ALUTECH
DOOR SYSTEMS

English

Design Description and Technical Guide for Industrial Sectional Doors Installation

ProPlus series
ProTrend series

2018

www.alutech-group.com

CONTENTS

As the design of sectional doors manufactured by ALUTECH is constantly improving Company preserves the right to make changes in the present document. The contents of this document cannot serve as basis for legal claims.

1. AREA OF APPLICATION AND OPERATING CONDITIONS OF THE DOORS

The 'Description of design and technical data for installation' is for ProPlus and ProTrend series sectional doors intended for installation in industrial, public and administrative buildings.

Doors are mounted behind the passage inside building.

Doors are not designed for installation in explosion and fire-hazard zones of buildings and structures as well nor are they intended for installation in fire-exits in place of fire doors.

The following values of outdoor temperature are determined for sectional doors during operation:

- upper operating temperature value +40 °C;
- lower operating temperature value minus 45 °C;
- limited upper operating temperature value +45 °C;
- limited lower operating temperature value minus 50 °C.

Notes.

1. Operating air temperature values are values within which there has been included the required nominal parameters and economically expedient life cycle of the product.
2. Operating air temperature limit values are values within which the products can be operated (very occasionally and for not more than six hours, and for the lower value of temperature, 12 hours) and thus should:
   – ensure operating capacity but it is not necessary to save the required nominal parameters;
   – restore the required nominal parameters after termination of these operating limit values.

Delivery of the doors into places located in a microclimatic area with a cold climate is only allowed only if the average air temperature (from absolute annual minimum temperatures) is not below minus 45 °C.

Doors are produced with manual or automatic control.

Electric drives are designed for power networks with a current frequency of 50 Hz and a rated voltage of 230 or 400 Volt.

Operation of electric drives is permitted at ambient temperatures from minus 20 to +50 °C.

The doors are designed for operating under the following relative air humidity conditions:

– up to 90% indoors;
– up to 100% outdoors.

2. COMPLIANCE OF DOORS TO THE REQUIREMENTS OF TECHNOLOGICAL NORMATIVE DOCUMENTS

Doors meet the requirements of:

- directive of Council of European Communities 89/106/EEC about approximation of legislative, regulating and administrative rules regarding building units;
- regulation of European Parliament and Council of the European Union № 305/2011 about the establishment of harmonised conditions for distribution of construction products on the market (this Regulation replaces the Directive mentioned above);
- standard EN 12604 'Industrial, commercial, garage doors and gates. Mechanical aspects. Requirements';
- standard EN 12453 'Industrial, commercial, garage doors and gates. Safety principles during operation of doors with power drive. Requirements.'

Standards determine requirements for doors which are intended for installation places reachable by people, for ensuring safe movement of people, for transporting of goods in industrial and commercial zones.

European standard EN 12604 mentions dangerous situations which can occur during doors operation and sets safety requirements concerning embodiment and application of main units, door components, control and protection elements:

EN 12604	Implemented in design of ALUTECH doors
Protection from finger trapping	Special design (shape) of panels and door hinges, angle bars are covered from the sides
Protection from snagging	Cable is located inside construction between vertical angle profile and door leaf
Protection from cutting	Absence of sharp edges on door components. Glazing is made from SAN sheet that will not break or shatter
Protection from uncontrollable movement of door leaf	Equipped with spring system which balances the door leaf in any position
Protection from falling of the door leaf	The door is constructed and designed to have a locking mechanism in the shaft to prevent uncontrolled descent of the door even in the case of spring breakage

EN 12604	Implemented in design of ALUTECH doors
Designing and durability requirements	Two twisted steel wire cables are used with a 6 times margin of safety. Cable drums and rollers diameter are designed to have at minimum 20 times the cable diameter which prevents the cables from fraying and damage. The cable winds around the drums in individual grooves in the drums to also prevent damage to the cable during the movement of the doors
Manual control device (availability)	There are handles on both sides of the door leaf. Rope or manual lifting point with a rope for doors with a height of more than 2 metre
Manual control device (hand operation)	260 H—maximum effort is assisted with spring balancing
The presence of viewing windows in the areas of vehicle movement	Viewing windows can be installed on all door types
The presence of end switches for door leaf movement	End limit switches are fitted on all types of doors to prevent overrun
Written warning notices should be provided	We have fitted written warning notices on all doors and on the threshold of each wicket door, hazardous warning tape is fitted
Operation manuals	Doors are supplied with a certificate and a manual
Use of corrosion-proof material and coatings	Doors are manufactured using corrosion-proof materials and coatings, including the use of factory-painted springs

European standard EN 12453 defines principles of doors safe operation with a power drive and mentions the requirements for safe operation of the doors with an electric drive.

Basic requirements regarding safety of the doors with electric drives, are specified by standard EN 12453 and their implementation in ALUTECH sectional doors are indicated in the table presented below. All the safety requirements regarding mechanical aspects are observed in the design of the doors with electric drives.

EN 12453	Implemented in design of ALUTECH doors
Protection from entrapment (inabilit to leave the premises)	The presence of an anti-blocking system for the motor with a manual facility for opening of doors
Protection from lifting of persons	Electric power limit on motor sense any overload while opening the doors
Protection from compression (crushing)	Rail motors are fitted with sensors to detect obstructions and stop if activated and also reverse the door to free it from the obstruction (rail motor). If optical sensors are not fitted or they have failed, the motor only works when controlled by a person (by pressing and holding the button on a control panel)
Motor switch-off in case of a cable breaking	Installation of microswitches (sensors), protect the cable from falling off the cable drum
Motor switch-off in case of spring breakage	Installation of a microswitch (sensor), which switches off the motor when the shaft is blocked (in case of spring breakage security system blocks the shaft)
Motor switch-off in case the wicket is open or half-open	Installation of a microswitch (sensor) controls wicket position, protecting people from injuries and the wicket from mechanical damage

Taking into account analysis of potential hazards which may occur during doors operation it is necessary to use additional measures which reduce the risk of dangerous situations in addition to the mentioned above, especially for the doors operated in automatic mode or with remote control:

- lightning of the doors' operating area;
- an audible alarm installation informing people that the door is working in automatic mode;
- an audible alarm installation informing people that the door leaf in operation;
- installation of traffic lights for traffic control;
- installation of a system warning of door operation in the places of traffic flow.

These measures are implemented by the door manufacturer and the Installation Company which installs the doors, based on the requirements and specifications of the architect for the project and of the customer's construction site.

3. DESCRIPTION OF SETS FOR THE DOORS WITH A LEAF MADE FROM SANDWICH PANELS

3.1. COMPOSITION OF A STANDARD SET FOR THE DOORS

3.1.1. Door panels

Sandwich panels, used for manufacturing of door leafs, are made of steel sheets, hot-galvanised, with further protection by powder coating. A panel is filled with environmentally friendly foamed polyurethane (CFC-free).

Sandwich panels used with series **ProPlus** doors have a thickness of 45 mm. Sandwich panels used with series **ProTrend** doors have a thickness of 40 mm.

In the upper cap of the panel there is a special seal of EPDM sealing insert providing stable air impermeability of the interpanel joint.

Design of panel surface	Basic colour of the front side of the panel
Microwave S-ribbed	RAL 1015—light ivory* RAL 3004—purple red* RAL 5010—gentian blue* RAL 6005—moss green* RAL 7016—anthracite grey* RAL 8014—sepia brown* RAL 8017—chocolate brown* RAL 9006—white aluminium* RAL 9016—white* ADS 703—anthracite

The outer side of panels can be painted any colours which closely correspond to RAL, DB scale or ADS703 colour. The possibility of painting dark colours, metallic colours, pearl and reflecting colours will be considered at individual request. It is not recommended to install doors from dark sandwich panels on the sunny side of a building as it can cause panel sagging, deteriorate door operation and lead to shortening of the doors' lifetime.

The inner side of the panel is painted white-grey (close to RAL 9002). Due to the doors design features the outside steel panel is visible at the junction of two sandwich panels. According to individual orders the inner side of the panels can be painted in other colours which closely correspond to RAL, DB scale or ADS703 colour. The possibility of painting the panels into dark colours, metallic colours, pearl and reflecting colours will be considered on an order by order basis. Outer and inner sides of panels are embossed woodgrain.

Painted steel coil is used for manufacturing of sandwich panel in standard colours. Liquid paint is applied by special rolls. For manufacturing of sandwich panels in non-standard colours sandwich panels of standard colours painted by liquid paint through air diffusion.

When ordering several elements of doors in one colour (e.g. built-in wicket framing, sandwich panels outside/inside, window frames) slight variations in colours are possible. This is due to the difference of the properties of materials used (steel, aluminium, plastic) and usage of different painting technology. Slight colour differences of the elements are also possible spare parts for repair work on previously mounted doors.

3.1.2. Components for a standard set of doors

- Door leaf made of sandwich panels of different heights;
- set of interpanel inserts (art. P1013) for S-ribbed type of door leaf. End-caps are installed under the side caps at the junction of sandwich panels;
- set of steel side caps installed on the ends of panels. Side caps are painted in white-grey colour (close to RAL 9002);
- top steel end profile. End profile is painted in white-grey colour (close to RAL 9002);
- bottom steel end profile;
- bottom EPDM sealing insert with a space for installation of optical sensors;
- top flexible EPDM sealing insert installed on the door leaf except for doors of low and inclined low mounting types. For the mounting types mentioned above top sealing insert together with the front profile is installed on the headroom;
- set of adjustable side brackets, made of stainless steel (door series ProPlus) or galvanised steel (door series ProTrend);
- set of roller plates made of stainless steel (door series ProPlus) or galvanised steel (door series ProTrend);
- set of intermediate hinges made of stainless steel (door series ProPlus) or galvanised steel (door series ProTrend);
- set of bottom brackets. Brackets are equipped with special devices preventing the door leaf lowering and falling in the case of cables breaking or slackening. In automated doors the bottom brackets are equipped with microswitches* for connection to the automation system to switch off the electric drive in the case of an emergency and to prevent the cables jumping off the drums;

* Colours shown closely correspond to RAL scale.

** With electric drives supplied by ALUTECH Group of Companies.
In case the drive is supplied by other company, microswitches are not included in the delivery kit.

- set of adjustable top brackets made of stainless steel (doors series ProPlus) or galvanised steel (door series ProTrend);
- set of rollers with rolling bearings;
- single-shaft balancing system for the door leaf. It consists of a continuous shaft (or two shafts with coupling unit), springs assembled with spring fittings, intermediate bracket (or intermediate brackets depending on doors dimensions and weight), cable drums, two galvanised (zinc-plated) cables assembled with thimbles, brackets with safety ratchet clutch.

  Safety ratchet clutches are designed to block the shaft, stopping spontaneous rotation in the case of a spring breaking (thus the door leaf is protected from falling). Microswitches*, which are connected with the automation system and which disconnect the electric drive in the case of a spring breaking, are installed on ratchet clutches when using electric drives on doors.

  Torsion springs are delivered with protective polymeric coating.

  Specified minimal life time of springs is 25,000 open/close cycles. Upon request it is possible to supply doors with springs with a life time of 35,000, 50,000, 75,000 and 100,000 cycles.

  In the request it is necessary to specify technical parameters of the doors: door dimensions, type of mounting as well as to specify a complete list of accessories which are installed on the doors (see p. 3.2);
- set of angle bars with vertical tracks and side EPDM sealing inserts;
- set of horizontal tracks and radial profiles;
- set of reinforcing brackets;
- suspension system for horizontal tracks;
- spring locking bar;
- doors opening-closing handle:
  - for doors serie ProPlus:
    - single side or double side handle (customer's choice);
  - for doors serie ProTrend:
    - single side handle for doors without inbuilt wicket door and/or reinforcing profiles on the door leaf;
    - double side handle for doors with inbuilt wicket door and/or reinforcing profiles on the door leaf;
- rope for manual lifting of doors;
- a set of fixings for the doors assembly with a 3-layer anticorrosive coating (zinc layer, chemical conversion film, heat-treated ceramic layer);
- bearing steel beam and set of mounting brackets for doors of high and vertical mounting type for installation of the low-set torsion shaft.

3.1.3. Variants from the standard set

If the doors width ***LDB*** is≥5 m, regardless of door weight, the following items are supplied:

- longitudinal reinforcing steel profiles installed on each door panel.

