilling and defects of cooling inserts CI should be protected with min. double layer of polyurethane varnish.

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, technical windows and doors in the MB-78EI system, class EW15, EI15, EW30 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 12cm,
- walls made of hollow, checker bricks or aerated concrete units of thickness not lessthan 12 cm and density of at least 650 kg/m^3,
- flexible wall made of wood or steel profiles with facing of gypsum plaster boards type F and of thickness not less than 10 cm
- wall composed of wood or steel profiles covered with plaster boards type F, Knauf Fireboard, Fermacell or, Promatect H boards thickness of min. 12,5 mm,
- walls of Aluprof® MB-118 EI system.

Walls, technical windows and doors in the MB-78EI system, class EI45, EW60, EI60 and EI90 may be fitted in:

- walls built of solid, perforated or chequer brick of thickness at least 17,5 cm,
- concrete and reinforced concrete walls of thickness at least 17,5 cm,
- walls made of hollow, checker bricks or aerated concrete units of thickness not less than 17,5 cm and density of at least 650 kg/m3,
- flexible wall made of wood or steel profiles with facing of gypsum plaster boards type F and of thickness not less than 12,5 cm
- wall composed of wood or steel profiles covered with plaster boards type F, Knauf Fireboard, Fermacell or, Promatect H boards thickness of min. 20 mm,
- walls of Aluprof® MB-118 EI system.

The doors and technical windows of this system May be also built in MB-78EI walls featuring fire resistance not lower than the fire resistance of doors and windows.
The MB-78EI walls may be erected in a vertical position or at the angle ±10° out of plumb, the doors and technical windows, however, may be fitted only in a vertical position.
The installation of walls, technical windows 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 frames of technical windows and doors must be fitted with steel expansion bolts min. Ø10 mm, steel system anchors or screws min. Ø7,5 mm, 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, technical window or door and masonry should be filled with non-flammable mineral wool of min. density 70 kg/m^3 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 https://aluprof.com) in the authorized section “Catalogues”.

4. INFORMATION ON THE SUSTAINABILITY OF ALUPROF SA PRODUCTS

Aluprof, as a leading manufacturer of aluminum systems, places the utmost importance on to sustainable development, minimizing the impact of their activities on the environment.
Since 2014, the Company has been a member of the UN Global Compact, committing to comply with international principles regarding human rights, labour standards and environmental protection.
Aluprof has in place an Environmental Management System in accordance with the PN-EN ISO 14001:2015 standard, which confirms the Company's commitment to environmental protection and concern for the natural environment. Aluprof's systems comply with standards and are developed in accordance with the requirements of legislation and other environmental obligations, and the continuous improvement of the environmental management system significantly improves the awareness and environmental performances of the Company.
In 2022, Kęty Group, of which Aluprof is a part, received a new Environmental Product Declaration (EPD) for their aluminium profiles, based on EN 15804 and verified in accordance with ISO 14025 by an external auditor.
Aluprof systems can be fully recycled and the materials obtained in this process can be reused without loss of quality. This action contributes significantly to extending the product life cycle, which in practice means reducing waste to a minimum. If a customer has a used product, he or she can easily return it to the collection centre, from where the material for the manufacture of new Aluprof products is obtained. However, in the case of aluminum products delivered directly to the Company, they are carefully sorted and coatings removed. The material is then scrapped, providing the Company with raw material that will be reused for new products. Both aluminum from the collection points and the Company goes to the Kęty Group's stamping plant, where new products are made from it. Thanks to this, Aluprof not only cares about the environment, but also ensures the high quality of their products by recycling and reusing materials. As an active member of the World Green Building Council and DGNB (*Deutsche Gesellschaft für Nachhaltiges Bauen*), Aluprof supports global and local initiatives promoting low-emission construction and the development of sustainable cities. The carbon footprint of the production of Aluprof profiles is only 3.3 kg CO2e/kg, compared to the average of 9.0 kg CO2e/kg of the European Aluminum Association. Aluprof creates a sustainable supply chain and encourages their suppliers to pursue a responsible environmental policy. The Company supports the development of green building and promotes technologies that reduce energy consumption in buildings, cooperating with the Polish Green Building Council (PLGBC) and acting as an Ambassador for Passive Building.Thanks to these activities, Aluprof sets high standards in the construction industry, striving to create a greener and more sustainable future.

5. GRAPHIC SYMBOLS USED IN THE CATALOGUE

№	Number		Working
!	Remarks		Compatible elements
	Total area [dm²/m]		Cut
	Decorative area [dm²/m]	G	Glue with two-component glue
	Angle of cut [º]	MS	Glue and seal
	Dimensions [mm]	S	Seal with silicone
1..	Number of items	G	Glue
	Material	_ _ _ _ _	Perform with the use of: _ _ _ _ _
N	Standard		Page

MB-78EI

STATYKA
STRUCTURAL ANALYSIS
СТАТИКА
STATIK

STRUCTURAL ANALYSIS

TABLE OF CONTENTS:

1. INTRODUCTION

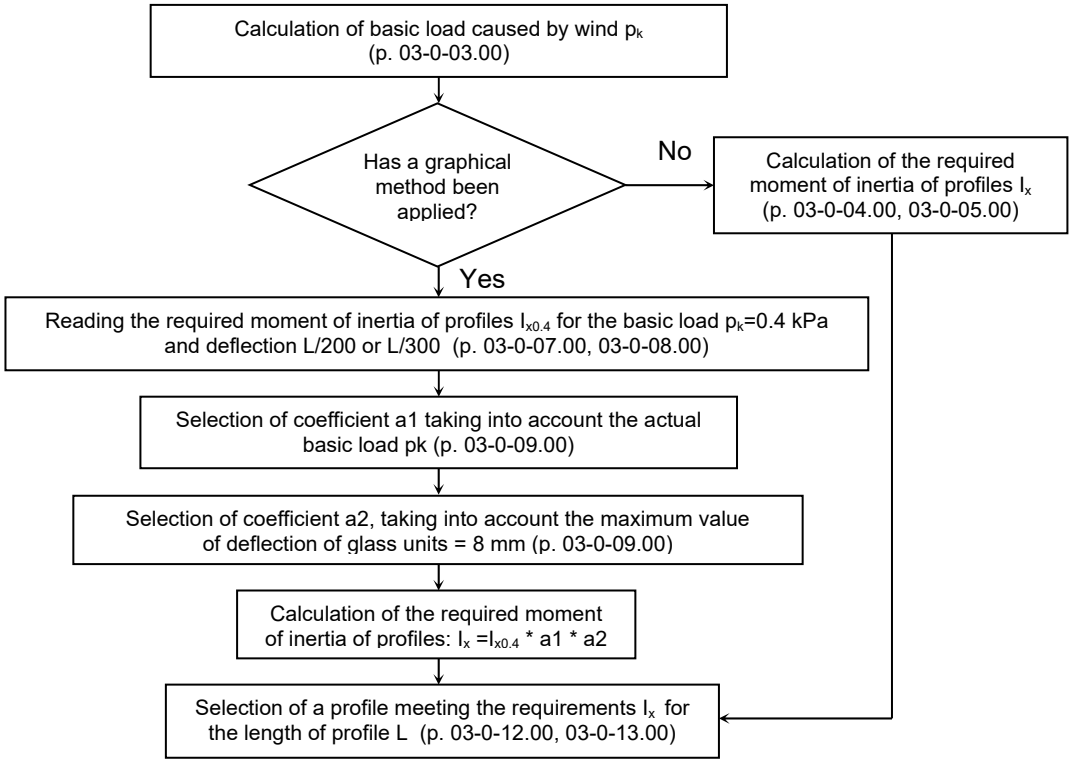
Profiles forming an aluminium construction are selected on the basis of structural analysis. Knowledge of rules and calculation methods for such types of constructions is required in order to properly take into account structural analysis requirements. Diagrams, data and examples presented in this section will help you select proper profiles.
Notes and restrictions regarding calculations:

a. Application of a graphical method may result in an error of 5%.
b. Computations included in the catalogue are simplified, i.e. they do not account for such phenomena as:
   - vibrations of construction caused by dynamic force of the wind,
   - existence of internal pressure in open buildings,
   - loads affecting umbrella roofs.
   - linear loads affecting internal walls.
c. There is a risk of making a mistake at the stage of:
   – collecting information about the structure (its location, dimensions, surrounding area),
   – assessment of probability of occurrence of the phenomena described in item b above.

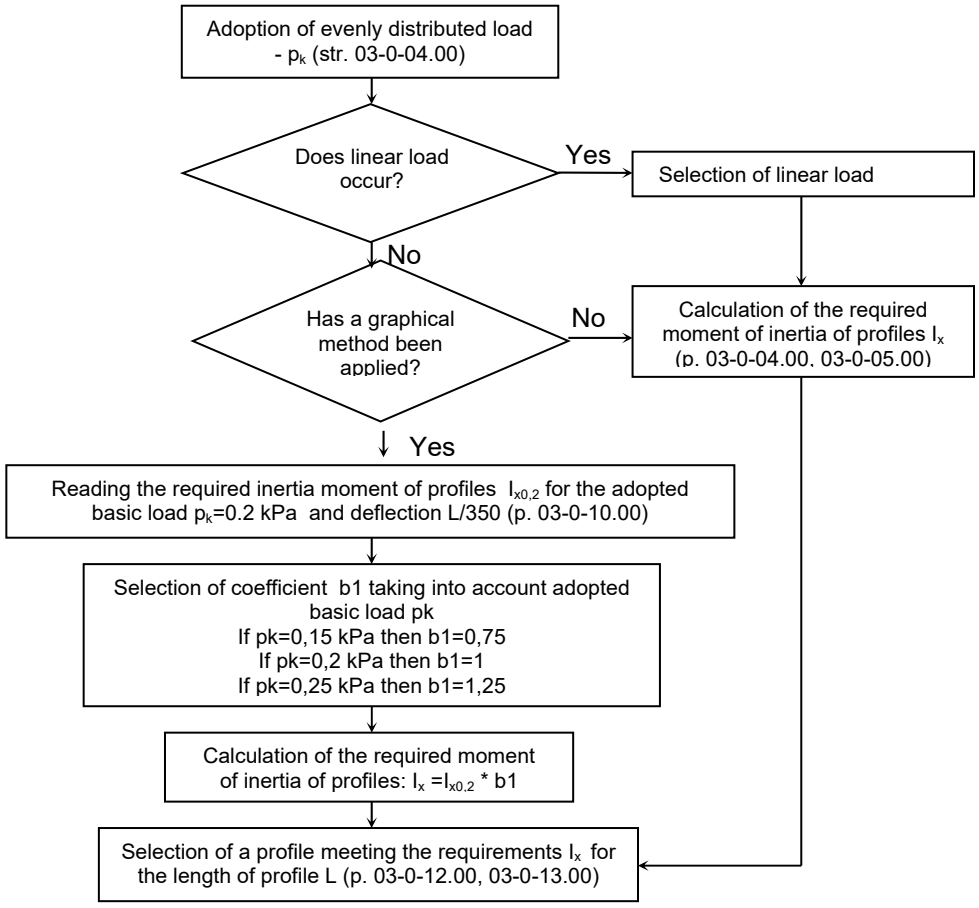
Hence, in view of the foregoing:
ALUPROF S.A. shall bear no responsibility for faulty selection of profiles for the construction.
Should there arise any queries regarding the adequacy of assumptions adopted for calculations, do not hesitate to contact ALUPROF S.A or a firm specialising in structural analysis computations.
Another simple method of selection of profiles for aluminium constructions manufactured by ALUPROF S.A is offered by computer software MB-CAD and MB-SOFT. These are highly efficient tools applicable in quick designing, preparing offers and sheets for the production based, *inter alia*, on a built-in structural analysis module.

2. CALCULATION ALGORITHMS

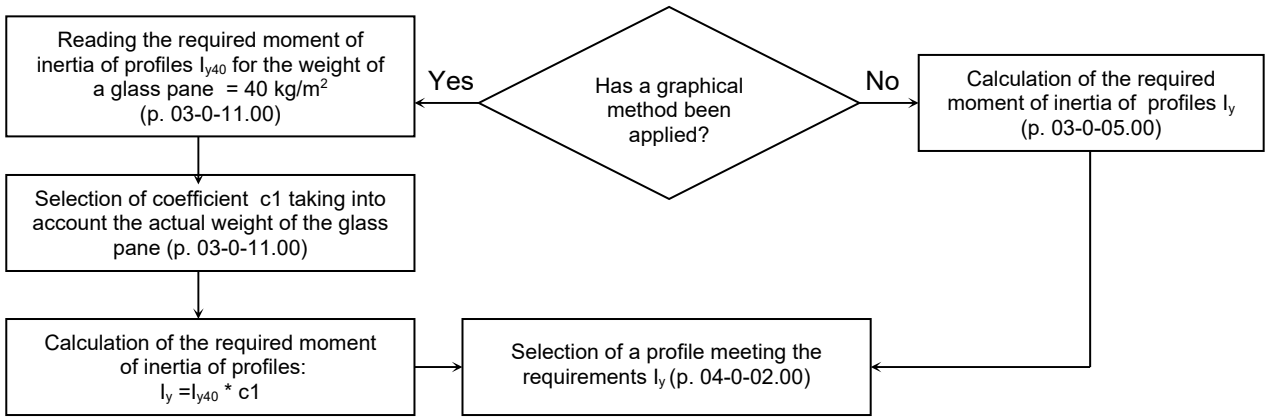
2.1. Selection of load carrying mullions, frames and cross bar profiles for external walls



2.2. Selection of load carrying profiles of mullions, frames and cross bars for internal walls without taking into account linear loads



2.3. Selection of load carrying profiles of cross bars with regard to loads caused by glazing for internal and external walls.



2.4. Maximum dimensions of walls and door leaves – p. 03-0-14.00, 03-0-15.00

2.5. Maximum dimensions of walls segments (buttjoint) VETROTECH SAINT-GOBAIN and AGC – p. 03-0-16.00, 03-0-17.00

3. CONSTRUCTION LOAD

In order to properly select profiles for execution of walls and doors, the following loads should be accounted for:
- wind load (pressure and suction)
- glazing load
- dead weight load

Wind load is the basic external load which depends, to a large extent, on the wind zone, height and shape of the building and the land type (exposure of the building).
Determination of the wind load is performed in compliance with the applicable standards.
While carrying out structural analysis of profiles applied in internal installations, the loads specified in item 4.2 should be taken into account.
Calculations of load values should be made subject to the standards and regulations applicable in the country where the construction is to be erected. In view of the fact that aluminium profiles are dimensioned via serviceability limit state method, the values of “basic load” - pk should be applied in determination of loads.

4. PRINCIPLES OF DETERMINATION OF THE REQUIRED MOMENTS OF INERTIA FOR PROFILES

4.1 EXTERNAL DEVELOPMENTS - ALLOWABLE DEFLECTIONS

Adopting the least favourable load affecting the wall or door in external development, allowable deflection of each profile must not exceed the value laid down for applicable standards and regulations. In most cases the following values of maximum deflection of profiles, depending on local regulations and applied glazing, are used:
Deflection caused by the wind load, single glass panes:
— L/200 and max. 15 mm
Deflection caused by the wind load, glass units:
— L/200 and max. 12 mm
— L/300 and max. 12 mm
Deflection caused be the glazing load and dead weight:
— L/500 and max. 3 mm

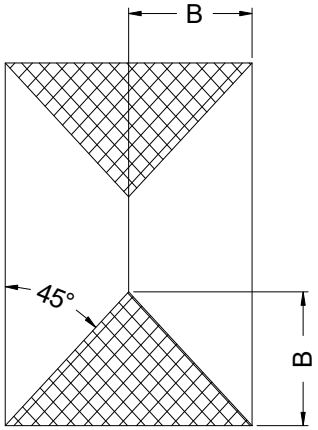
4.2 INTERNAL DEVELOPMENTS – ALLOWABLE DEFLECTIONS

Taking into account the least favourable load affecting the internal structure, allowable deflection of each profile must not exceed the value laid down in applicable standards and local regulations.

4.3 LOAD DISTRIBUTION

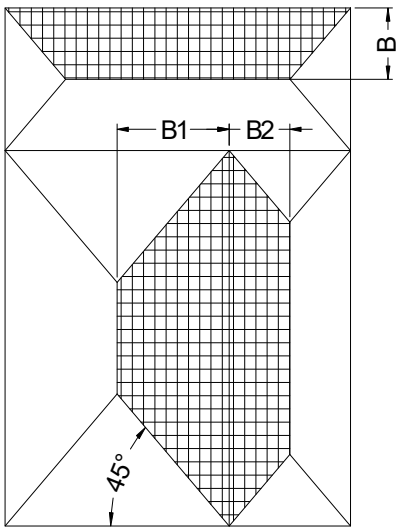
Fig. 1 shows schematically distribution of wind loads, so called load distribution areas.
It is assumed that loads affecting particular areas are evenly distributed. Areas exposed to loads are shown as trapezoids or triangles. Wall or door elements affected by the loads are the base of a trapezoid or a triangle.

Fig. 1. Load distribution areas of a wall or door



Load distribution areas of a wall with vertical and horizontal crosspieces are shown in figure 2.

Fig. 2. Load distribution areas of a wall with crosspieces

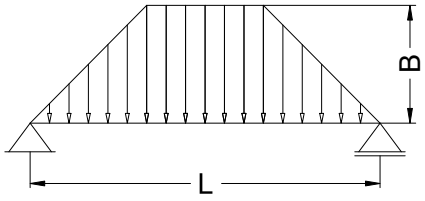


Calculations should account for the loads affecting two adjacent areas.

5. ANALYTICAL METHOD OF DETERMINATION OF THE REQUIRED MOMENTS OF INERTIA Ix and Iy

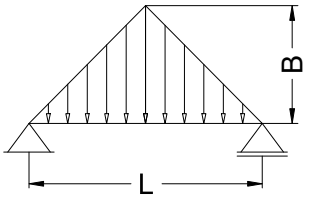
5.1. DETERMINATION OF THE REQUIRED MOMENT OF INERTIA Ix RELATED TO WIND LOADS.

For the trapezoidal distribution of loads::



$$I_x = \frac{q}{1920 \cdot E \cdot f_{\max}} \cdot (5 \cdot L^2 - 4 \cdot B^2)^2$$

For the triangular distribution of loads:



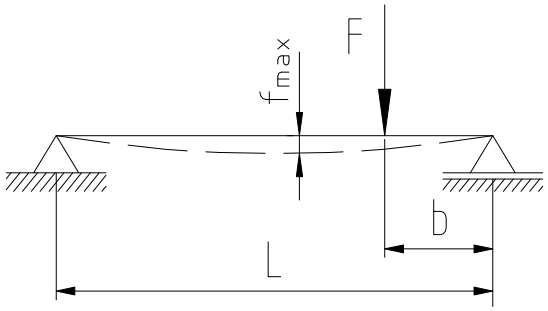
$$I_x = \frac{q \cdot L^4}{120 \cdot E \cdot f_{\max}}$$

where:

$q = p_k \cdot B/10000$ – maximum load for a length unit of a profile [N/cm],

p_k = basic load [Pa],
B = load width [cm],
L = load span (length of profile) [cm],
f_{max} - maximum deflection of profile [cm],
E = Young's modulus [N/cm^2],

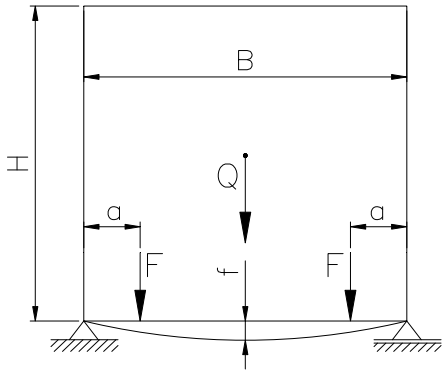
5.2 DETERMINATION OF THE REQUIRED MOMENT OF INERTIA Ix RELATED TO LINEAR LOAD



$$I_x = \frac{F \cdot b}{3 \cdot E \cdot L \cdot f_{\max}} \cdot \left(\frac{L^2 - b^2}{3} \right)^{\frac{3}{2}}$$

where:
F – force derived from linear load [N],
b – distance from load F to the support [cm],
L – profile length [cm],
f_{max} - maximum deflection of a profile [cm],
E - Young's modulus [N/cm^2].

5.3 DETERMINATION OF THE REQUIRED MOMENT OF INERTIA Iy RELATED TO THE GLAZING WEIGHT



$$I_y = \frac{F \cdot a}{24 \cdot E \cdot f_{\max}} \cdot (3 \cdot B^2 - 4 \cdot a^2)$$

$$F = \frac{Q}{2}$$

where:
Q – force derived from glazing weight [N],
a – distance between the point of support of a glass pane and the end of a profile [cm],
B – width of a plass pane [cm],
H – height of a glass pane [cm],
f_{max} – maximum deflection of profile [cm],
E - Young's modulus [N/cm^2],

It is assumed in calculations that the maximum deflection of a profile f_{max} must not exceed 3 [mm].

6. GRAPHICAL METHOD OF DETERMINATION OF THE REQUIRED MOMENTS OF INERTIA Ix, Iy

The process of determination of the required moments of inertia Ix and Iy has been shown in the form of algorithms in items 2.1, 2.2 and 2.3.

7. REINFORCING AN ALUMINIUM PROFILE WITH A STEEL PROFILE

Where the required moment of inertia Ix or Iy is higher than moments of inertia of profiles available in the MB-78EI system or when we wish to apply a profile with a lower moment of inertia, such an aluminium profile should be reinforced with a steel profile. Application of profiles made of different materials requires anti-corrosion protection of profiles as in the point of contact of such profiles there occurs a corrosion centre. Also a distance between profiles should be ensured by means of an insulating element (e.g. plastic foil).