If the doors width ***LDB*** is>5 m, regardless of door weight, the following items are supplied:

- double set of adjustable side and top roller brackets;
- set of longer roller plates instead of short plates;
- set of rollers with longer spindles;
- wider side caps mounted on the ends of the sandwich panels.

Reinforcing steel profiles are installed on door leafs more than 4.5 m wide when using the following types of mounting:

- high with top/bottom shaft positioning;
- vertical with top/bottom shaft positioning;
- inclined high with top/bottom shaft positioning.

If it is not possible to manufacture a door with a single shaft balancing system, possibility to produce the door with double shaft balancing system is considered upon the customer's request (as an optional extra).

The double shaft balancing system includes two shaft blocks kinematically connected through two chain transmissions, chain stretchers, intermediate brackets, side brackets, cable drums, two galvanized cables assembled with thimbles, set of mounting brackets for installation of the double shaft balancing system. Each shaft block includes two shafts with adjustable coupling, springs with fittings, safety ratchet clutches.

On doors with a single shaft balancing system depending on door leaf weight ***P*** the following shafts are supplied:

- ***P***≤200 kg—hollow shaft Ø25.4 mm with key groove;
- 200 kg<***P***≤350 kg—solid shaft Ø25.4 mm with key groove;
- ***P***>350 kg—solid shaft Ø31.75 mm with key groove.

On doors with a double shaft balancing system solid shaft Ø31.75 mm with key groove is always supplied.

* With electric drives supplied by ALUTECH Group of Companies.
In case the drive is supplied by other company, microswitches are not included in the delivery kit.

3.2. LIST OF OPTIONAL EXTRAS FOR A STANDARD SET

3.2.1. Wicket door

Wicket standard set includes the following elements:

- set of extruded aluminium profiles without thermal break, used for edging of a wicket or opening. Black extruded aluminium profile 20 mm used is applied in a wicket with a flat threshold;
- set of EPDM seals along the perimeter;
- mortice lock, keyed outside locking cylinder and inside thumb-turn locking mechanism, set of keys. Lock cylinder with a key on both sides can be supplied upon request;
- reinforced lock body;
- handle;
- door closer;
- electric sensor connected with automation system for blocking doors from lifting if the wicket is open;
- bottom strengthening steel profile (aluminium strengthening profile is used in doors with panoramic glazing), is not used in a wicket with a flat threshold). Colour: white-grey (close to RAL 9002).

Detailed description of wicket parameters is shown in section 3.11.

3.2.2. Set of caps for wicket WD2028K

Caps are installed under the wicket framing and opening framing in every groove of S-type panels from the outer side of garage and industrial doors. Caps provide additional sealing of the wicket opening.

3.2.3. Windows

Recommended parameters and window positioning plans, as well as window dimensions are stated in section 3.9.

3.2.4. Set of caps for window P1012K

Caps are installed under the window framing in every groove of S-type panels from the outer side of garage and industrial doors. Caps are used with all types of windows and provide additional sealing of the window framing.

3.2.5. Set of reinforcing profiles SPK

When operating the doors in conditions leading to significant temperature difference of outer and inner surfaces of the door leaf (installation of the dark-coloured doors on the sun side of the buildings, operating the doors in heated premises while the outside temperature is low, etc.) the sandwich panels can bend due to the thermal expansion/contraction of the steel sheets.

Acceptable index of temperature difference of outer and inner surfaces of the door leaf cannot exceed 40 °C. If this value is exceeded, the doors of more than 3.5 m wide are recommended to be equipped with the set of reinforcing profiles in order to avoid damaging of the components during open/close cycle.

Set includes longitudinal reinforcing profiles which are mounted on each panel except panels with wicket. Reinforcing profiles also improve door leaf rigidity and resistance to wind/impact loads.

3.2.6. Key lock

Lock is designed for locking the door leaf in the closed position (and replaces the locking bar set). It has a cylinder mechanism with a key.

3.2.7. Motor

Rail-type motors can be used for doors of Low and Inclined low mounting types. Shaft-mounted motors are used for all other mounting types.

3.2.8. Release mechanism for rail motor

Release mechanism is used for doors used in premises without secondary entrance equipped with rail motor. Release mechanism RM0104-4500 is fitted into the door panel and allows to release the motor and operate the door manually. Spring locking bar should not be installed in the door with the release mechanism.

3.2.9. Chain hoist

A chain hoist is installed on the torsion shaft and is used for opening industrial doors without a motor. Chain hoist transmission ratio is 1:4. Opening and closing of doors is done manually by steel chain. Standard chain length is 8 meters, which allows to operate doors with a torsion shaft placed at 4.5 meters above floor. If torsion shaft placement height is more than 4.5 meters, the chain hoist is fitted with a chain extender (not included in a standard set of the chain hoist).

3.2.10. Block for manual opening

A pulley block is used for doors that are not equipped with motor or chain hoist. The door is operated by rope passing over pulley and attached to bottom roller bracket. It is recommended to use the block for doors over 2 m height and door leaf area up to 15 m^2.

3.2.11. Anti-jacking system

An anti-jacking system is used for doors with shaft-mounted motor and prevents door lifting by burglars.

Bottom roller brackets of special design are included in the option set for doors up to 5 m width and door leaf area up to 25 m^2. The special design of the roller brackets allows to adjust cables tensioning during installation and maintenance of the doors.

3.2.12. Optical sensors

Optical sensors are installed in the bottom sealing and connected to the motor. This safety option is designed for stopping the door leaf in case of hitting an obstacle.

3.2.13. False panel

False panels are used to cover partly the opening below the headroom. False panel may consist of several panels (depending on height). Each panel consists of sandwich panel framed by C-shaped profile. If false panel consists of several panels they are supplied unasambled. The design and colour of sandwich panels used for the false panel and the door leaf is the same. The false panel is supplied complete with a set of brackets for fixing to the opening. False panel minimum height is 60 mm, maximum height is 4155 mm. Recommendations and options for the use of false panels are shown in section 10.

Correspondence between door leaf colour and false panel framing colour:

Colour of door leaf	Colour of false panel framing
RAL 8014 (sepia brown)* RAL 8016 (red-brown)* RAL 8017 (chocolate brown)* RAL 8019 (grey-brown)*	RAL 8019 (grey-brown)*
Other colours	A00-D6 (silver)

As an option false panel framing can be painted colours that closely correspond to the RAL, DB scale or ADS703 colour. The possibility of painting in dark colours, metallic colours, pearl and reflective colours will be considered on individual request.

3.2.14. Air grid

Air grids provide natural ventilation of premises, creating additional convenience. Recommended parameters and layouts for air grid positioning are presented in section 3.10.

3.2.15. Wicket emergency open mechanism for emergency exits (EN 1125)

The option is available for doors of ProPlus series. Anti-panic locks are used for doors, situated on fire escape routes from premises. An anti-panic lock is a device that keeps the wicket in the closed position and provides emergency opening of the wicket without using a key simply by pushing a **horizontal bar**, which is located on the inner side of the wicket, using your hand or body. Wicket doors are secured from outside with a cylinder lock and key.

Anti-panic locks meet the requirements of the European standard EN 1125:1997 'Building hardware. Panic exit devices operated by a horizontal bar, for use on escape routes. Requirements and test methods'.

3.2.16. Wicket emergency open mechanism (B or E function) for emergency exits EN 179

The option is available for doors of ProPlus series. The emergency open mechanism ('anti-panic') is used for wickets of emergency exits. With the help of the 'anti-panic' mechanism you can lock the wicket inbuilt into the door leaf and open the wicket door from the inside without a key by pressing the **lever-handle**.

Anti-panic handles with ***B*** or ***E*** function correspond to the standards of EN 179: 2008-04 European Standard 'Building hardware—Emergency exit devices operated by a lever handle or push pad, for use on escape routes—Requirements and test method'.

Emergency open mechanism with ***B*** function is fitted with the **lever handles** both from the inside and outside. The option is available for doors of all types of mounting.

Emergency open mechanism with ***E*** function is fitted with the **lever handle** from the inside, and with the **fixed handle**—from the outside.

The wicket door is locked with the key from the outside. The option is available for doors of all types of mounting (except for vertical and high types).

3.2.17. Set of fixings

A set of fixings FS10×50D consists of nylon dowels with self-tapping screws and washers necessary for installing the door. The set of fixings is used fixing doors to walls made of concrete, bricks, ceramsite concrete, natural stone and other similar materials.

For mounting of the doors in the wooden opening screws and washers assemblies included in the set are used, while nylon dowels should not be used. Before tightening the screws it is necessary to drill holes in the wooden structure (5 mm in diameter, 50 mm deep; the wall should be no less than 100 mm thick).

* Colours shown closely correspond to RAL scale.

Set of fixing elements FS10×60D includes nylon plugs with screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of concrete, natural stone, perforated and solid ceramic bricks, perforated and solid sand-lime bricks, lightweight concrete, aerated concrete. Reliable fixing even in the perforated materials.

Set of fixing elements FS8×25 includes 8 and 25 mm long self-tapping screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of metal.

3.2.18. Set of panel caps

The set is used for door leaf of S-ribbed panels. The panel caps are installed under side caps in each groove of sandwich panels to improve thermal insulation and sealing properties.

3.2.19. Double side handle

The option is available for doors of ProTrend series without inbuilt wicket door and/or reinforcing profiles on the door leaf. When there is a wicket door and/or reinforcing profiles on the door leaf, the double side handle is in a standard delivery set of doors of ProTrend series.

3.3. SUPPORTING DOCUMENTS

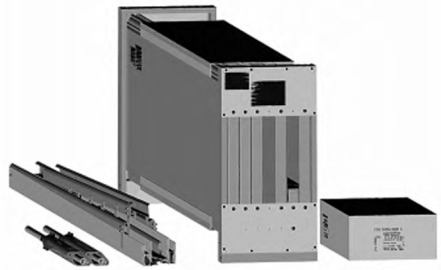
Doors are supplied with a product information label, safety label, product certificate, installation instructions and operation manual.

3.4. DOOR PACKING

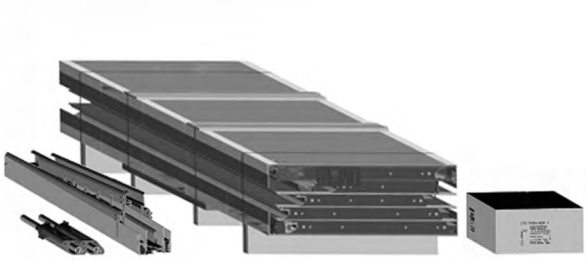
Standard packaging generally includes 4 packing pieces:

- pallet (vertical or horizontal) with panels (type and quantity of pallets depend on door sizes and weight);
- package with horizontal and vertical tracks;
- package with shafts and springs;
- box with kitting.

False panel (if available) is supplied as a separate packing piece. Motor (if available) is supplied in original packaging. Upon request pallet packing can be reinforced in order to provide safer transportation and storing.



Door packing with vertical pallet



Door packing with horizontal pallet

3.5. SET OF COMPONENTS FOR EXTRA HUMID PREMISES

The option is available for doors of ProPlus series.