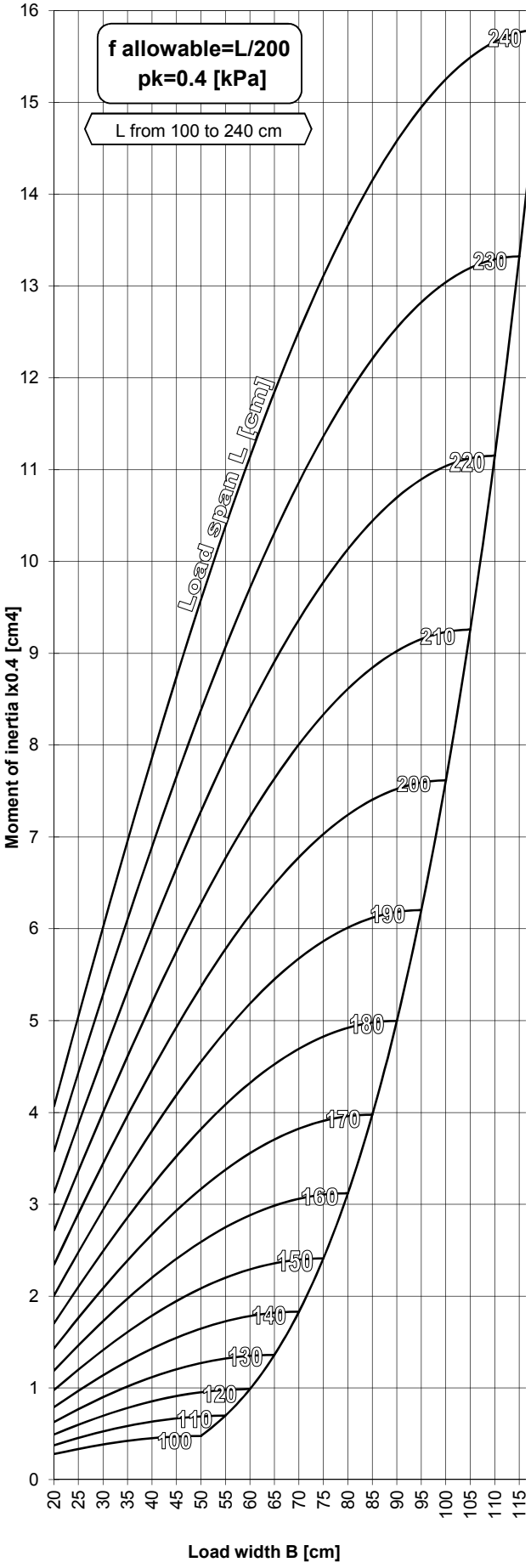
7.1. CALCULATION OF THE MOMENT OF INERTIA OF AN ALUMINIUM PROFILE REINFORCED WITH A STEEL PROFILE

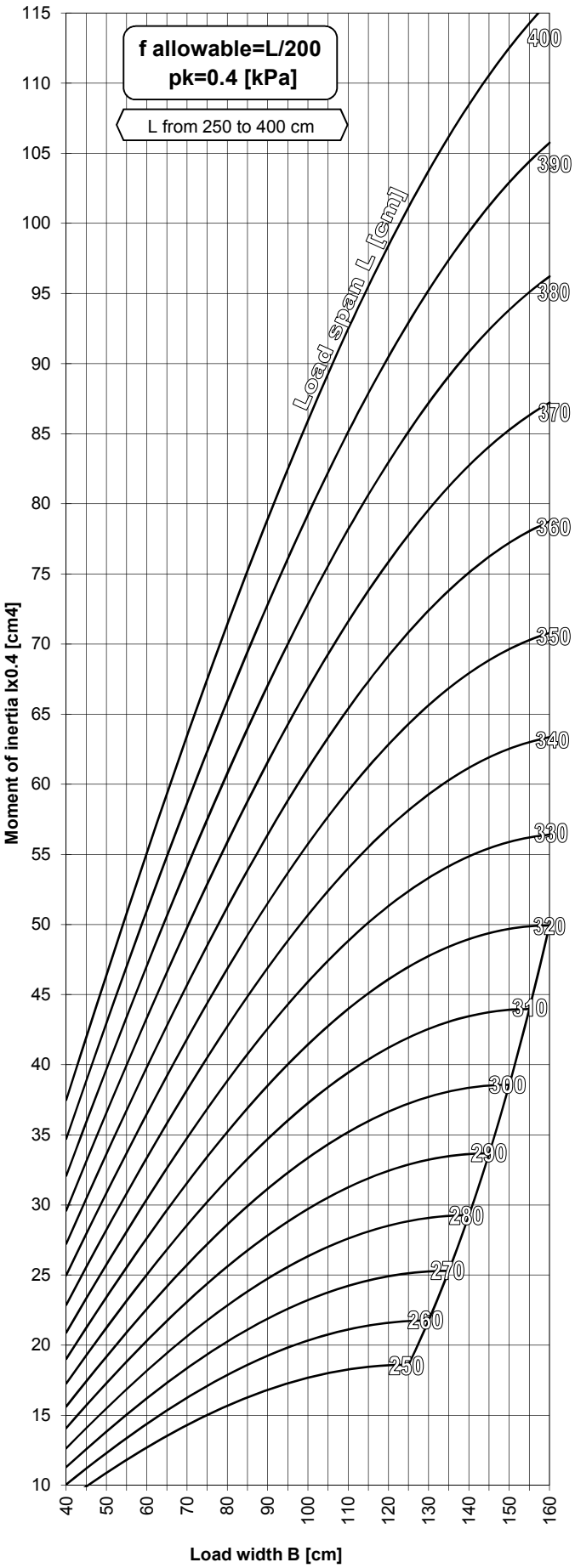
In view of the fact that the Young's modulus E for steel is 3 times higher than for aluminium, moments of inertia of steel elements added to the moment of inertia of an aluminium profile should be multiplied by 3.

$$Ix_{SUM} = Ix_{AL} + 3 * Ix_{St}$$

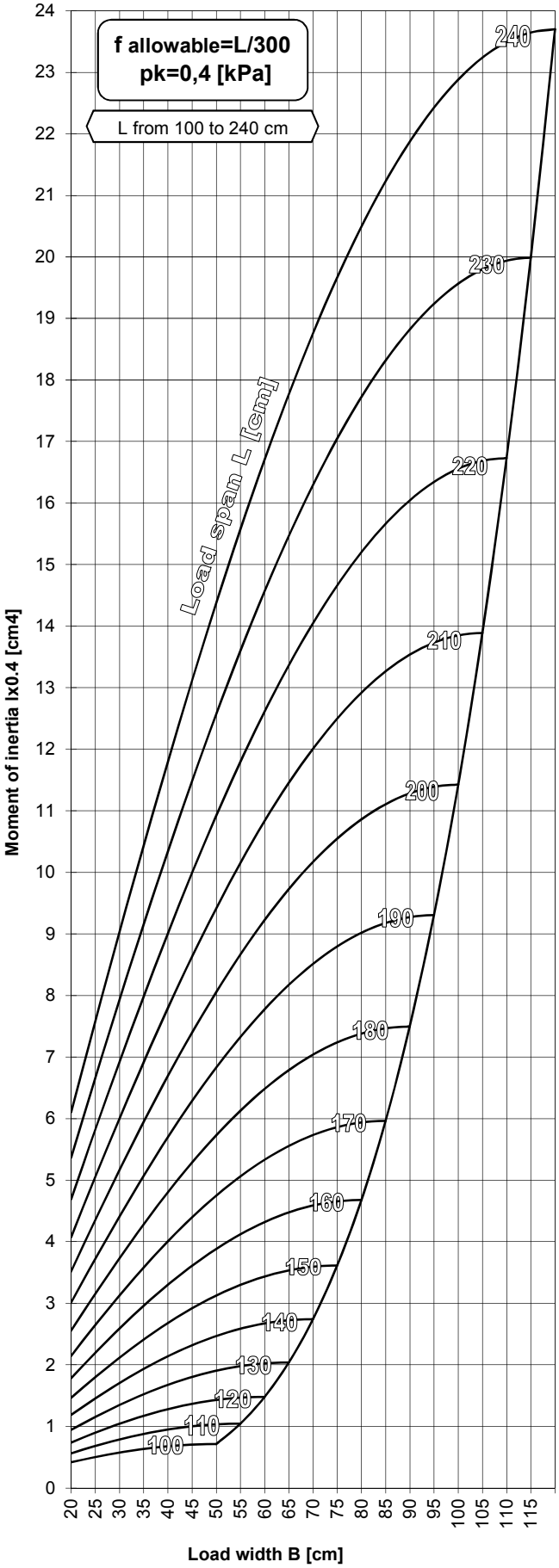
where:
Ix_{SUM} – overall moment of inertia [cm^4],
Ix_{AL} - moment of inertia of an aluminium profile [cm^4],
Ix_{St} - moment of inertia of a steel profile [cm^4].

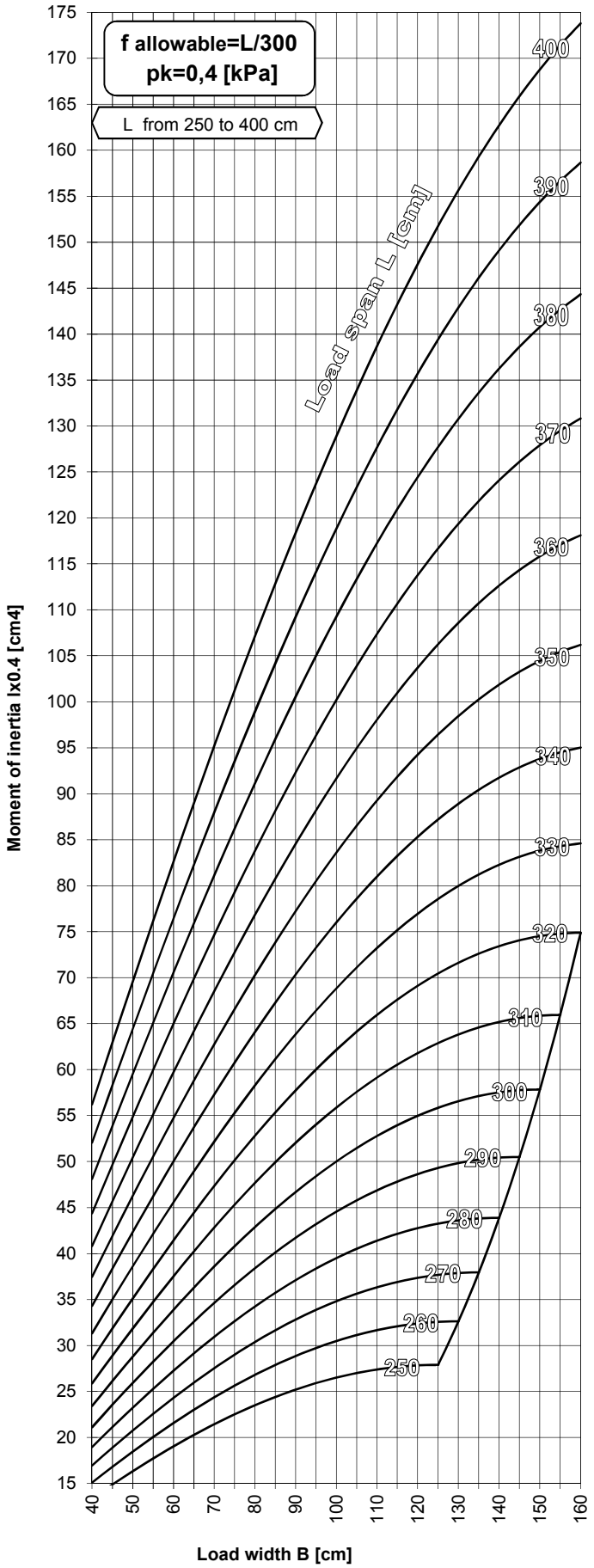
Diagrams of selection of Ix0.4 for the basic load pk=0.4kPa and deflection L/200





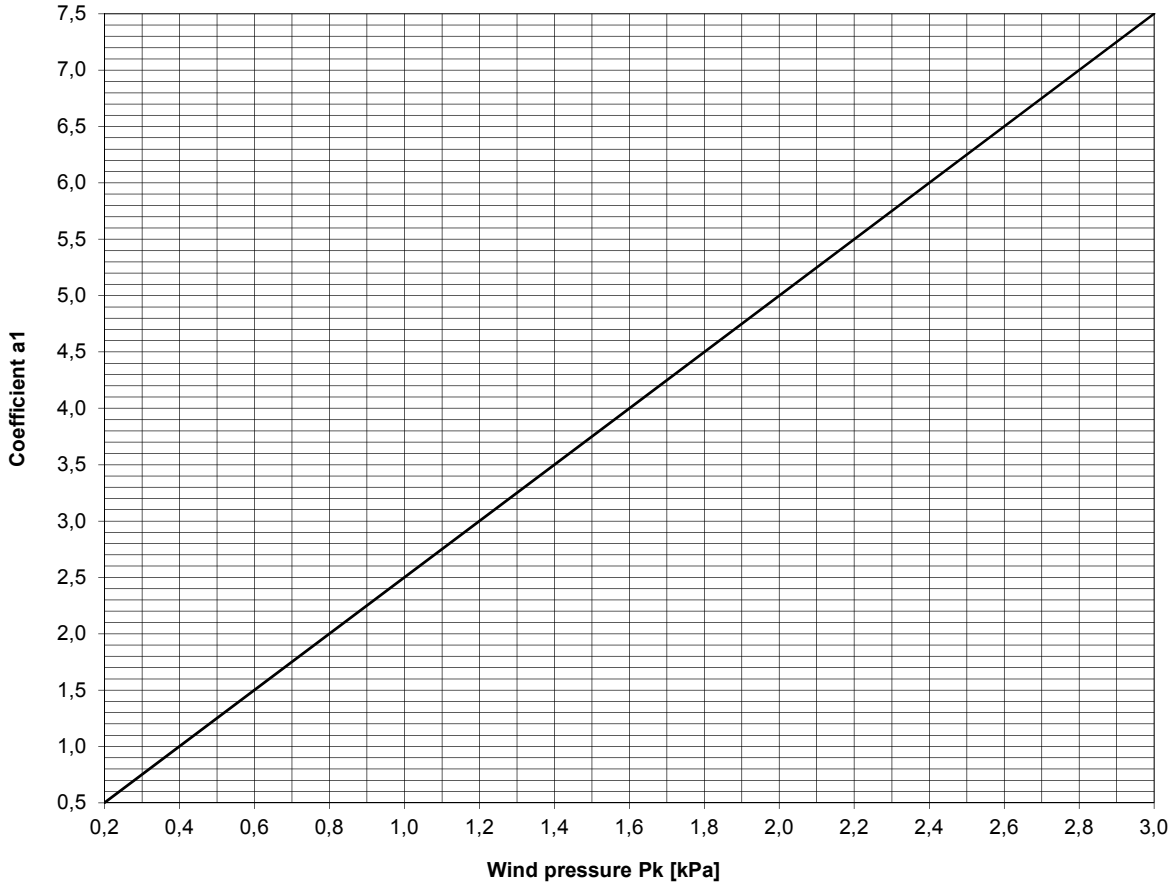
Diagrams of selection of Ix0.4 for the basic load pk=0.4kPa and deflection L/300



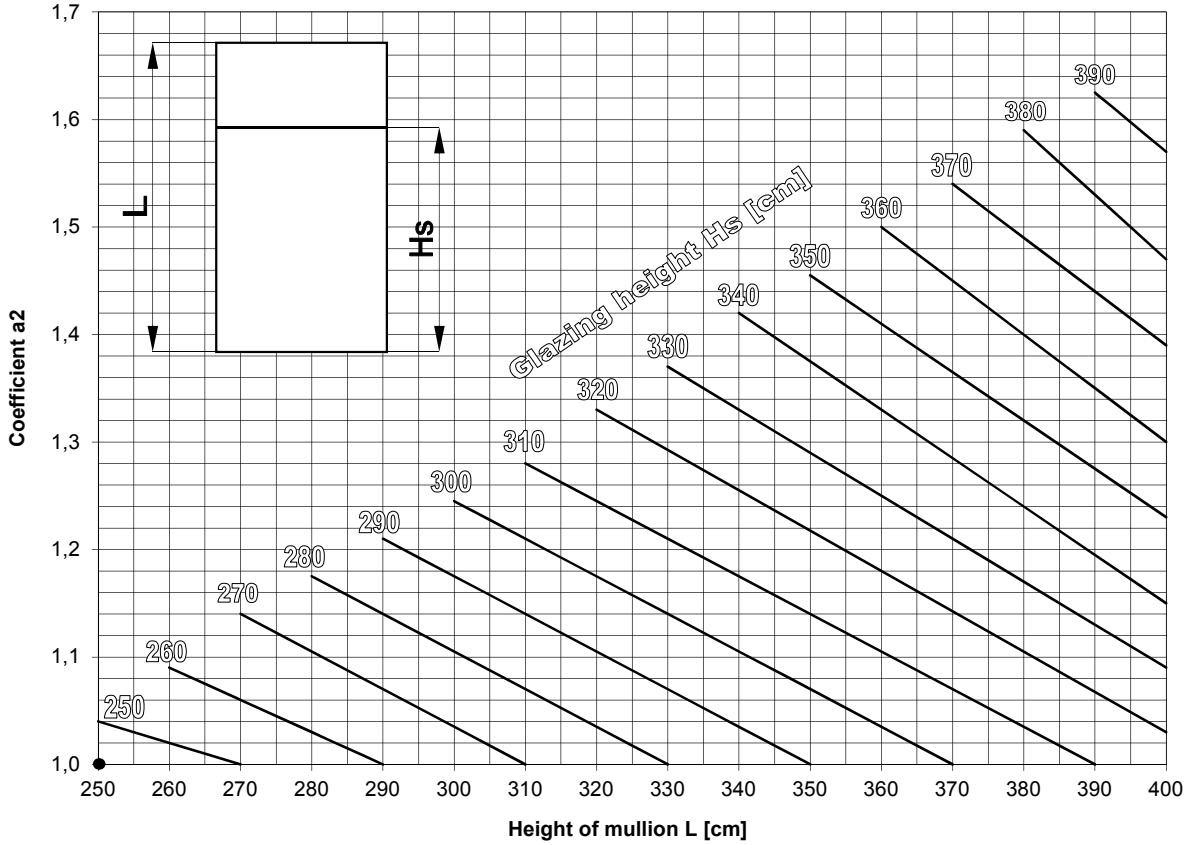


Diagrams of selection of coefficients a1 and a2

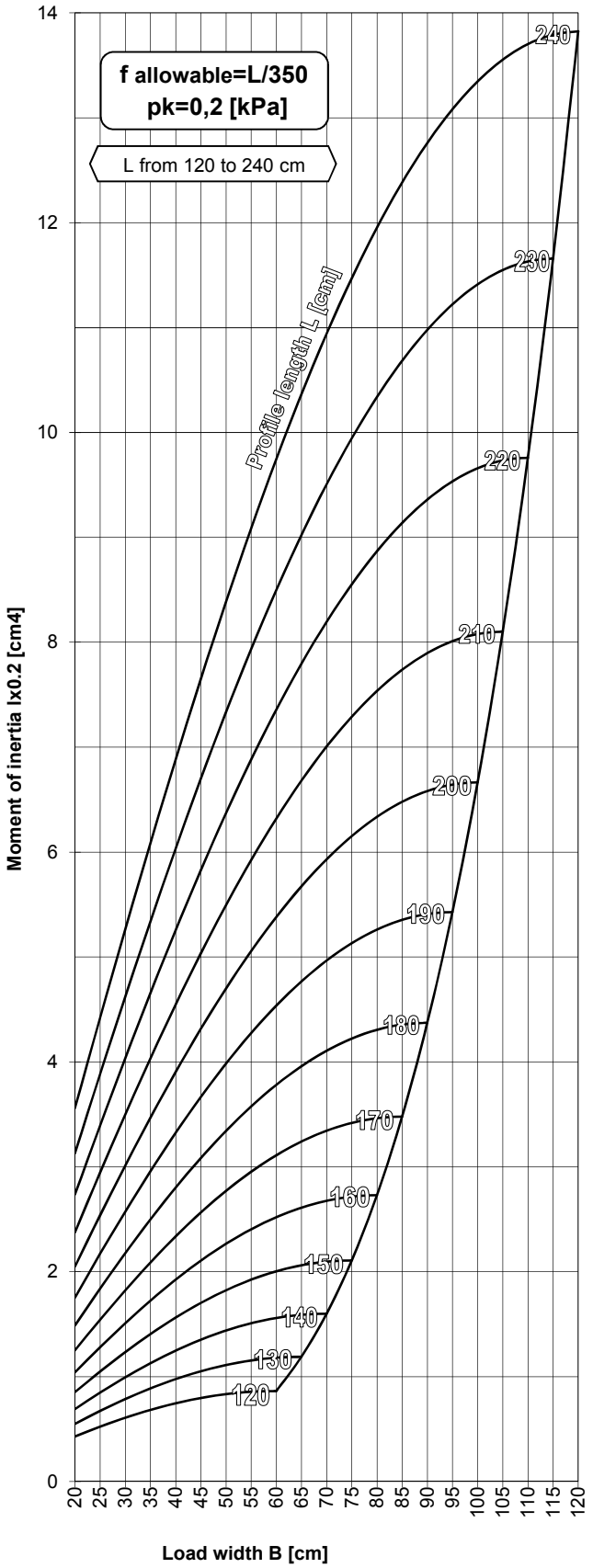
Selection of coefficient a1 taking into account the actual basic wind load pk

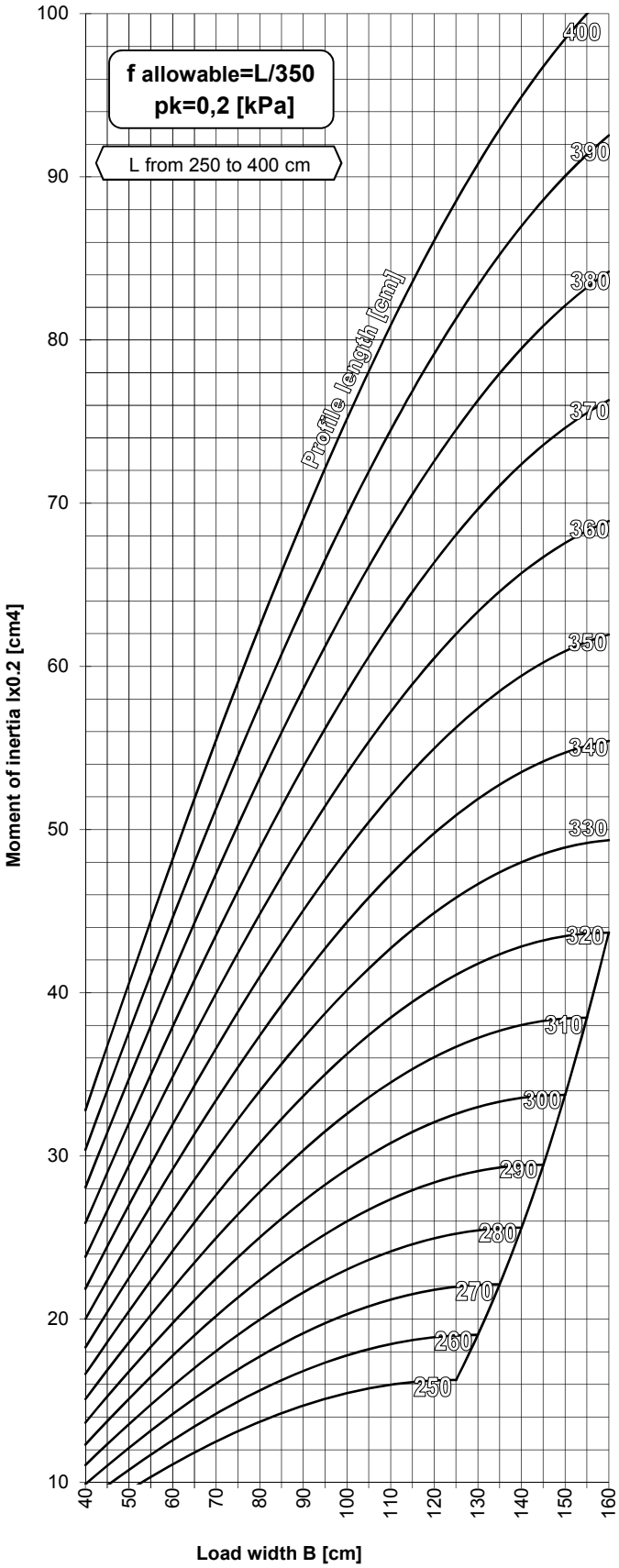


Selection of coefficient a2 taking into account the required maximum deflection for the glass unit fmax=8 [mm]