'Standard' set for extra humid premises includes the following components:

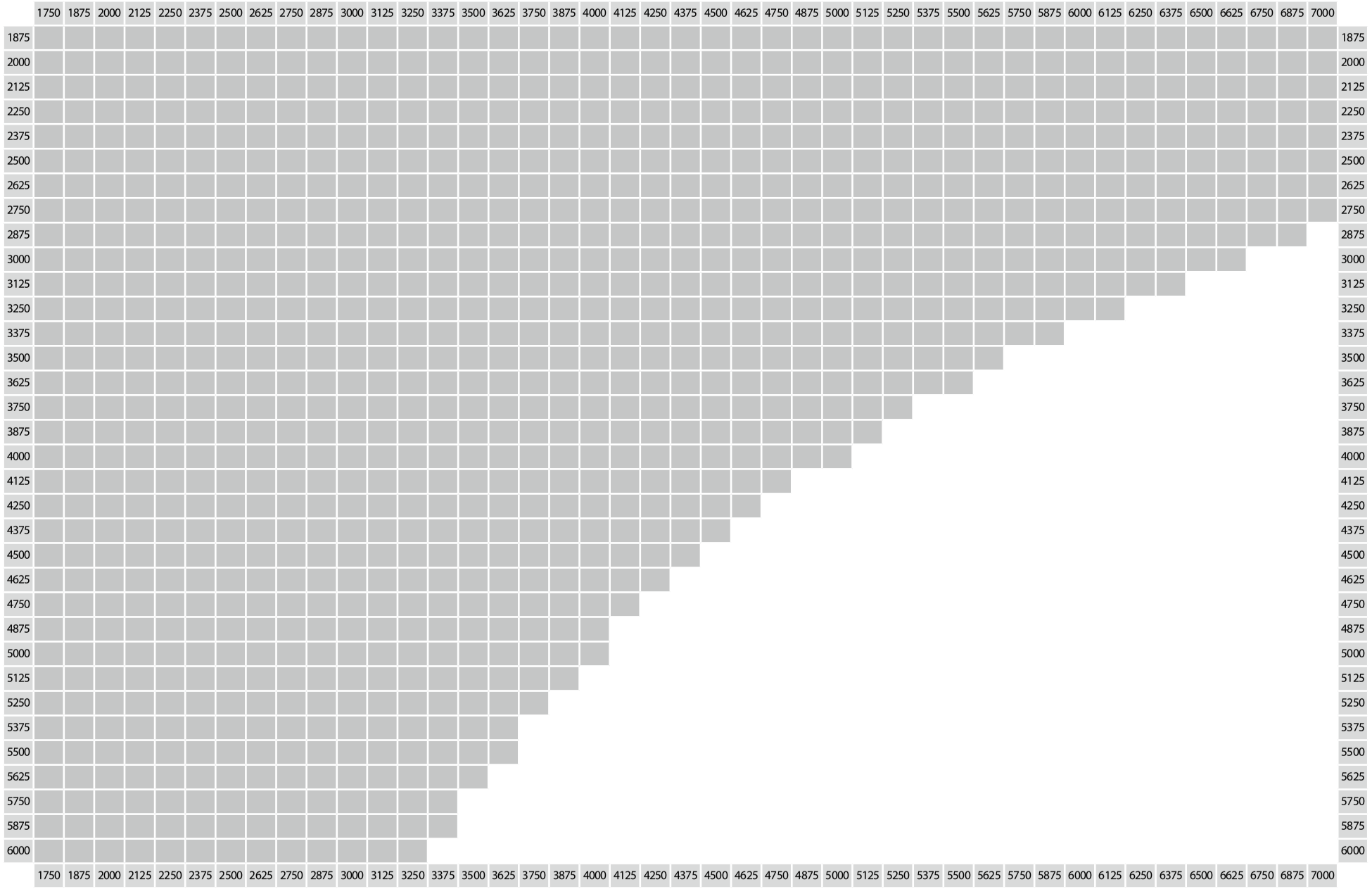
- stainless metalware for assembling the door leaf;
- stainless cables;
- track and hanger system with protective coating. Colour closely corresponds to RAL 9002;
- rollers with stainless spindle.

'Extra' set for extra humid premises includes the following components:

- track and hanger system with enhanced Interpon polymeric coating. Colour: anthracite;
- galvanized torsion springs and shaft elements with enhanced Interpon polymeric coating. Colour: anthracite;
- fittings for assembling the door leaf made of stainless steel with enhanced Interpon polymeric coating. Colour: anthracite;
- safety elements with 3-layer coating:
  - zinc layer;
  - chemical conversion film;
  - heat-treated ceramic layer;
- stainless cables;
- stainless metalware for assembling the door leaf;
- rollers with stainless spindle.

Upon request industrial sectional doors can be equipped with motors with a high level of surface protection IP65.

3.5.1. Dimensional scale of ProPlus series industrial doors with the option of 'Extra' set of components for extra damp premises art. ANCE-1, ANCE-2



3.6. TECHNICAL CHARACTERISTICS OF DOORS WITH THE LEAF MADE FROM SANDWICH PANELS

3.6.1. Technical features of industrial doors

Characteristics	Value/Technical class/Compliance	
	Series ProPlus (thickness of sandwich panel is 45 mm)	**Series ProTrend (thickness of sandwich panel is 40 mm)**
Thermal transmittance (U-value) of ALUTECH sectional doors, W/(m²K)*		
without a wicket door	1.01	1.15
with a wicket door	1.20	1.35
Resistance to wind load		
without a wicket door	Class 4**	Class 4**
Air permeability		
without a wicket door	Class 5***	Class 3****
with a wicket door	Class 1***	Class 3****
Resistance to water penetration		
without a wicket door	Class 2***	Class 2****
with a wicket door	Class 1***	Class 2****
Door leaf without reinforcing profiles weight*****	up to 14.7 kg/m²	up to 13.9 kg/m²
Door leaf with reinforcing profiles weight*****	up to 16.5 kg/m²	up to 15.7 kg/m²
Load on ceiling headroom	up to 32 kg/m²	

* The parameter is calculated for 25 m² doors based on tests at ift Rosenheim GmbH.

** Calculation is made for doors up to 2.5 m wide without options according to tests conducted by the TÜV NORD CERT GmbH.

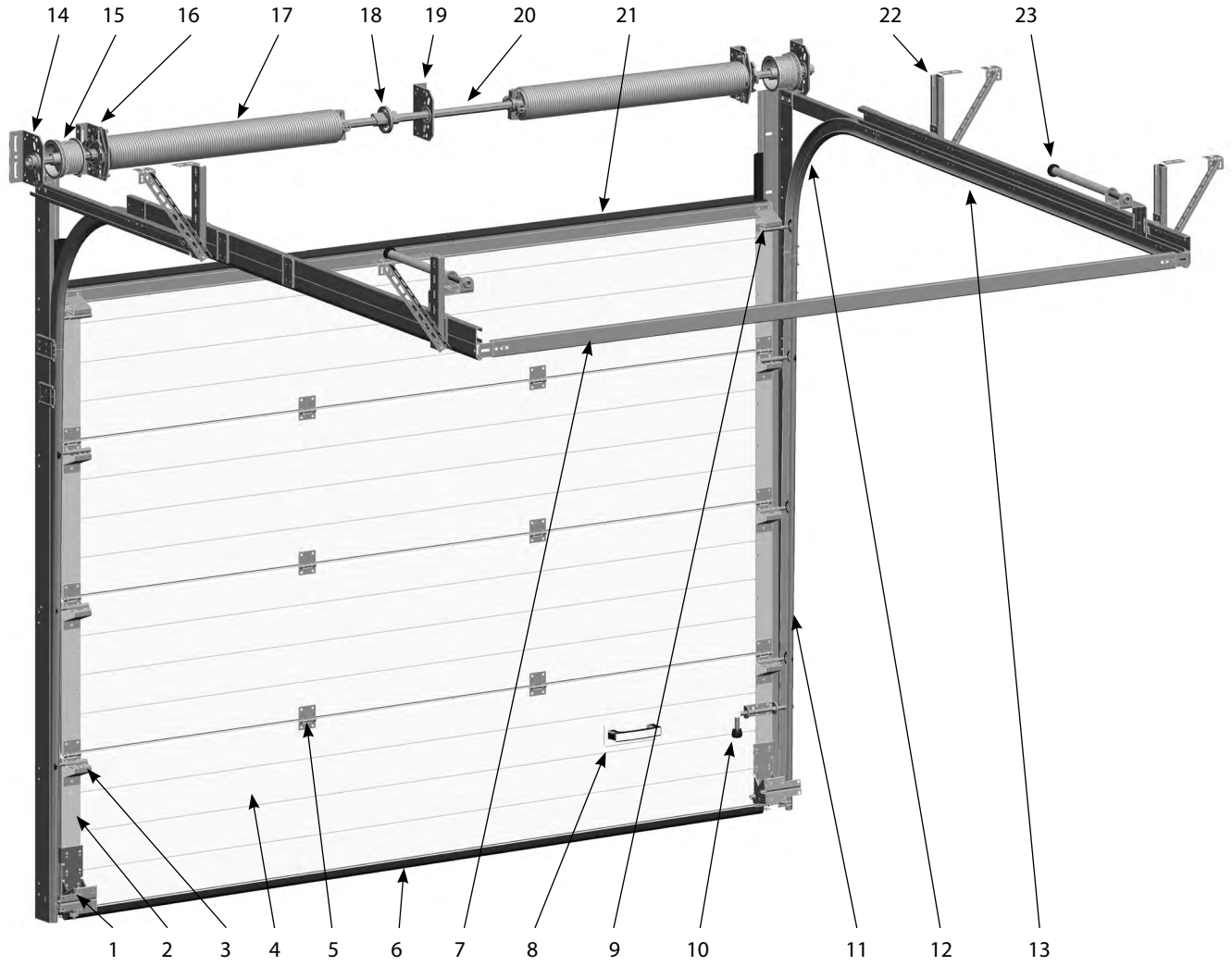
*** The tests have been conducted by NISI laboratory (Bulgaria).

**** Tests have been conducted by TÜV SÜD Czech s.r.o.

***** Parameter of door leaf weight can vary depending on panels, additional elements and other factors.

3.7. TYPICAL DESIGN OF DOORS

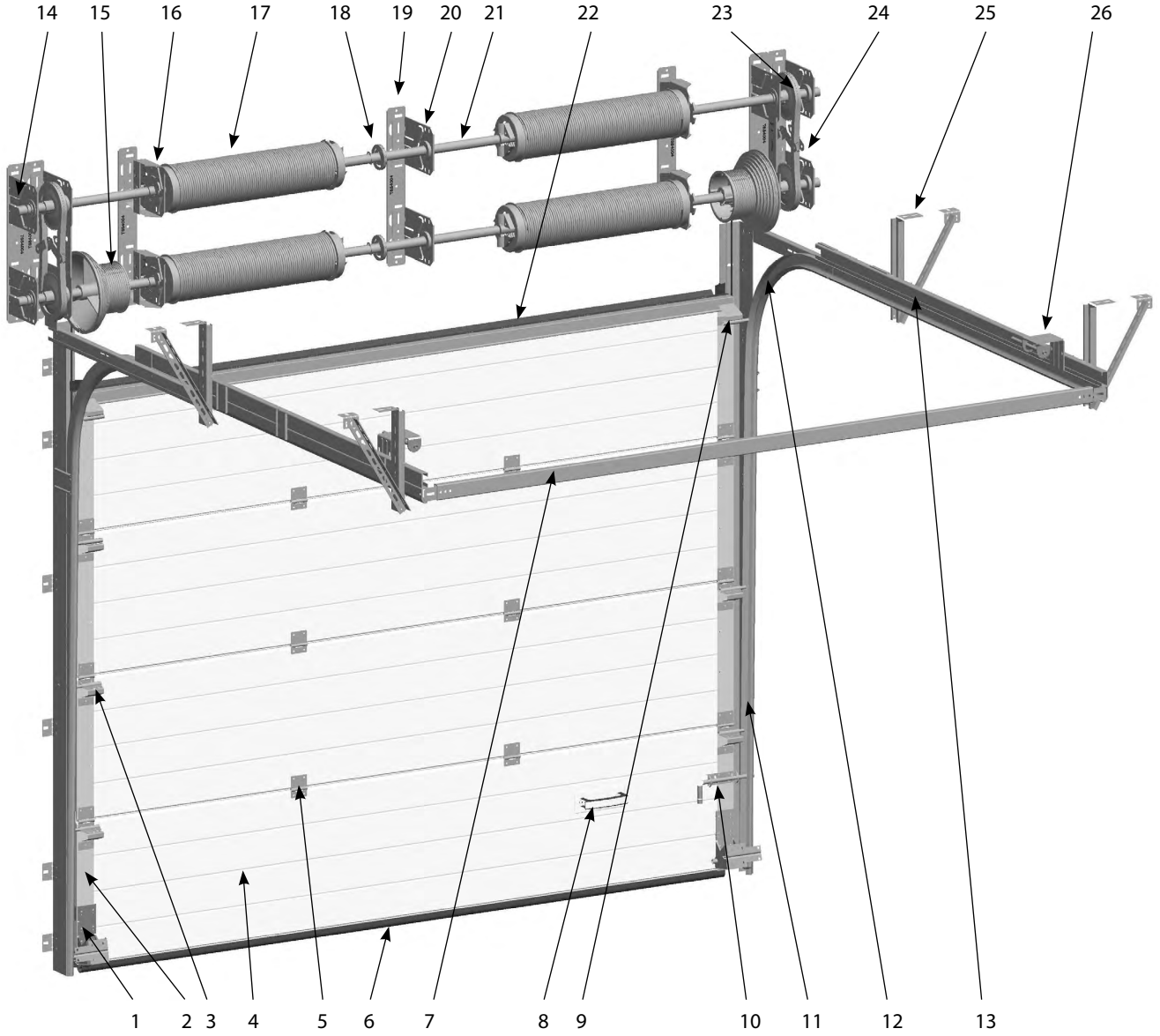
3.7.1. Doors series ProPlus and ProTrend with single shaft balancing system. Standard mounting