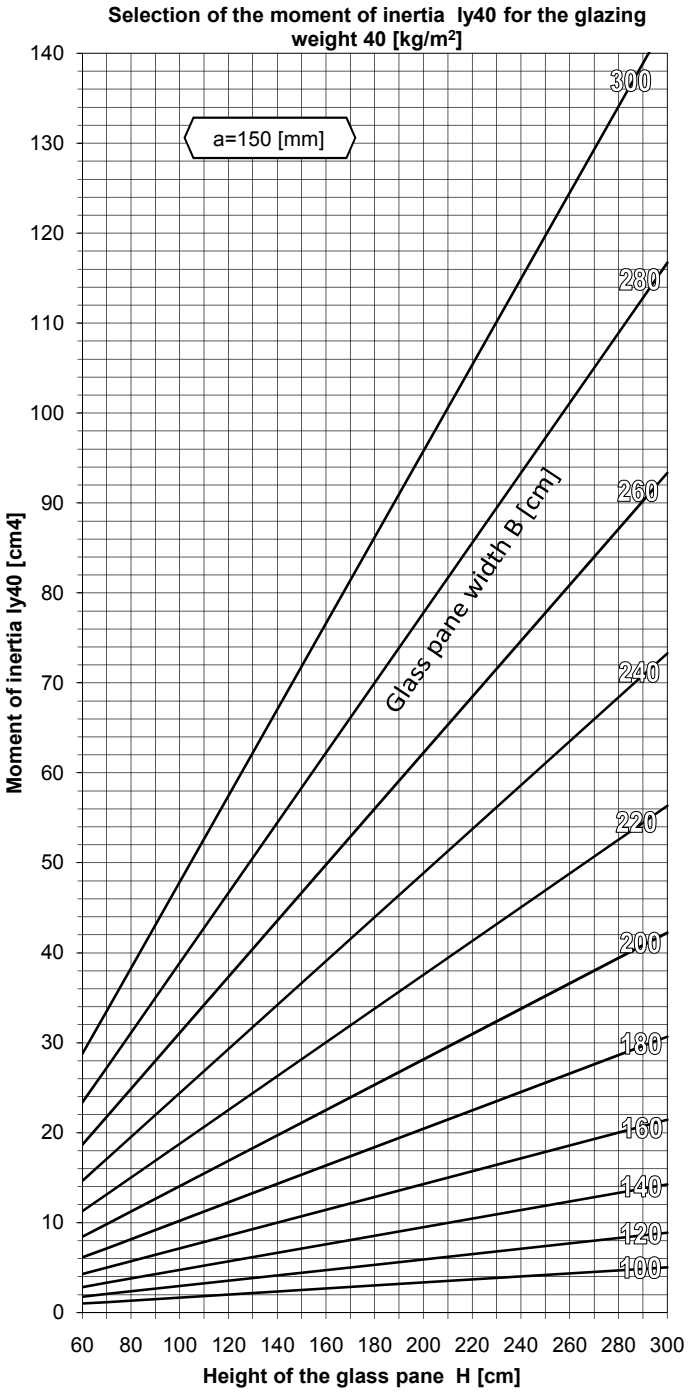
Diagrams of selection of Ix0.2 for the basic load pk=0.2kPa and deflection L/350

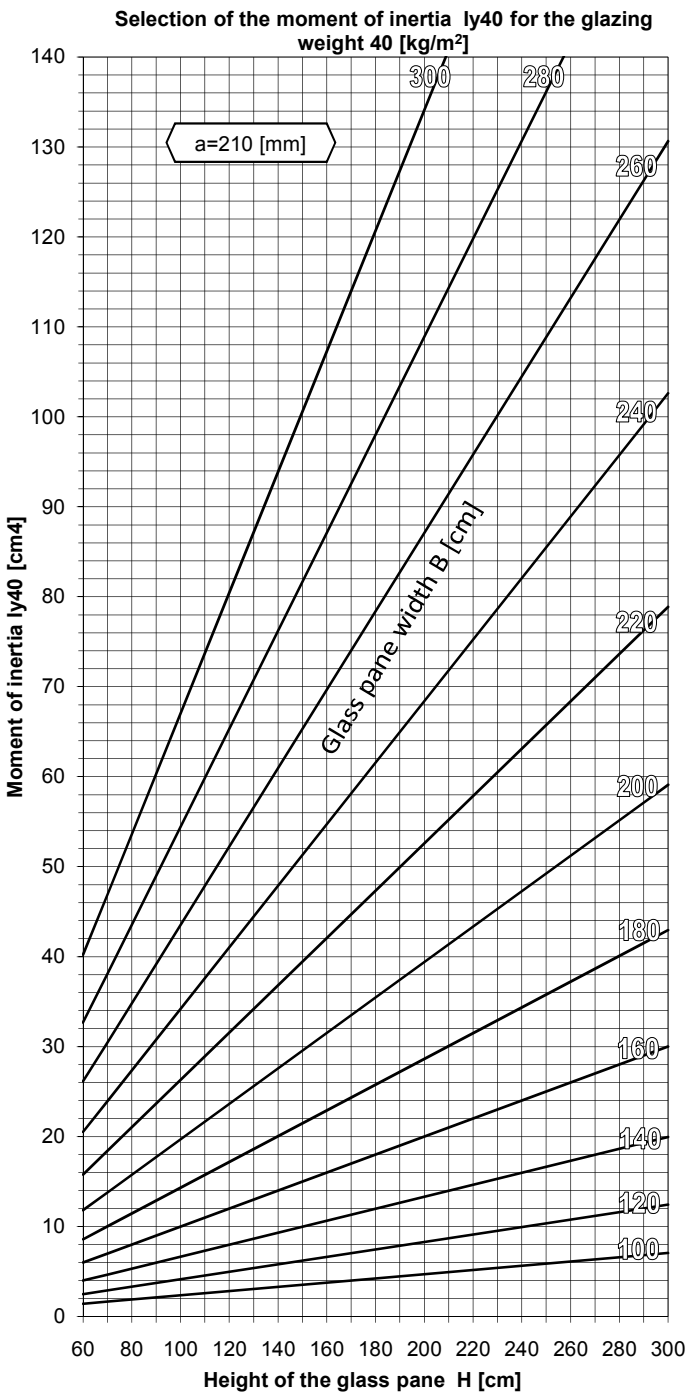


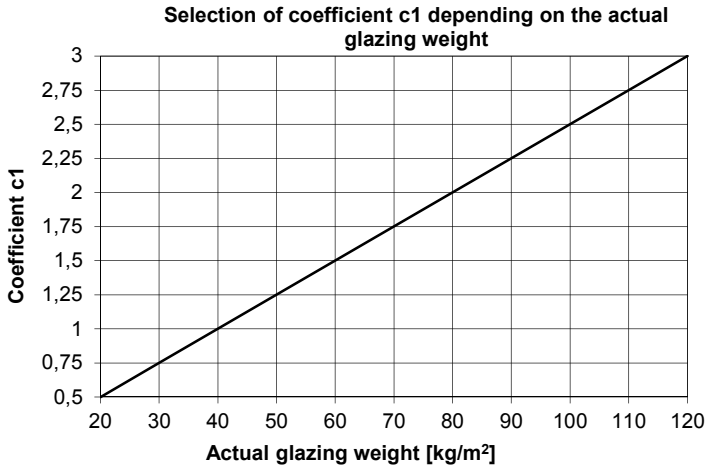


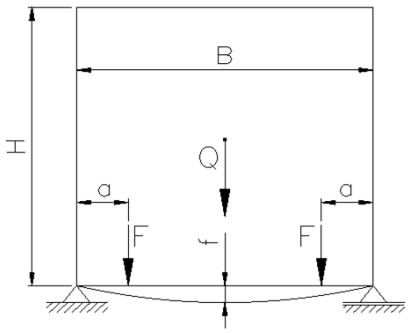
Coefficient **b1 taking into account the adopted basic load** pk:
If pk=0.15 kPa then **b1**=0.75
If pk=0.20 kPa then **b1**=1
If pk=0.25 kPa then **b1**=1.25

Diagrams of selection of ly40 for the glazing weight 40 [kg/m^2] and coefficient c1

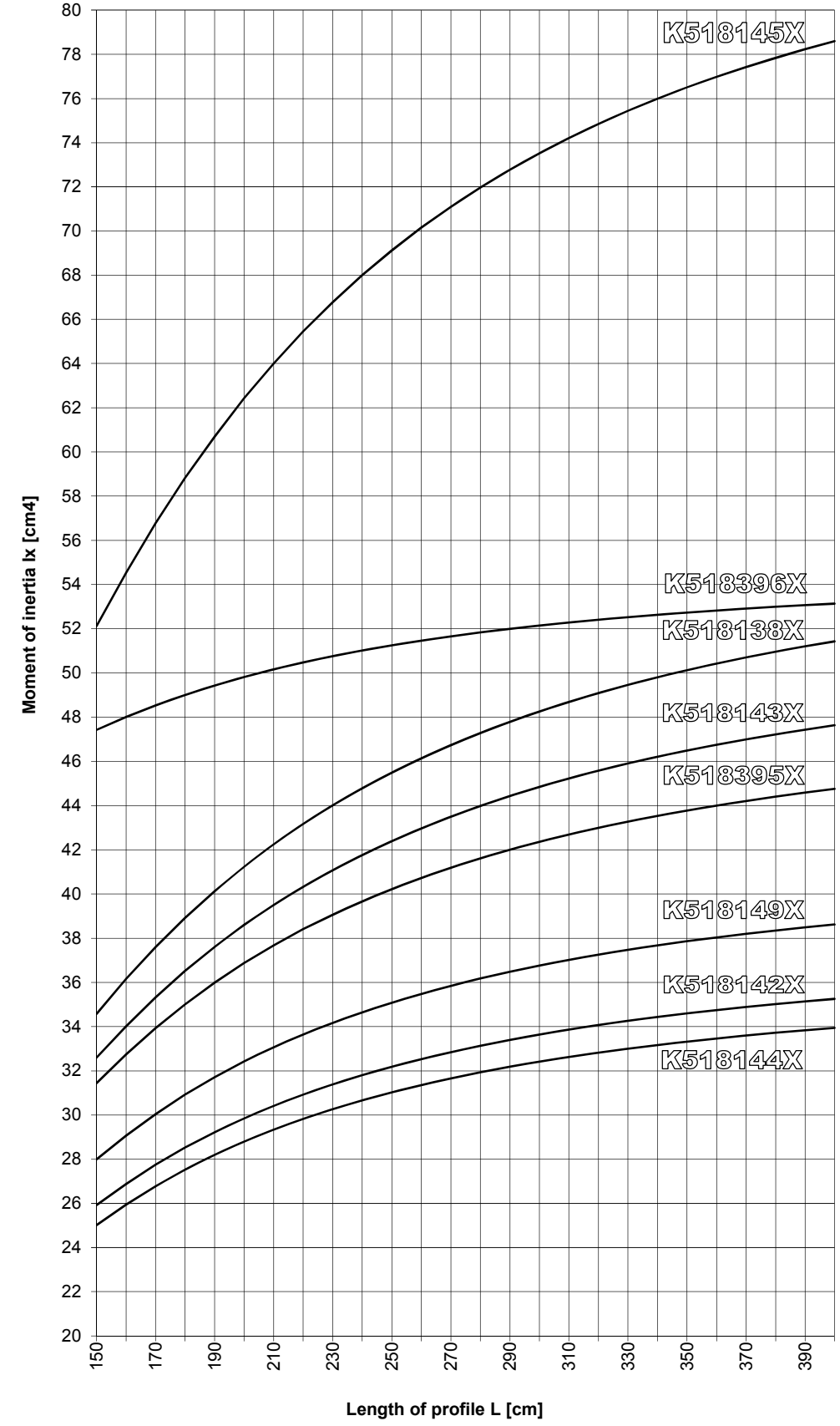


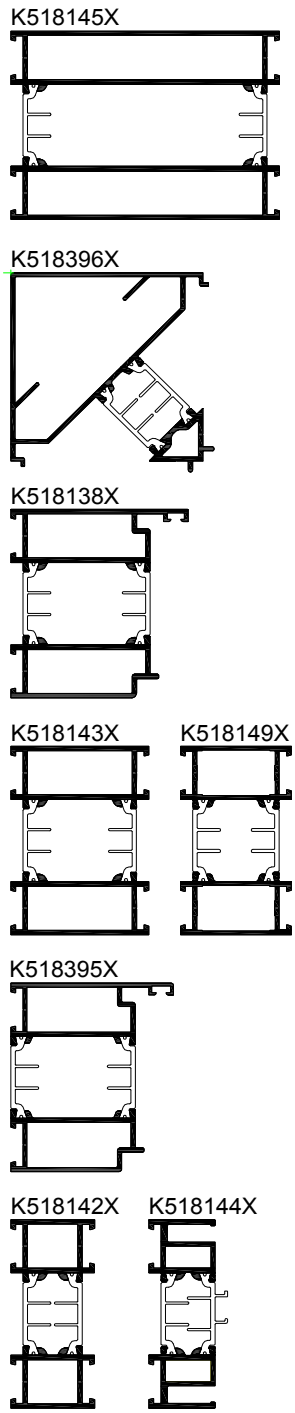






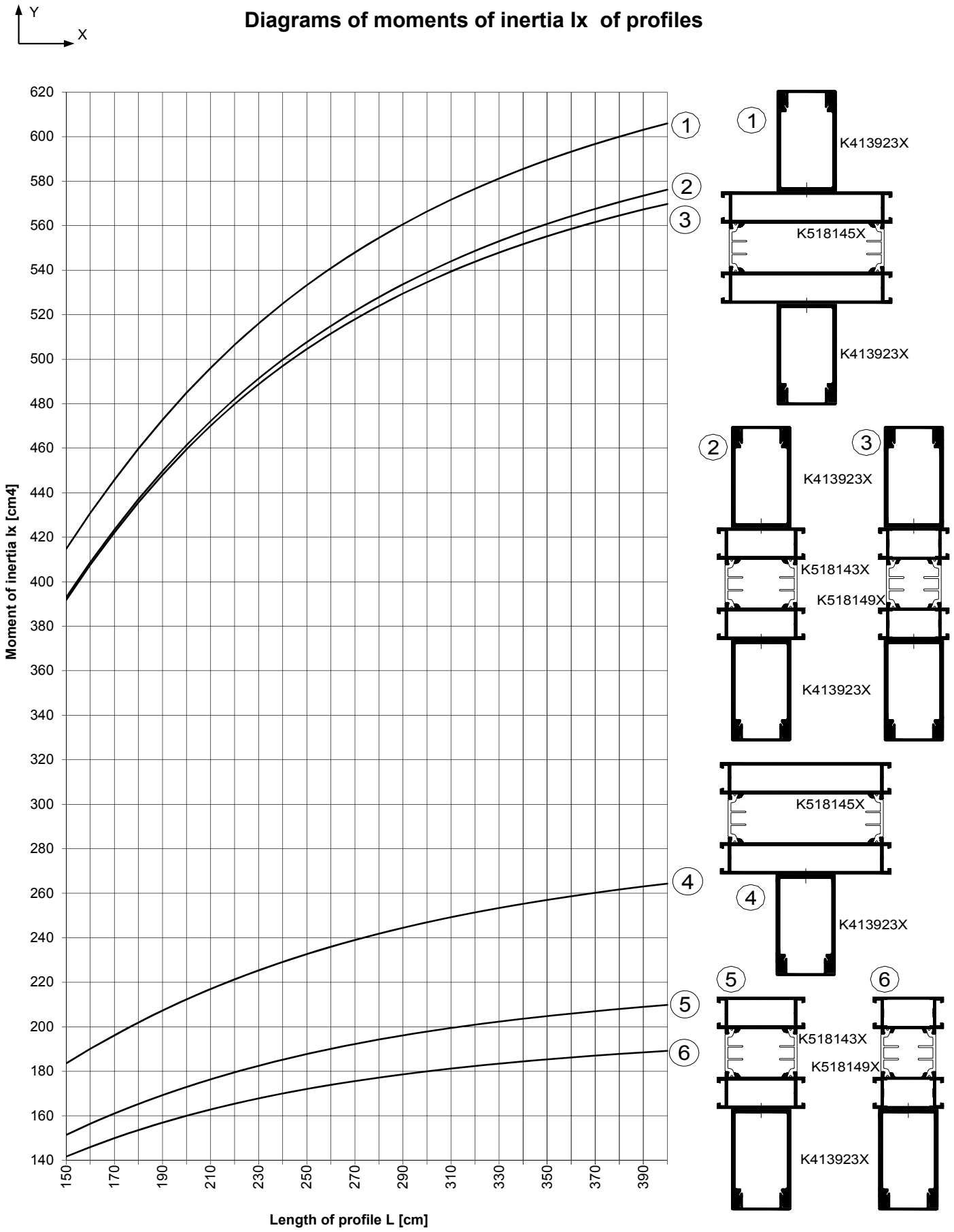
Diagrams of moments of inertia Ix of profles





The method of additional reinforcing aluminium profiles with steel profiles has been described in the section Structural Analysis

Diagrams of moments of inertia Ix of profiles



The method of additional reinforcing aluminium profiles with steel profiles has been described in the section Structural Analysis

7.2. REINFORCEMENT WITH ALUMINUM PROFILES

In MB-78EI system, wall mullions may be strengthened with aluminium sections No. K413923X + K413924X and, depending on the variant – with a steel tube 50 x 30 mm or with two profiles K413923X + K413924X fixed on both sides of the wall mullion profile, depending on the structural analysis requirements.

Mullions which are not fixed to the structure of the building in the case of MB-78 EI walls, of the class EI30 and of the height at least and over 3600 mm should be strengthened (at last on one side) with an aluminium section No. K413923X + K413924X, screwed with at least 300 mm spacing.

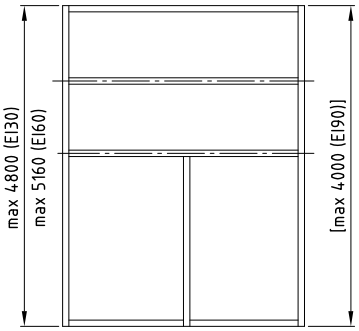
Mullions which are not fixed to the structure of the building in the case of MB-78 EI walls, of the class EI60 and of the height between 3400 – 4000 mm should be strengthened (at last on one side) with an aluminium section No. K413923X + K413924X, screwed with at least 400 mm spacing.

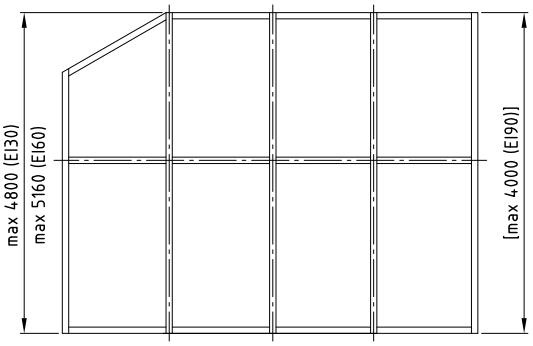
Mullions which are not fixed to the structure of the building in the case of MB-78 EI walls, of the class EI60 and of the height at least and over 4000 mm should be strengthened on both sides with aluminium sections No. K413923X + K413924X, screwed with at least 250 mm spacing.

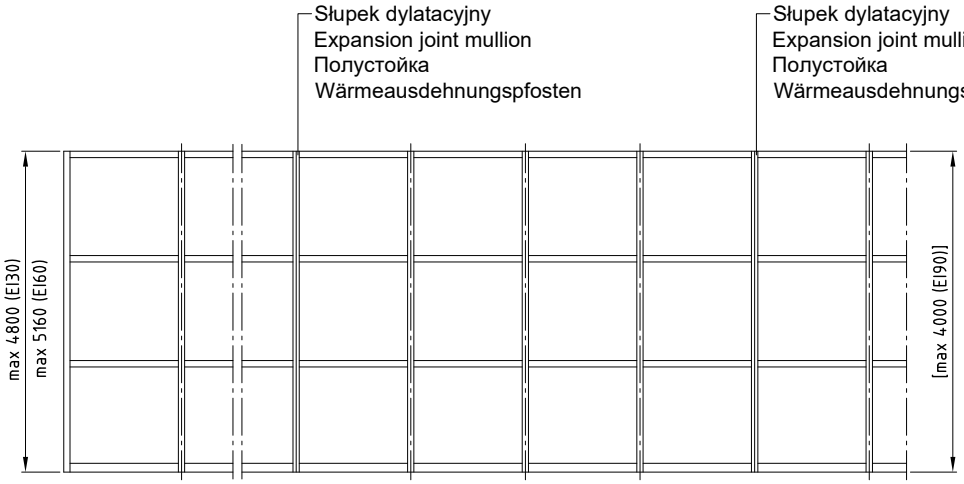
The walls of MB-78EI system may be mounted vertically or with a vertical tilt up to ±10°

MB-78EI

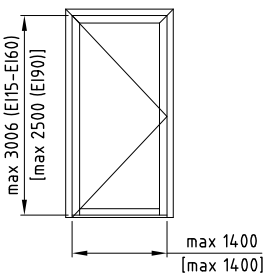
EI 15, EI 30, EI 45, EI60, EI90. Maksymalne wymiary ścianek i drzwi.
EI 15, EI 30, EI 45, EI60, EI90. Maximum dimensions of wall segments and door.
EI 15, EI 30, EI 45, EI60, EI90. Максимальные размеры стеновых панелей и двери.
EI 15, EI 30, EI 45, EI60, EI90. Maximale Abmessungen von Wand und Flüglige.