Notation	Description
1	Bottom roller bracket
2	Side cap
3	Side hinge with a roller
4	Door panel
5	Intermediate hinge
6	Bottom end profile with a sealing insert
7	C-profile
8	Handle
9	Top roller bracket
10	Locking bar
11	Angle bar with a vertical track and a side sealing insert
12	Radius profile

Notation	Description
13	Horizontal track
14	Side bracket
15	Cable drum
16	Bracket with a spring break device
17	Spring with end caps
18	Adjustable coupler
19	Intermediate bracket
20	Shaft
21	Top end profile with a sealing insert
22	Telescopic hanger
23	Damper

3.7.2. Doors series ProPlus with double-shaft balancing system. Standard mounting



Notation	Description
1	Bottom roller bracket
2	Side cap
3	Side hinge with a roller
4	Door panel
5	Intermediate hinge
6	Bottom end profile with a sealing insert
7	C-profile
8	Handle
9	Top roller bracket
10	Locking bar
11	Angle bar with a vertical track and a side sealing insert
12	Radius profile
13	Horizontal track

Notation	Description
14	Side bracket
15	Cable drum
16	Bracket with a spring break device
17	Spring with end caps
18	Adjustable coupler
19	Mounting bracket
20	Intermediate bracket
21	Shaft
22	Top end profile with a sealing insert
23	Chain gear
24	Chain tensioner
25	Telescopic hanger
26	Damper

3.8. MATCHING DOORS DESIGN (DOOR FACADE SYSTEM)

If several sectional doors are mounted in line on the same building wall it is possible to align on the same level a specific door elements. For example:

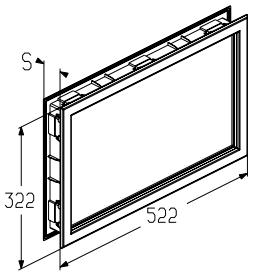
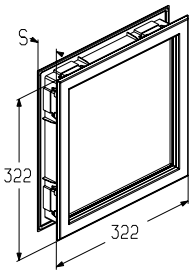
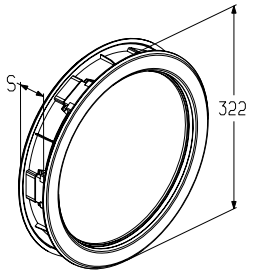
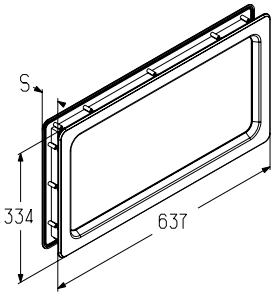
- panel joints by using the same panel set for all doors;
- windows;
- locks;
- handle for door opening;
- wicket.

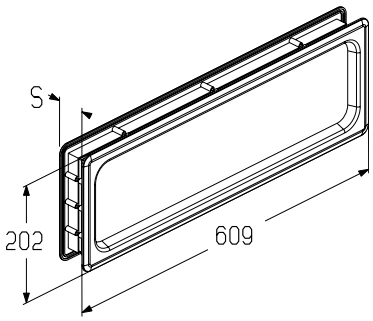
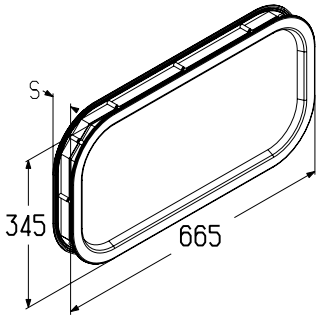
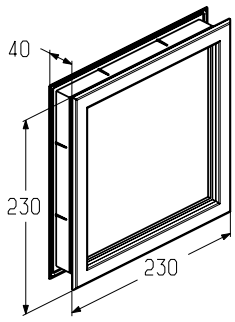
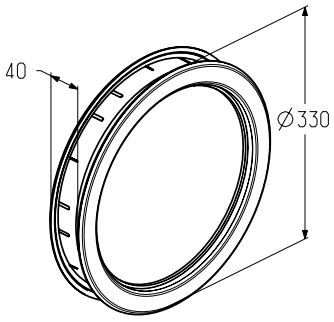
Matching design can be achieved for doors of different mounting types, different heights, with or without wicket. You must specify when ordering the set of doors if this is required. In the order it is necessary to state the individual requirements for the full set of doors that should be matching.

ATTENTION! For achieving the same level of door elements it is necessary to ensure matching of ground level for all the openings.

3.9. RECOMMENDED PARAMETERS AND WINDOW POSITIONING

3.9.1. Windows dimensions

Window article and thickness		Image and dimensions	Colour of edging frame	Type of glazing
Series ProPlus (S=45 mm)	**Series ProTrend** (S=40 mm)			
W043WH-TG	**W043WH-TG40**		White	Transparent SAN-glazing
W043BR-TG	**W043BR-TG40**		Brown	
W043WH-CG	**W043WH-CG40**		White	Crystal SAN-glazing
W043BR-CG	**W043BR-CG40**		Brown	
W050WH	**W050WH-40**		White	Transparent SAN-glazing
W050BR	**W050BR-40**		Brown	
W050WH-CG	**W050WH-CG40**		White	Crystal SAN-glazing
W050BR-CG	**W050BR-CG40**		Brown	
W060WH	**W060WH-40**		White	Transparent acrylic
W060BR	**W060BR-40**		Brown	
W060WH-CG	**W060WH-CG40**		White	Crystal SAN-glazing
W060BR-CG	**W060BR-CG40**		Brown	
W046	**W046-40**		Black	Transparent SAN-glazing

Window article and thickness		Image and dimensions	Colour of edging frame	Type of glazing
Series ProPlus (S=45 mm)	**Series ProTrend** (S=40 mm)			
W085	**W085-40**		Black	Transparent SAN-glazing
W095	**W095-40**		Black	Transparent SAN-glazing
—	**W51SS-40**		Stainless steel	Transparent acrylic
—	**W61SS-40**		Stainless steel	Safety glass, translucent

Upon request window frames (art. W043…, W050…, W060…) can be painted outside in colours that closely correspond to RAL, DB catalogue or ADS703 colour. Painting in colours like metallic, pearl and reflective colours will be considered individually.

3.9.2. Window positioning

To choose the maximum number of windows located in one panel it is necessary to use the following table.

ATTENTION! Windows in door leafs for openings with a width LDB>5000 mm, should be confirmed and agreed additionally upon request and will be manufactured only if it is technically possible.

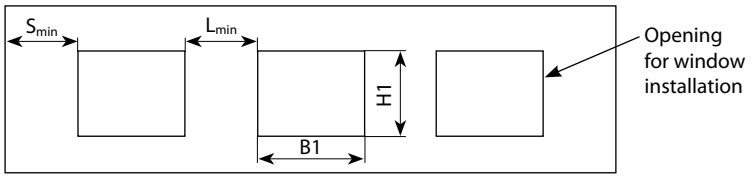
Window installation is made, as a rule, symmetrically relative to the vertical axis of the door leaf. Non-standard window positioning should be approved by individual request and will be implemented only if it is technically possible.

Width of opening LDB (door width according to the order), mm	Maximum possible number of windows	Window width B1, mm	Window height H1, mm
Art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG, W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40			
from 1750 to 2440	2	494	294
from 2445 to 3185	3		
from 3190 to 3925	4		
from 3930 to 4670	5		
from 4675 to 5415	6		
from 5420 to 6160	7		
from 6165 to 6905	8		
from 6910 to 7895	9		
from 7900 to 8000	10		
Art. W050WH, W050BR, W050WH-40, W050BR-40, W050WH-CG, W050BR-CG, W050WH-CG40, W050BR-CG40			
from 1750 to 1840	2	294	294
from 1845 to 2385	3		
from 2390 to 2925	4		
from 2930 to 3470	5		
from 3475 to 4015	6		
from 4020 to 4560	7		
from 4565 to 5105	8		
from 5110 to 5645	9		
from 5650 to 6190	10		
from 6195 to 6735	11		
from 6740 to 7280	12		
from 7285 to 7825	13		
from 7290 to 8000	14		
Art. W060WH, W060BR, W060WH-40, W060BR-40, W060WH-CG, W060BR-CG, W060WH-CG40, W060BR-CG40			
from 1750 to 1840	2	Ø294	
from 1845 to 2385	3		
from 2390 to 2925	4		
from 2930 to 3470	5		
from 3475 to 4015	6		
from 4020 to 4560	7		
from 4565 to 5105	8		
from 5110 to 5645	9		
from 5650 to 6190	10		
from 6195 to 6735	11		
from 6740 to 7280	12		
from 7285 to 7825	13		
from 7290 to 8000	14		
Art. W046, W046-40			
from 1750 to 1925	1	610	302
from 1930 to 2785	2		
from 2790 to 3645	3		
from 3650 to 4505	4		
from 4510 to 5365	5		
from 5370 to 6225	6		
from 6230 to 7085	7		
from 7090 to 7945	8		
from 7950 to 8000	9		

Width of opening LDB (door width according to the order), mm	Maximum possible number of windows	Window width B1, mm	Window height H1, mm
Art. W085, W085-40			
from 1750 to 1885	1	588	180
from 1890 to 2720	2		
from 2725 to 3560	3		
from 3565 to 4395	4		
from 4400 to 5235	5		
from 5240 to 6075	6		
from 6980 to 6910	7		
from 6915 to 7750	8		
from 7755 to 8000	9		
Art. W095, W095-40			
from 1750 to 1985	1	638	320
from 1990 to 2870	2		
from 2875 to 3760	3		
from 3765 to 4635	4		
from 4640 to 5535	5		
from 5540 to 6425	6		
from 6430 to 7310	7		
from 7315 to 8000	8		
Art. W51SS-40			
from 1750 to 2030	3	205	205
from 2035 to 2485	4		
from 2490 to 2940	5		
from 2945 to 3395	6		
from 3400 to 3850	7		
from 3855 to 4305	8		
from 4310 to 4760	9		
from 4765 to 5215	10		
from 5220 to 5670	11		
from 5675 to 6125	12		
from 6130 to 6580	13		
from 6585 to 7035	14		
from 7040 to 7490	15		
from 7495 to 7945	16		
from 7950 to 8000	17		
Art. W61SS-40			
from 1750 to 1800	2	Ø280	
from 1805 to 2330	3		
from 2335 to 2860	4		
from 2865 to 3390	5		
from 3395 to 3920	6		
from 3925 to 4450	7		
from 4455 to 4980	8		
from 4985 to 5510	9		
from 5515 to 6040	10		
from 6045 to 6570	11		
from 6575 to 7100	12		
from 7105 to 7630	13		
from 7635 to 8000	14		

3.9.3. Technical limits for window positioning

Minimum distance from the edge of the door leaf to window insert S_{min}, and the distance between windows L_{min} is 250 mm in each case.



Windows are installed in panels 500 and 625 mm high with Microwave and S-panel design. Window installation in top and bottom panels should be approved by a customer individually and will be implemented only if it is technically possible.

3.10. RECOMMENDED PARAMETERS AND AIR GRIDS POSITIONING

3.10.1. Types of air grids

Air grid type	Article	Outside colour	Inside colour	Outside size, mm (W×B)	Opening square size, cm²
Non-adjustable air grid (white)	VG-368WH	white	white	368×130	143
Non-adjustable air grid (black)	VG-368BK	black	white	368×130	143
Adjustable air grid (white)	VG-368RWH	white	white	368×130	65
Adjustable air grid (black)	VG-368RBK	black	white	368×130	65

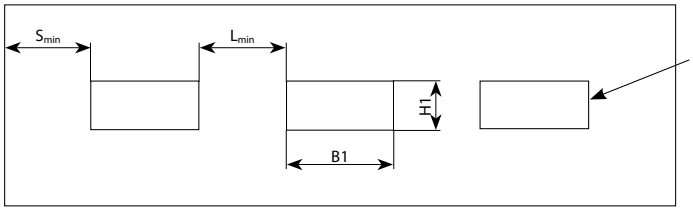
3.10.2. Air grid parameters

Air grids are installed in the centre of the panel. The maximum number of air grids placed within the length of a single door panel is shown in the table below:

Door width LDB (ordered door width), mm	Maximum quantity of air grids	Air grid width B1, mm	Air grid height in H1, mm
from 1750 to 1960	2	335	96
from 1965 to 2545	3		
from 2550 to 3130	4		
from 3135 to 3715	5		
from 3720 to 4300	6		
from 4305 to 4885	7		
from 4890 to 5470	8		
from 5475 to 6055	9		
from 6060 to 6640	10		
from 6645 to 7225	11		
from 7230 to 7810	12		
from 7815 to 8000	13		

3.10.3. Technical limits for air grid positioning

Minimum distance from the edge of door leaf to air grids S_{min}, and distance between air grids L_{min} is 250 mm in each case.



Air grids are installed in the upper panel with a panel height not less than 400 mm. If a locking bar is installed a grid cannot be installed closer than 1000 mm from the door panel edge on the same side. Non-standard air grid positioning should be agreed with the Customer individually.

3.11. WICKET PARAMETERS

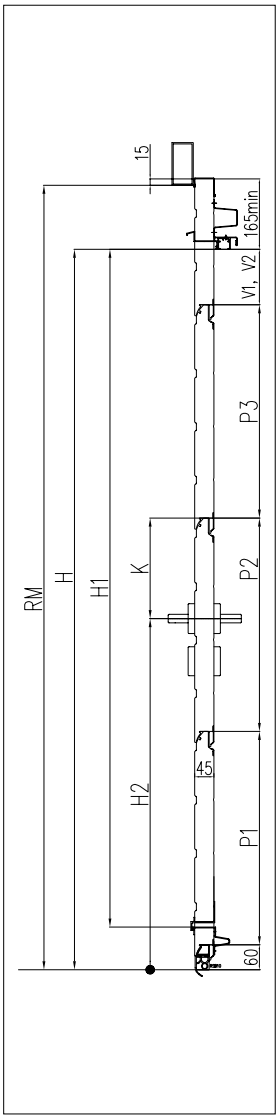
Industrial doors can be ordered with a wicket. Wickets are available in right or left versions. Wickets open outward only.

3.11.1. Wicket dimensions

Clear dimension of the wicket is 920 mm. The wicket can contain a window built into the third (top) section.

3.11.1.1. Dimensions of wicket with low, standard or flat threshold for ProPlus doors

Min. opening height (RM_{min}), mm	Max. opening height (R_{max}), mm	Height of panels in a door leaf, mm				Dimensions of cut-in into the last wicket panel (V1, V2), mm	Wicket opening height (H), mm	Clear wicket opening height (H1), mm	Height of handle positioning (H2), mm
		P1	P2	P3	P4				
2355	6000	500	500	500	500	130	2205	with flat threshold: H-20; with low threshold: H-115; with standard threshold: H-160	840
2125		625	500	500	—	130	1830		965
2125		625	500	500	—	255	1955		965
2230		625	625	500	—	255	2080		1090
2230		625	625	625	—	130	2080		1090



3.11.1.2. Dimensions of wicket with low or standard threshold for ProTrend doors

Min. opening height (RM_{min}), mm	Max. opening height (R_{max}), mm	Height of panels in a door leaf, mm				Dimensions of cut-in into the last wicket panel (V1, V2), mm	Wicket opening height (H), mm	Clear wicket opening height (H1), mm	Height of handle positioning (H2), mm
		P1	P2	P3	P4				
2350	6000	500	500	500	500	130	2200	with low threshold: H-115; with standard threshold: H-160	835
2125		625	500	500	—	130	1825		960
2125		625	500	500	—	255	1950		960
2225		625	625	500	—	255	2075		1085
2225		625	625	625	—	130	2075		1085

3.11.1.3. Dimensions of wicket with flat threshold for ProTrend doors

Min. opening height (RM_{min}), mm	Max. opening height (R_{max}), mm	Height of panels in a door leaf, mm				Dimensions of cut-in into the last wicket panel (V1, V2), mm	Wicket opening height (H), mm	Clear wicket opening height (H1), mm	Height of handle positioning (H2), mm
		P1	P2	P3	P4				
2325	6000	500	500	500	500	130	2175	with flat threshold: H-18	810
2125		625	500	500	—	130	1800		935
2125		625	500	500	—	255	1925		935
2200		625	625	500	—	255	2050		1060
2200		625	625	625	—	130	2050		1060

3.11.2. Dimensional limitations

Wicket is built into:

- doors of all types of mounting (except for vertical mounting with bottom and top shaft positioning) beginning from height 2125 mm (upon the request a wicket can be built into the doors 2085–2120 mm height);
- doors of vertical type of mounting with top and bottom shaft positioning beginning from height 2500 mm.

The choice of wicket positioning depends on the door width. The limits are presented below.

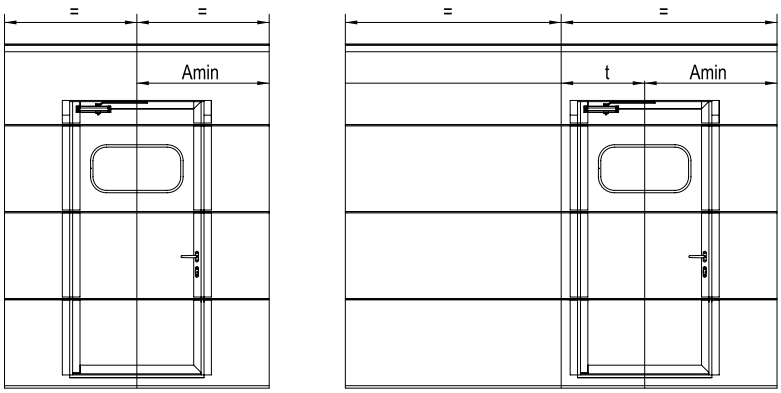
The minimum width of the door with a wicket is 2125 mm. Upon request a wicket can be built in the doors with width of 1915–2120 mm.

Doors width, mm	Wicket positioning
from 2125 to 5000	with flat (18, 20 mm) threshold
from 2125 to 4500	with low (115 mm) threshold
from 4505 to 7000	with standard (160 mm) threshold

3.11.3. Wicket positioning

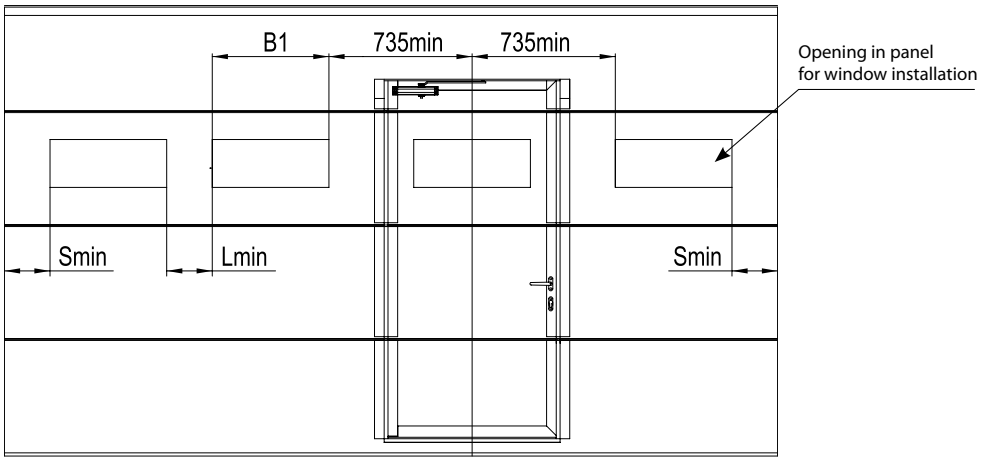
The wicket can be installed in the centre of the door or offset to one side. When the door is installed offset all measurements are taken as viewed from the inside of the door. It is possible to position the door from the centre axis t in multiples of 330 mm increments.

Minimum distance from the central axis of the wicket to the leaf edge is 978 mm, minimum distance from the central axis of the wicket to the opening edge is 958 mm.



To install windows in the door leaf within the wicket the following conditions should be observed:

- minimum possible distance from the door leaf edge to the window S_{min} must be equal to 250 mm;
- minimum possible distance between windows L_{min} must be equal to 250 mm;
- minimum possible distance from the central axis of the wicket to the window must be equal to 735 mm.



ATTENTION! Window positioning in the fourth (top) section of the door leaf within the wicket must be confirmed by the manufacturer and will be installed only if it is technically possible.

3.11.4. Door leaf and wicket elements colours correspondence

Door colour	Colour of wicket frame profiles and wicket opening edges	Colour of wicket handle	
		by default	other variations
RAL 8014 (sepia brown)* RAL 8016 (red-brown)* RAL 8017 (chocolate brown)* RAL 8019 (grey-brown)*	RAL 8019 (grey-brown)*	RAL 8019 (grey-brown)*	A00-D6 (silver) RAL 9005 (black)*
All other colours	A00-D6 (silver)	A00-D6 (silver)	RAL 8019 (grey-brown)* RAL 9005 (black)*
	Other colours according to RAL scale**	RAL 9005 (black)*	RAL 8019 (grey-brown)* A00-D6 (silver)

* Colours closely correspond to RAL scale.

** The wicket frame profiles and wicket opening edges can be painted in other colours according to individual order using colours which closely correspond to RAL, DB scale or ADS703 colour. The possibility of painting in dark colours, metallic colours, pearl and reflecting colours will be considered upon individual order.

3.12. STANDARD DIMENSIONS OF DOORS WITH A LEAF MADE FROM SANDWICH PANELS

3.12.1. Standard dimensions of doors series ProPlus with a leaf made from sandwich panels

Doors are ordered with taking into account the following dimensions: opening width × opening height (LDB×RM).

Actual width of the door leaf exceeds the nominal width of the opening by 40 mm (by 20 mm on both left and right sides). Actual height of the door leaf exceeds the nominal height of the opening by 15 mm.

Doors height, mm	Doors width, mm																																																			Doors height, mm
	1750	1875	2000	2125	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250	4375	4500	4625	4750	4875	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875	7000	7125	7250	7375	7500	7625	7750	7875	8000	
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	1750	1875	2000	2125	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250	4375	4500	4625	4750	4875	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875	7000	7125	7250	7375	7500	7625	7750	7875	8000	

Note:

- (light grey) Without the request the doors of standard type of mounting with a wicket/without a wicket are manufactured. Doors of other types of mounting are manufactured upon the request.
- (dark grey) Doors are manufactured upon the request. It is possible to produce doors with double shaft balancing system.

Intermediate values of width and height of the doors with a pitch of 5 mm can be chosen from the mentioned dimensional scale. Values of maximal dimensions of the doors with single shaft balancing system depending on the type of mounting are shown in the table below.

Type of doors mounting	Maximal dimensions of the doors	
	Maximal width, mm	Maximal height, mm
Standard	8000	7000
Low	5000	7000
High with top shaft positioning	8000	6000
High with bottom shaft positioning	5500	6000
Vertical with top shaft positioning	8000	6000
Vertical with bottom shaft positioning	5500	6000
Inclined	8000	6000
Inclined low	5000	6000
Inclined high with top shaft positioning	8000	6000
Inclined high with bottom shaft positioning	5500	6000

3.12.2. Standard dimensions of doors series ProTrend with a leaf made from sandwich panels

Doors are ordered by taking into account the following dimensions: opening width × opening height (LDB×RM).

Actual width of the door leaf exceeds the nominal width of the opening by 40 mm (by 20 mm on both left and right sides). Actual height of the door leaf exceeds the nominal height of the opening by 15 mm.