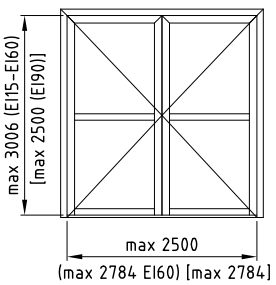




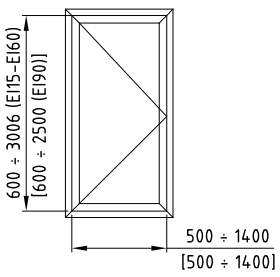


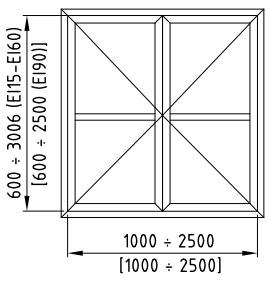
Drzwi
Door
Дверь
Tur





Okno techniczne
Technical window
Техническое окно
Technische Fenster

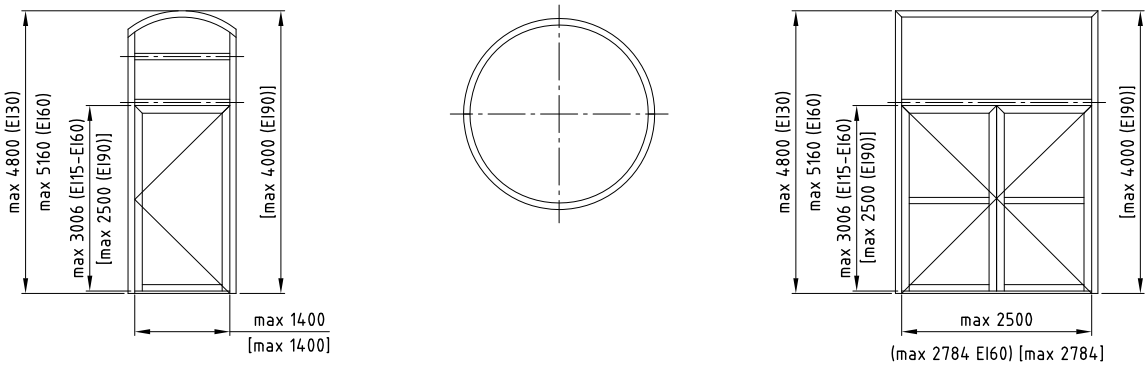


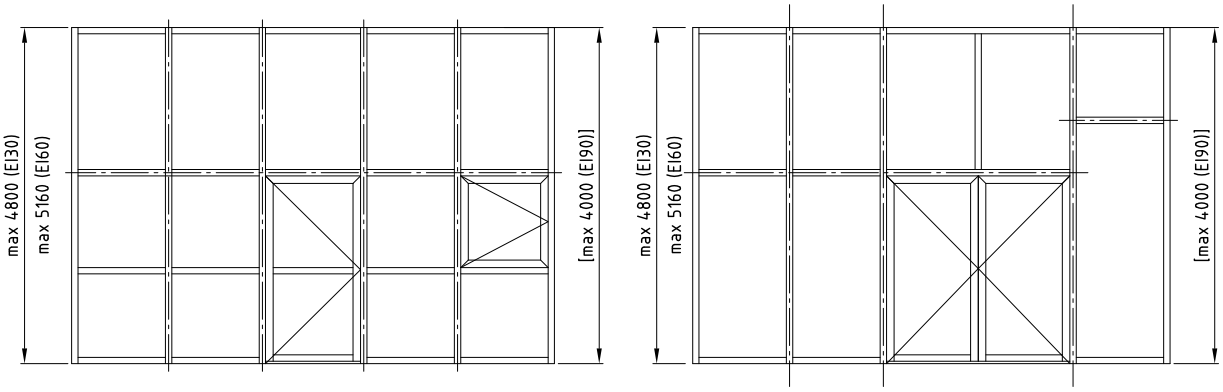


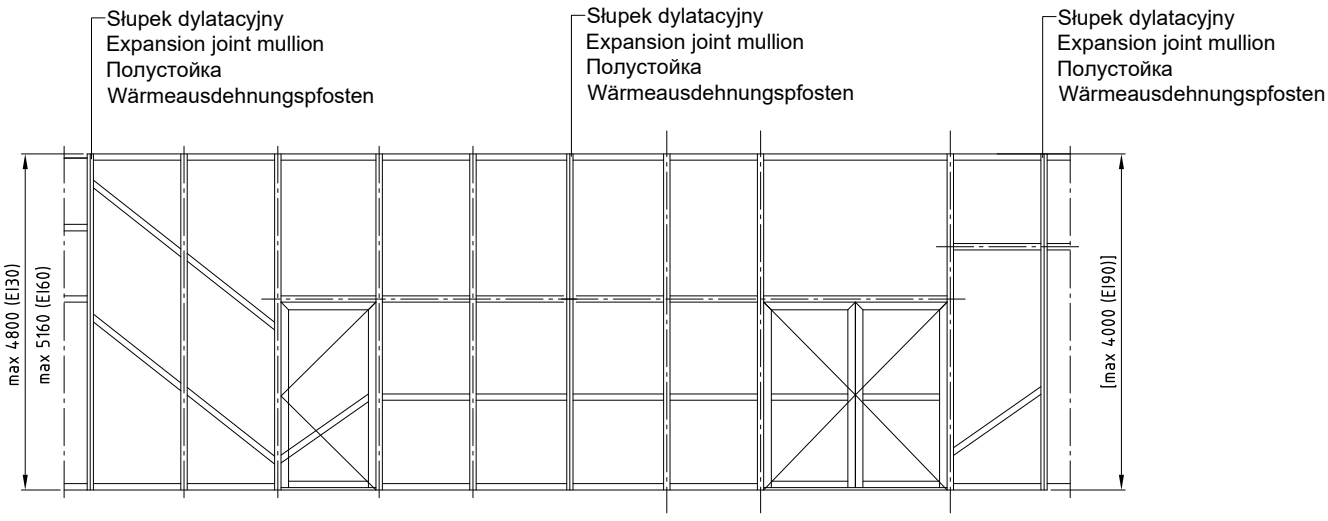
Maksymalne wymiary szyb dobrać zgodnie z dokumentacją dopuszczającą do obrotu.
The maximum dimensions of the glass panes should be performed in accordance with the approval documentation.
Максимальные размеры стёкол согласно с разрешающей документацией.
Die maximalle Glasmasse in Übereinstimmung mit der Prüfnachweisen.

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.







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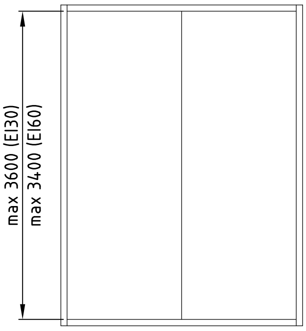
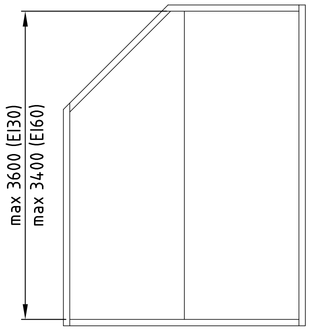
The maximum dimensions of the glass panes should be performed in accordance with the approval documentation.
Максимальные размеры стёкол согласно с разрешающей документацией.
Die maximalle Glasmasse in Übereinstimmung mit der Prüfnachweisen.

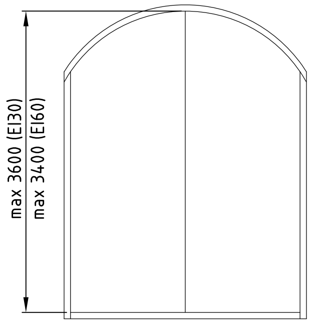
MB-78EI

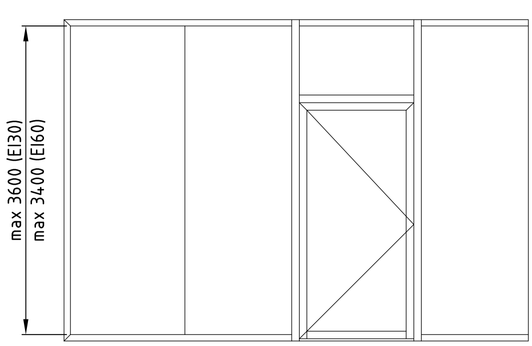
EI15, EI30, EI45, EI60. Maksymalne wym. ścianek bezszprosowych
EI15, EI30, EI45, EI60. Maximum dimensions of wall segments (buttjoint)
EI15, EI30, EI45, EI60. Максимальные размеры перегородок без шпросов
EI15, EI30, EI45, EI60. Maximale Abmessungen sprossenloser Trennwände