Doors height, mm	Doors width, mm																																										Doors height, mm
	1750	1875	2000	2125	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250	4375	4500	4625	4750	4875	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875	7000	
1875																																												1875
2000																																												2000
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	1750	1875	2000	2125	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250	4375	4500	4625	4750	4875	5000	5125	5250	5375	5500	5625	5750	5875	6000	6125	6250	6375	6500	6625	6750	6875	7000	

Note:

Without special request the doors of standard type of mounting with a wicket/without a wicket are manufactured. Doors of other types of mounting are manufactured upon request

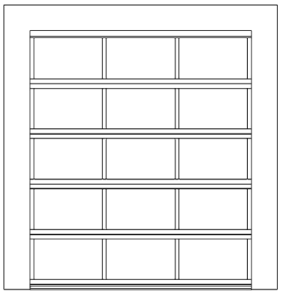
Doors are manufactured upon the request.

Intermediate values of width and height of the doors in increments of 5 mm can be chosen from the dimensional matrix above. The maximum dimensions for doors with a single shaft balancing system depending on the type of mounting used are shown in the table below.

Type of doors mounting	Maximal dimensions of the doors	
	Maximal width, mm	Maximal height, mm
Standard	7000	6000
Low	5000	6000
High with top shaft positioning	7000	6000
High with bottom shaft positioning	5500	6000
Vertical with top shaft positioning	7000	6000
Vertical with bottom shaft positioning	5500	6000
Inclined	7000	6000
Inclined low	5000	6000
Inclined high with top shaft positioning	7000	6000
Inclined high with bottom shaft positioning	5500	6000

4. DESCRIPTION OF DOORS WITH PANORAMIC SECTIONS (PANORAMIC DOORS WITH ALP TYPE OF DOOR LEAF)

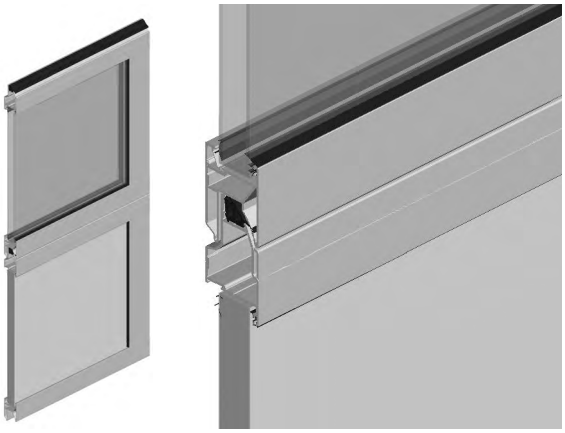
4.1. TYPES OF DOOR LEAF FOR PANORAMIC DOORS



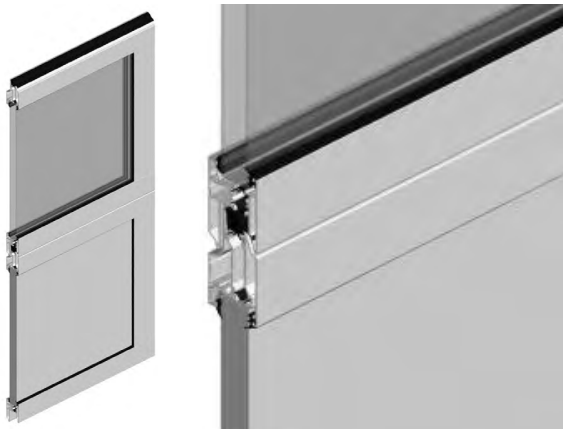
A panoramic section is a frame construction assembled from aluminium extruded profiles. The construction is infilled with either transparent glazed inserts or composite panels (special infill).

There are three series of panoramic sections:

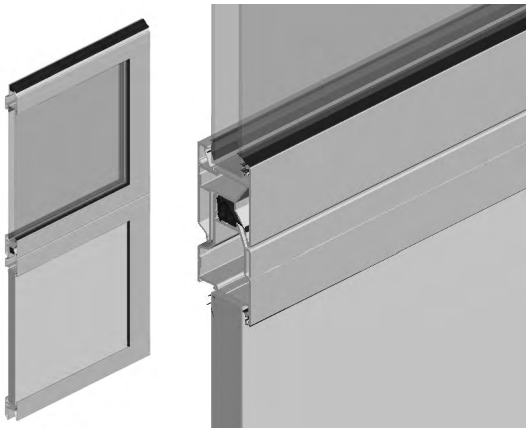
- AluPro, AluTherm (section thickness is 45 mm);
- AluTrend (section thickness is 40 mm).



AluPro—profile system without thermal break



AluTherm—profile system with thermal break



AluTrend—profile system without thermal break

4.2. TYPES OF INFILL FOR PANORAMIC SECTIONS

4.2.1. Section infilling with transparent inserts

Sections can be filled with translucent glazing inserts from polymer mix of sterol and acrylonitrile (SAN-plastic).

4.2.1.1. Door leaf made from sections series AluPro:

- single insert with SAN-plastic 3 mm thick;
- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m^2;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m^2.

4.2.1.2. Door leaf made from sections series AluTherm:

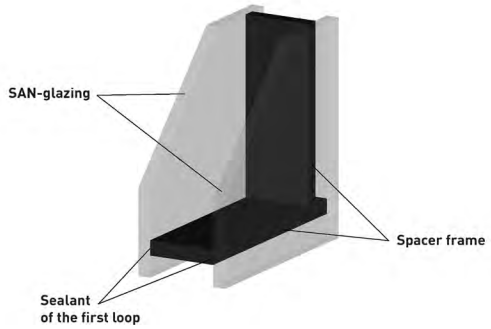
- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m^2;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m^2;
- triple insert 25 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-9.5-2-9.5-2). It is used on inserts till 0.5 m^2;
- triple insert 25 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-8-3-8-3). It is used on inserts over 0.5 m^2.

4.2.1.3. Door leaf made from sections series AluTrend:

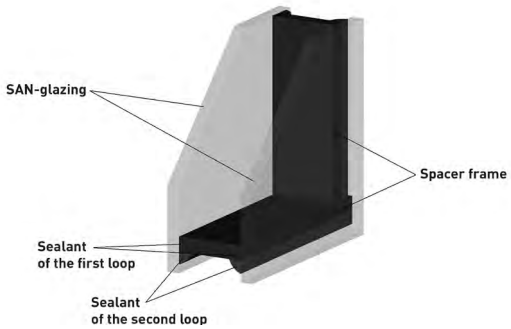
- single insert of SAN-plastic 3 mm thick;
- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m^2;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m^2.

It is not recommended to install dark panoramic series AluTherm doors on the sunny side of a building as it can cause panel sagging and can deteriorate door operation.

Double and triple transparent inserts are manufactured with a single or double sealing loop. It is recommended to use a double sealing loop if microclimatic conditions inside the premises can cause the generation of condensate in the transparent inserts.



Transparent insert with a single sealing loop



Transparent insert with double sealing loop

4.2.2. Special infill for panoramic sections

4.2.2.1. Infill for AluPro sections

As special infill for **AluPro** sections, for which **single glazing** is chosen, the following options are available:

- composite panel 3 mm thick, consisting of two aluminium sheets, the space between them is filled with high pressure polyethylene. Outer and inner aluminium panel sheets are smooth;
- expanded mesh of galvanized steel 4 mm thick. Cross section of ventilation cuts—58%. Colour: natural colour of steel;
- square mesh 40×40 mm of galvanized steel 4 mm thick. Cross section of ventilation cuts—83%. Colour: natural colour of steel;
- perforated aluminium sheet 1.6 mm thick. Perforation: apertures 8 mm in diameter, the distance between the apertures—12 mm. Cross section of ventilation cuts—40%. Colour: natural colour of aluminium.

As special infill for **AluPro** sections, for which **double glazing** is chosen, the following option is available:

- composite panel 26 mm thick, consisting of two aluminium sheets, the space between them is filled with polyurethane foam. Outer and inner aluminium sheets have stucco embossment.

4.2.2.2. Infill for AluTherm sections

As special infill for **AluTherm** sections, for which **double glazing** is chosen, the following option is available:

- composite panel 26 mm thick, consisting of two aluminium sheets, the space between them is filled with polyurethane foam. Outer and inner aluminium sheets have stucco embossment.

As special infill for **AluTherm** sections, for which **triple glazing** is chosen, the following option is available:

- composite panel 26 mm thick, consisting of two aluminium sheets, the space between them is filled with polyurethane foam. Outer and inner aluminium sheets have stucco embossment.

4.2.2.3. Infill for AluTrend sections

As special infill for **AluTrend** sections, for which **single glazing** is chosen, the following options are available:

- composite panel 3 mm thick, consisting of two aluminium sheets, the space between them is filled with high pressure polyethylene. Outer and inner aluminium panel sheets are smooth;
- expanded mesh of galvanized steel 4 mm thick. Cross section of ventilation cuts—58%. Colour: natural colour of steel;
- square mesh 40×40 mm of galvanized steel 4 mm thick. Cross section of ventilation cuts—83%. Colour: natural colour of steel;
- perforated aluminium sheet 1.6 mm thick. Perforation: apertures 8 mm in diameter, the distance between the apertures—12 mm. Cross section of ventilation cuts—40%. Colour: natural colour of aluminium.

As special infill for **AluTrend** sections, for which **double glazing** is chosen, the following option is available:

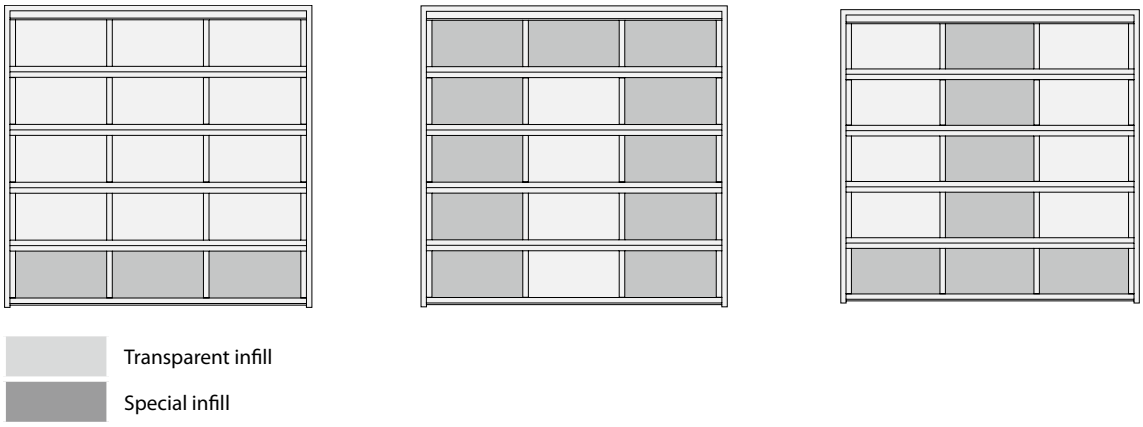
- composite panel 26 mm thick, consisting of two aluminium sheets, the space between them is filled with polyurethane foam. Outer and inner aluminium sheets have stucco embossment.

Within one horizontal panoramic section, only one type of special infill may be used. All special infill inserts used in door leaf are painted in the same colour.

4.2.3. Infill placement in panoramic sections

Each section the door leaf has one type of infill. A combination of translucent inserts and special infill is possible.

Examples of special infill positioning.



4.3. COLOUR RANGE

Sections for series AluPro/AluTrend	
Basic colour of profiles in panoramic sections*	**Colour of composite panels in special infill***
RAL 1015—light ivory	RAL 1015—light ivory
RAL 3004—purple red	RAL 3004—purple red
RAL 5010—gentian blue	RAL 5010—gentian blue
RAL 6005—moss green	RAL 6005—moss green
RAL 7016—grey anthracite	RAL 7016—grey anthracite
RAL 8014—sepia brown	RAL 8014—sepia brown
RAL 8017—chocolate brown	RAL 8017—chocolate brown
RAL 9006—white aluminium	RAL 9006—white aluminium
RAL 9016—white	RAL 9016—white
A00-D6—silver**	RAL 9006—white aluminium

Sections for series AluTherm	
Basic colour of profiles in panoramic sections*	**Colour of composite panels in special infill***
RAL 5010—gentian blue	RAL 5010—gentian blue
RAL 8014—sepia brown	RAL 8014—sepia brown
RAL 9006—white aluminium	RAL 9006—white aluminium
RAL 9016—white	RAL 9016—white

To special order panoramic sections AluPro, AluTherm, AluTrend and special infill can be painted colours that closely correspond to RAL scale or ADS703 colour. The possibility of painting in dark colours, metallic colours, pearl and reflective colours will be considered on individual request. Composite panels can be painted in colours according to DB catalogue as well.

* Colours shown closely correspond to RAL scale.
Meshes and perforated aluminium infills are manufactured in colours of natural aluminium or galvanized steel on default

** For sections serie AluPro only.

4.4. STANDARD SET OF COMPONENTS SUPPLIED WITH PANORAMIC DOORS

4.4.1. Elements supplied in a standard set:

- door leaf consisting of panoramic sections with infill from double transparent inserts with single sealing loop;
- bottom aluminium end profile;
- bottom flexible sealing insert with a cavity for optic sensors installation;
- top flexible sealing insert installed on the door leaf except for doors of low and inclined low mounting types. For the mounting types mentioned above top sealing insert together with the front profile is installed on the headroom;
- set of adjustable side brackets made from stainless steel (door series AluPro, AluTherm) or galvanised steel (door series AluTrend);
- set of roller plates made from stainless steel (door series AluPro, AluTherm) or galvanised steel (door series AluTrend);
- set of intermediate hinges made from stainless steel (door series AluPro, AluTherm) or galvanised steel (door series AluTrend);
- set of bottom brackets. Brackets are equipped with special devices preventing the door leaf lowering and falling in the case of cables breaking or slackening. In automated doors the bottom brackets are equipped with microswitches* for connection to the automation system to switch off the electric drive in the case of an emergency and to prevent the cables jumping off the drums;
- set of adjustable top brackets (door series AluPro, AluTherm) or galvanised steel (door series AluTrend);
- set of rollers with rolling bearings;
- single shaft balancing system including continuous shaft (or two shafts with joint coupling), springs assembled with fittings, intermediate bracket (or intermediate brackets depending on doors weight and dimensions), cable drums, two galvanised cables assembled with thimbles, brackets with safety ratchet clutch.

  Safety ratchet clutches are designed to block the shaft, stopping spontaneous rotation in the case of a spring breaking (thus the door leaf is protected from falling). Microswitches*, which are connected with the automation system and which disconnect the electric drive in the case of a spring breaking, are installed on ratchet clutches when using electric drives on doors.
- Torsion springs are delivered with protective polymeric coating;
- specified minimal life time of springs is 25,000 open/close cycles. Upon request it is possible to supply doors with springs with a life time of 35,000, 50,000, 75,000 and 100,000 cycles. In the request it is necessary to specify technical parameters of the doors: door dimensions, type of mounting as well as to specify a complete list of accessories which are installed on the doors (see p. 4.5);
- set of angle bars with vertical tracks and side EPDM sealing inserts;
- set of reinforcing brackets;
- set of horizontal tracks with radius profiles;
- system for hanging for horizontal tracks;
- single side handle for doors;
- rope for manual opening of doors;
- a set of fixings for the doors assembly with a 3-layer anticorrosive coating (zinc layer, chemical conversion film, heat-treated ceramic layer);
- bearing steel beam and set of brackets for doors with high and vertical types of mounting with bottom shaft positioning.

4.4.2. Variants to the standard set

If the doors width ***LDB*** is≥5 m, regardless of door weight, the following elements are supplied:

- longitudinal reinforcing steel profiles installed on each door panel (except for wicket panels).

If the doors width ***LDB*** is>5 m, regardless of door weight, the following elements are supplied:

- double set of adjustable side and top roller brackets;
- set of longer roller plates instead of short plates;
- set of rollers with longer spindles.

If it is not possible to manufacture a door with a single shaft balancing system, possibility to produce the door with double shaft balancing system is considered upon the customer's request (as an optional extra).

The double shaft balancing system includes two shaft blocks kinematically connected through two chain transmissions, chain stretchers, intermediate brackets, side brackets, cable drums, two galvanized cables assembled with thimbles, set of mounting brackets for installation of the double shaft balancing system. Each shaft block includes two shafts with adjustable coupling, springs with fittings, safety ratchet clutches.

On doors with a single shaft balancing system depending on door leaf weight ***P*** the following shafts are supplied:

- ***P***≤200 kg—hollow shaft Ø25.4 mm with key groove;
- 200 kg<***P***≤350 kg—solid shaft Ø25.4 mm with key groove;
- ***P***>350 kg—solid shaft Ø31.75 mm with key groove.

On doors with a double shaft balancing system solid shaft Ø31.75 mm with key groove is always supplied.

* With electric drives supplied by ALUTECH Group of Companies.
In case the drive is supplied by other company, microswitches are not included in the delivery kit.

4.5. ADDITIONAL OPTIONS

4.5.1. Built-in wicket

4.5.1.1. Parameters of a wicket

Wicket is built into door leafs made from series AluPro or AluTrend sections. The width of the wicket can vary from 920 to 1200 mm depending on the doors width; the height can vary from 1800 to 2310 mm depending on the doors height.

There are two variants of wicket design:

- with standard threshold 165 mm high;
- with flat threshold 20 mm high.

Wicket can consist of three or four sections depending on the doors height. Lock for the wicket is built into the second panel from the bottom. Wickets are available in right or left versions. Wickets open outward only.

Standard set of built-in wicket consists of:

- wicket leaf made of extruded aluminium profiles without thermal break;
- sealing insert made from EPDM for sealing of wicket perimeter;
- mortice lock, keyed outside locking cylinder and inside thumb-turn locking mechanism, set of keys. Lock cylinder with a key on both sides can be supplied upon request;
- set of metal handles;
- door closer of linear type;
- electric sensor connected to the automation system which prevents the door form lifting when the wicket is open.

Door leaf and wicket elements colours correspondence:

Door colour	Colour of wicket frame profiles and wicket opening edges	Colour of wicket handle	
		By default	Other variations
RAL 8014 (sepia brown)* RAL 8016 (red-brown)* RAL 8017 (chocolate brown)* RAL 8019 (grey-brown)*	RAL 8019 (grey-brown)*	RAL 8019 (grey-brown)*	A00-D6 (silver) RAL 9005 (black)*
All other colours	A00-D6 (silver)	A00-D6 (silver)	RAL 8019 (grey-brown)* RAL 9005 (black)*
	Other colours according to RAL scale**	RAL 9005 (black)*	RAL 8019 (grey-brown)* A00-D6 (silver)

4.5.1.2. Dimensional limitations of panoramic doors with a wicket

Minimum width of doors with a wicket is 2125 mm and minimum height is 2460 mm. For doors of vertical mounting types with a wicket minimum door height is 2500 mm. Wicket installation into end sections of the doors is not possible.

4.5.2. Motor

A rack-type motor can be used on doors with low or inclined mounting. A shaft mounted motor is used in other types of mounting.

4.5.3. Chain hoist

A chain hoist is installed on the torsion shaft and is used for opening industrial doors without a motor. Chain hoist transmission ratio is 1:4. Opening and closing of doors is done manually by steel chain. Standard chain length is 8 meters, which allows to operate doors with a torsion shaft placed at 4.5 meters above floor. If torsion shaft placement height is more than 4.5 meters, the chain hoist is fitted with a chain extender (not included in a standard set of the chain hoist).

4.5.4. Block for manual opening

A pulley block is used for doors that are not equipped with motor or chain hoist. The door is operated by rope passing over pulley and attached to bottom roller bracket. It is recommended to use the block for doors over 2 m height and door leaf area up to 15 m^2.

4.5.5. Anti-jacking system

An anti-jacking system is used for doors with shaft-mounted motor and prevents door lifting by burglars. Bottom roller brackets of special design are included in the option set for doors up to 5 m width and door leaf area up to 25 m^2. The special design of the roller brackets allows to adjust cables tensioning during installation and maintenance of the doors.

* Colours closely correspond to RAL scale.

** The wicket frame profiles and wicket opening edges can be painted in other colours that closely correspond to RAL, DB scale or ADS703 colour. The possibility of painting in dark colours, metallic colours, pearl and reflecting colours will be considered upon individual order.

4.5.6. Optical sensors

Optical sensors are installed in the bottom sealing and connected to the motor. This safety option is designed for stopping the door leaf in case of hitting an obstacle.

4.5.7. False panel

False panels are made of extruded aluminium profiles with an infill of translucent inserts. Depending on the required height the false panel can consist of one or several sections. If the false panel consists of two or more sections all its translucent elements have the same height. Minimum height of the false panel for panoramic doors is 300 mm and maximum height is 4155 mm. The colour of the false panel corresponds to the colour of the doors leaf.

4.5.8. Wicket emergency open mechanism (B or E function) for emergency exits (EN 179)

The option is available for doors made of AluPro sections. The emergency open mechanism ('anti-panic') is used for wickets of emergency exits. Anti-panic handle provides possibility to open a wicket door quickly from inside without using a key by pressing the **lever-handle**. Anti-panic handles with ***B*** or ***E*** function correspond to the standards of EN 179: 2008-04 European Standard 'Building hardware—Emergency exit devices operated by a lever handle or push pad, for use on escape routes—Requirements and test method'.

Emergency open mechanism with ***B*** function is fitted with the **lever handles** both from the inside and outside. The option is available for doors of all types of mounting.

Emergency open mechanism with ***E*** function is fitted with the **lever handle** from the inside, and with the **fixed handle** from the outside. The option is available for doors of all types of mounting except for vertical and high types.

The wicket door is locked with the key from the outside.

4.5.9. Set of fixings

The set of fixings FS10×50D consists of nylon dowels with self-tapping screws and washers necessary for installing the door. The set of fixings is used for fixing doors to walls made of concrete, bricks, ceramsite concrete, natural stone and other similar materials.

For mounting of the doors in the wooden opening screws and washers assemblies included in the set are used, while nylon dowels should not be used. Before tightening the screws it is necessary to drill holes in the wooden structure (5 mm in diameter, 50 mm deep; the wall should be no less than 100 mm thick).

Set of fixing elements FS10×60D includes nylon plugs with screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of concrete, natural stone, perforated and solid ceramic bricks, perforated and solid sand-lime bricks, lightweight concrete, aerated concrete. Reliable fixing even in the perforated materials.

Set of fixing elements FS8×25 includes 8 and 25 mm long self-tapping screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of metal.

4.5.10. Scratch resistant covering

This is to protect glazing against possible damages (scratches) that may happen to doors after installation. Special surface coating will keep glazing transparent for a long time even after multiple cleaning. This coating is available for AluPro, AluTherm and AluTrend doors with double/triple glazing and single/double sealing.