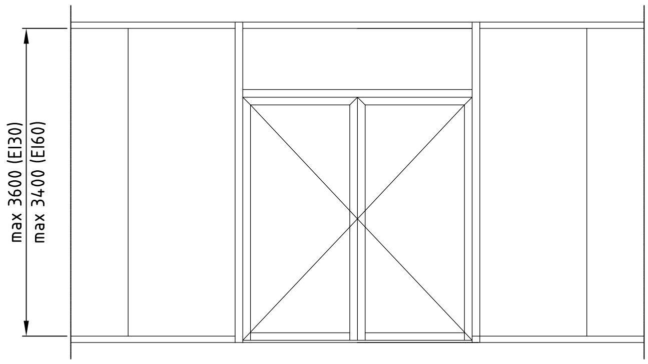
VETROTECH SAINT-GOBAIN

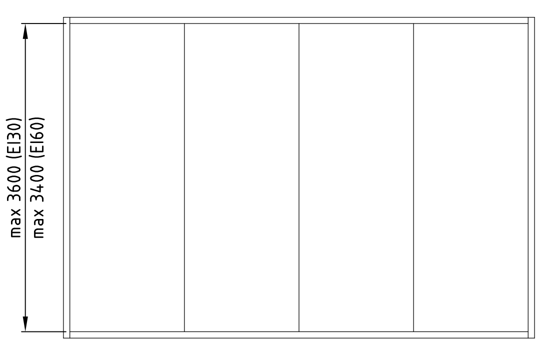


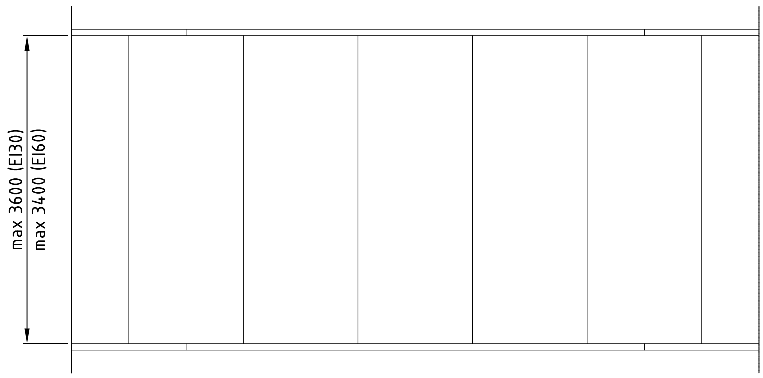










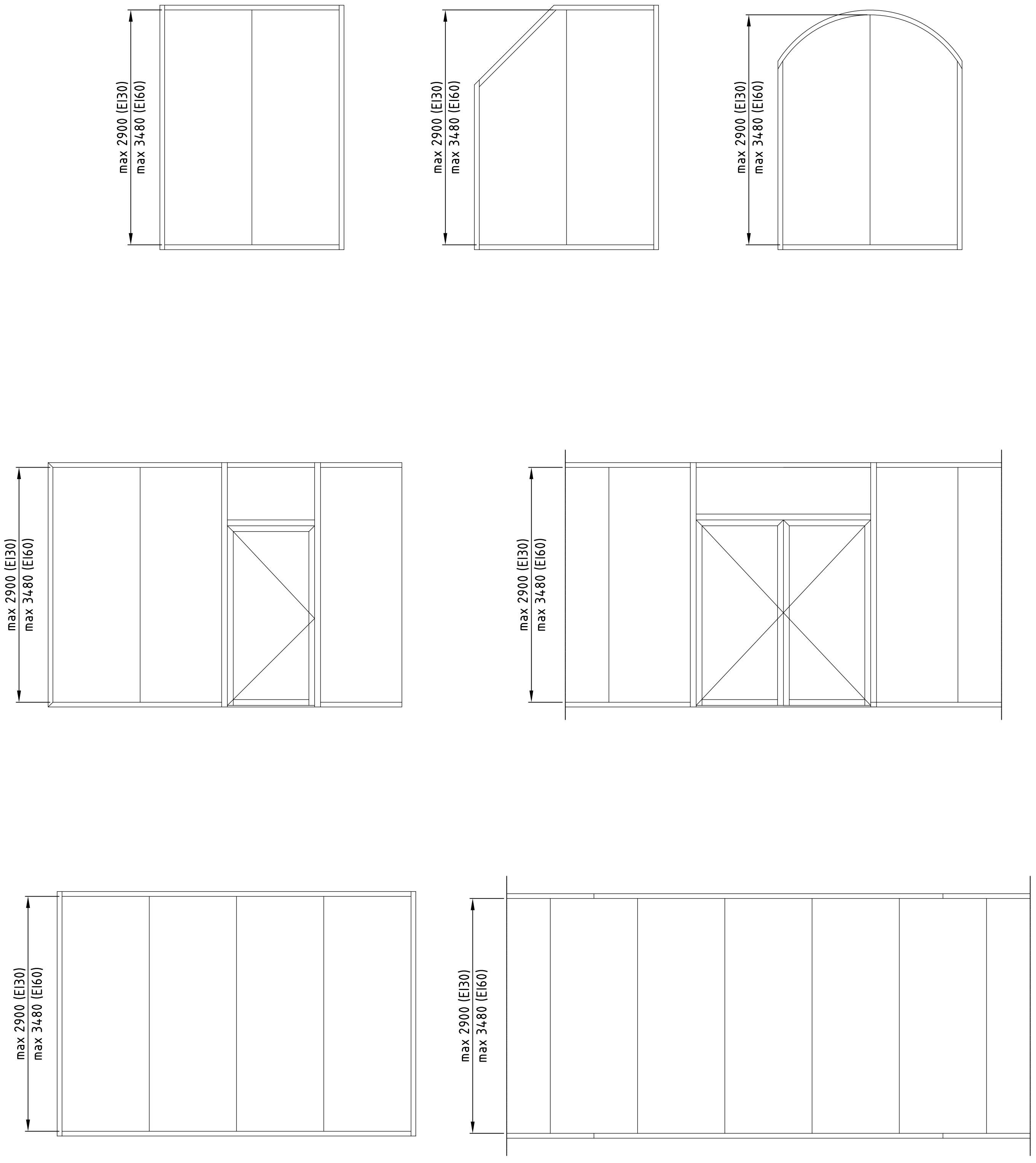


! Maksymalne wymiary szyb dobrać zgodnie z dokumentacją dopuszczającą do obrotu.
The maximum dimensions of the glass panes should be performed in accordance with the approval documentation.
Максимальные размеры стёкол согласно с разрешающей документацией.
Die maximalle Glasmasse in Übereinstimmung mit der Prüfnachweisen.

MB-78EI

EI15, EI30, EI45, EI60. Maksymalne wym. ścianek bezszprosowych
EI15, EI30, EI45, EI60. Maximum dimensions of wall segments (buttjoint)
EI15, EI30, EI45, EI60. Максимальные размеры перегородок без шпросов
EI15, EI30, EI45, EI60. Maximale Abmessungen sprossenloser Trennwände

AGC



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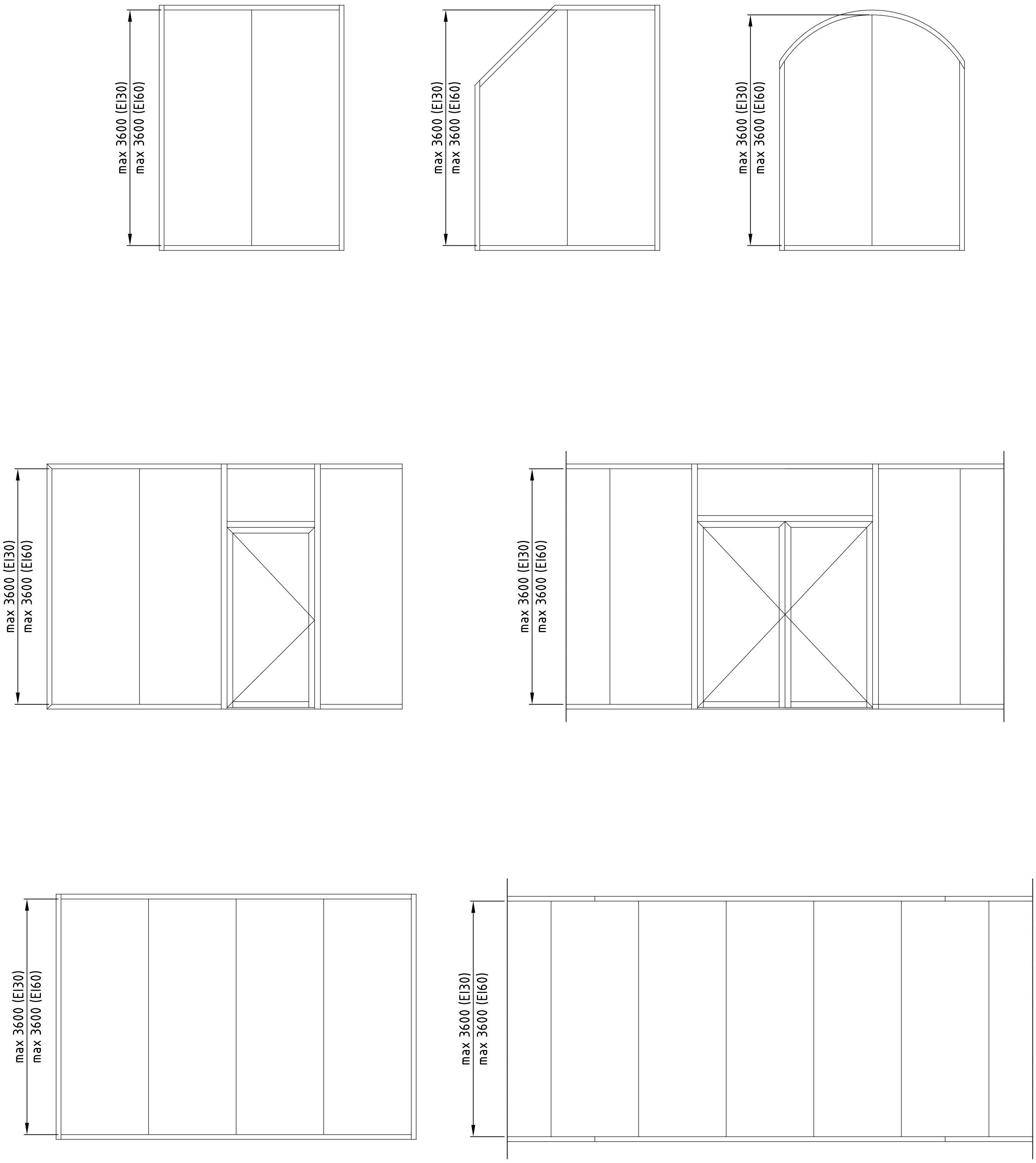
Максимальные размеры стёкол согласно с разрешающей документацией.
Die maximalle Glasmasse in Übereinstimmung mit der Prüfnachweisen.

MB-78EI	**EI15, EI30, EI45, EI60. Maksymalne wym. ścianek bezszprosowych** **EI15, EI30, EI45, EI60.** Maximum dimensions of wall segments (buttjoint) **EI15, EI30, EI45, EI60.** Максимальные размеры перегородок без шпросов **EI15, EI30, EI45, EI60.** Maximale Abmessungen sprossenloser Trennwände

POLFLAM

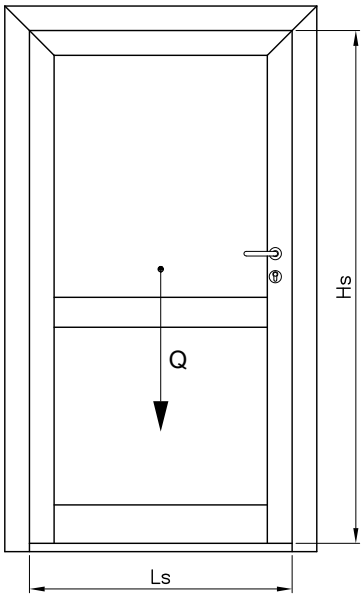


! Maksymalne wymiary szyb dobrać zgodnie z dokumentacją dopuszczającą do obrotu.
The maximum dimensions of the glass panes should be performed in accordance with the approval documentation.
Максимальные размеры стёкол согласно с разрешающей документацией.
Die maximalle Glasmasse in Übereinstimmung mit der Prüfnachweisen.

MB-78EI

Maksymalne wymiary skrzydeł drzwi
Maximum dimensions of leaves
Максимальные размеры створок, подбор дверей
Maximale Abmessungen für Türflügel

Wymiary maksymalne mają ścisły związek z profilami, z których wykonane są skrzydła i obowiązują jedynie z kompletnymi zestawami okuć oraz po skojarzeniu ich z zakresem stosowania tych okuć przedstawionym w rozdziale "Okucia" i katalogu "Okucia"
Maximum dimensions are closely correlated with the profiles of which the sashes are made and they are applicable only with complete sets of hardware and they are subject to the application range of this hardware, presented in the section "Hardware" and "Hardware"catalogue
Максимальные размеры тесно связаны с профилями, из которых выполнены створки и обязательны только с полными наборами фурнитуры, а также после сочетания х с пределом применения этой фурнитуры, представленным во главе "Фурнитура" .
Maximale Maße stehen im engen Zusammenhang mit Flügelprofilen und gelten ausschließlich mit kompletten Beschlägen sowie ihrem Einsatzbereich (siehe Kapitel „Beschläge“ und Katalog „Beschläge“)



№	Ls max [mm]	Hs max [mm]	Q max [kg]	EI
K518138X	1400	3006	250	EI15 ÷ EI60
K518395X	1400	3006	250	
K518138X	1400	2500	250	EI90
K518395X	1400	2500	250	

Minimalne wymiary drzwi należy dobierać biorąc pod uwagę aktualne zalecenia przepisów i norm.
Adjust minimum dimensions of door taking into account current regulations and standards
Минимальные размеры дверей следует подобрать учитывая актуальные рекомендации положений и стандартов.
Minimale Türabmessungen haben den geltenden Vorschriften und Normen zu entsprechen.