4.6. SET OF COMPONENTS FOR EXTRA HUMID PREMISES

The option is available for doors made of AluPro or AluTherm sections. 'Standard' set for extra humid premises includes the following components:

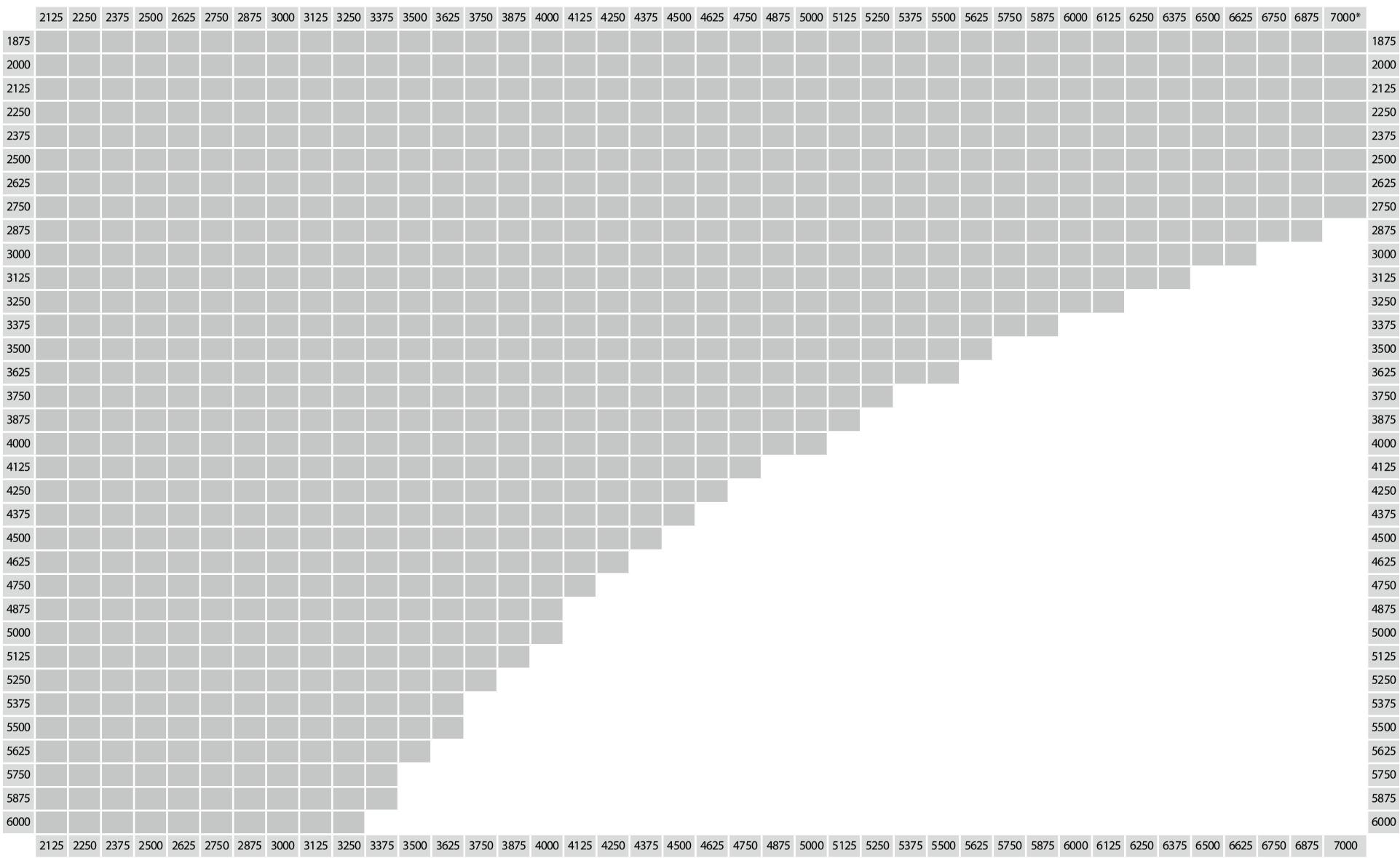
- stainless metalware for assembling the door leaf;
- stainless cables;
- track and hanger system with protective coating. Colour closely corresponds to RAL 9002;
- rollers with stainless spindle;
- transparent inserts with double sealing loop.

'Extra' set for extra humid premises includes the following components:

- track and hanger system with enhanced Interpon polymeric coating. Colour: anthracite;
- galvanized torsion springs and shaft elements with enhanced Interpon polymeric coating. Colour: anthracite;
- fittings for assembling the door leaf made of stainless steel with enhanced Interpon polymeric coating. Colour: anthracite;
- safety elements with 3-layer coating:
  - zinc layer;
  - chemical conversion film;
  - heat-treated ceramic layer;
- stainless cables;
- stainless metalware for assembling the door leaf;
- rollers with stainless spindle;
- transparent inserts with double sealing loop.

Upon request industrial sectional doors can be equipped with motors with high level of surface protection IP65.

4.6.1. Dimensional scale of AluPro and AluTherm series industrial doors with the option of 'Extra' set of components for extra damp premises art. ANCE-1, ANCE-22



* Maximum width of AluTherm series doors made of sections is 6900 mm.

4.7. SUPPORTING DOCUMENTS

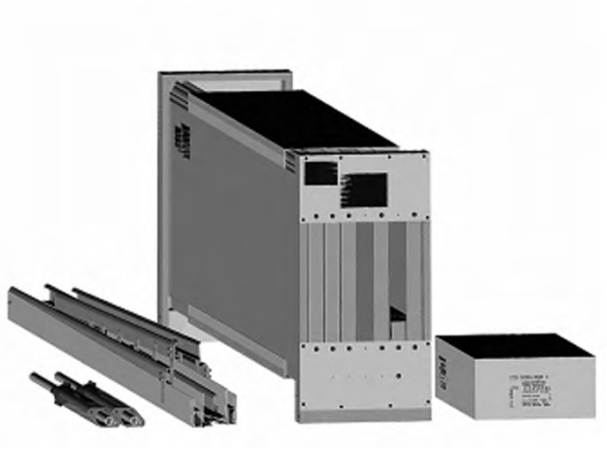
Doors are supplied with a product information label, safety label, product certificate, installation instruction and operation manual.

4.8. DOOR PACKING

Standard packaging generally includes 4 packing pieces:

- vertical pallet with panels (type and quantity of pallets depend on door sizes and weight);
- package with horizontal and vertical tracks;
- package with shafts and springs;
- box with kitting.

False panel (if available) is supplied as a separate packing piece. Motor (if available) is supplied in original packaging. Upon request pallet packing can be reinforced in order to provide safer transportation and storing.



Door packing with vertical pallet

4.9. TECHNICAL PARAMETERS OF PANORAMIC DOORS

4.9.1. Technical parameters

Parameter	Series AluPro	Series AluTherm	Series AluTrend
Thermal transmittance (U-value) of ALUTECH sectional doors, W/(m²K)*			
Doors without a wicket door			
double insert	4.52	3.42	4.36
triple insert	—	2.82	—
Resistance to wind loads			
without a wicket door	Class 4**	—	Class 4**
Air permeability			
without a wicket door	Class 2***		Class 3****
with a wicket door	Class 1***	—	—
Resistance to water penetration			
without a wicket door	Class 1***		Class 2****
with a wicket door	Class 1***	—	—
Door leaf without reinforcing profiles weight **	Up to 18.5 kg/m²		Up to 18.3 kg/m²
Load on ceiling headroom	Up to 32 kg/m²		

* The parameter is calculated for 25 m² doors on the basis of tests at ift Rosenheim GmbH.

** The index is calculated on the basis of tests conducted by TÜV NORD CERT GmbH for AluPro or AluTrend series doors up to 4 m wide without options.

*** The tests have been conducted by NISI laboratory (Bulgaria).

**** Tests have been conducted by TÜV SÜD Czech s.r.o.

***** Parameter of door leaf weight can vary depending on panels, additional elements and other factors.

4.10. DIMENSIONS OF PANORAMIC DOORS

- Height of panoramic sections depending on doors height can be within limits from 425 to 625 mm.
- All panoramic sections within one door have equal height.
- When a client chooses doors with panoramic panels the system automatically offers them standard division of the door leaf into sections. The number of sections (horizontal) in panoramic doors with the standard variant of division depending on door width can vary from 3 to 6, width of each section can vary from 520 to 1200 mm.
- Number of sections can be increased or decreased in comparison with the standard set. In this case the number of sections in AluPro, AluTrend or AluTherm panels will be the following:
  - in doors less than 3000 mm wide—1 (section without impost);
  - in doors from 3005 to 5000 mm wide—2 (sections with one impost);
  - in doors from 5005 mm and more—3 (sections with two imposts).
- Width of all windows in panoramic doors is equal. The only exception is doors with a wicket. In such doors the width of side windows can differ from the width of wicket windows.

Max door dimensions depending on the type of mounting are shown in the table below:

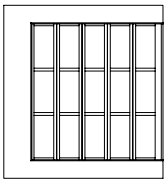
Type of mounting	Max door dimensions	
	Width, mm	Height, mm
Standard	7000	6000
Low	5000	
High with top shaft positioning	7000	
High with bottom shaft positioning	5500	
Vertical with top shaft positioning	7000	
Vertical with bottom shaft positioning	5500	
Inclined	7000	
Inclined low	5000	
Inclined high with top shaft positioning	7000	
Inclined high with bottom shaft positioning	5500	

Standard dimensions of panoramic doors are shown in tables below. From the dimensional matrix you can choose intermediate values of width and height in increments of 5 mm.

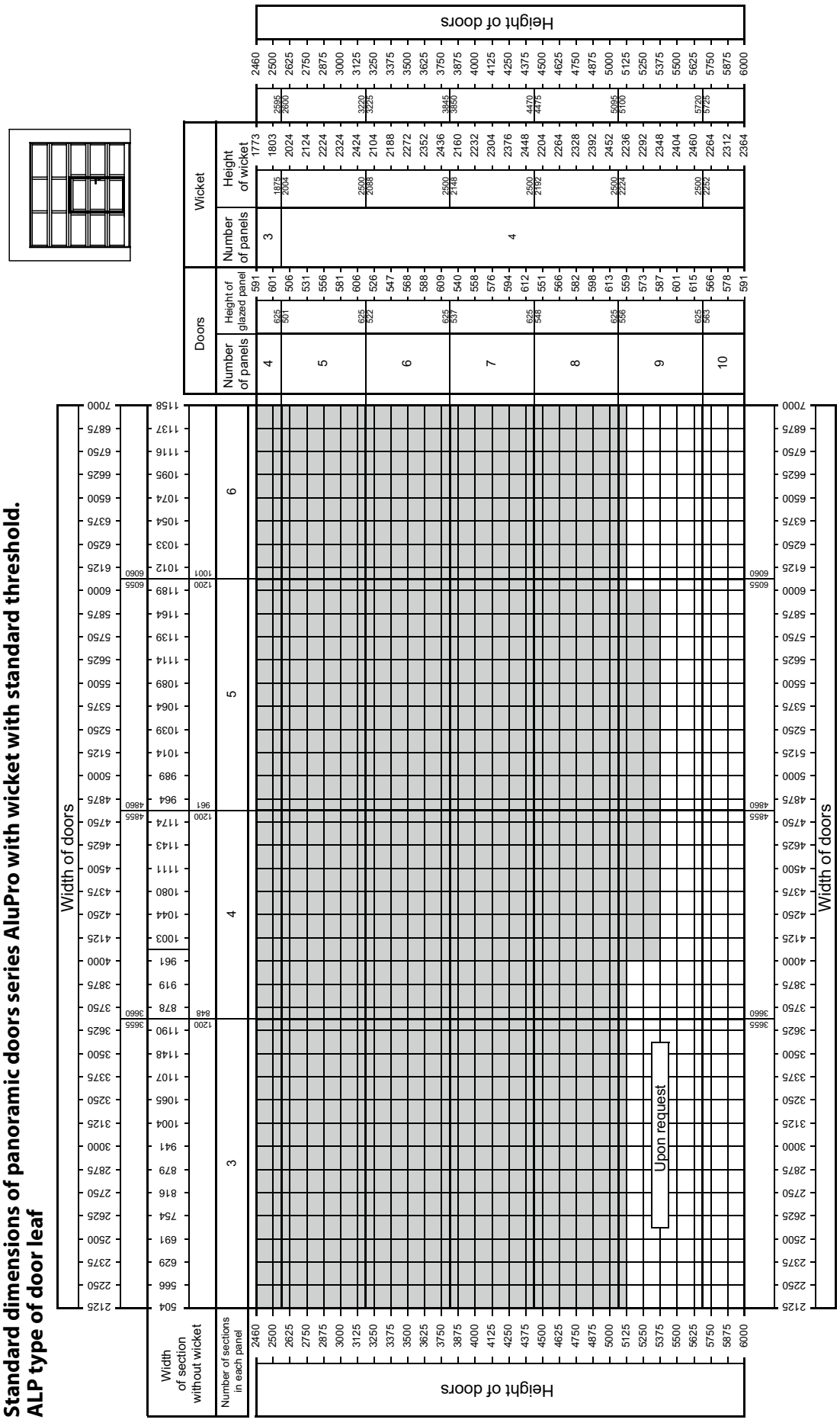
Doors are ordered by taking into account the following dimensions: opening width × opening height (LDB×RM).

Actual width of the door leaf exceeds the nominal width of the opening by 40 mm (by 20 mm on both left and right sides). Actual height of the door leaf exceeds the nominal height of the opening by 15 mm.

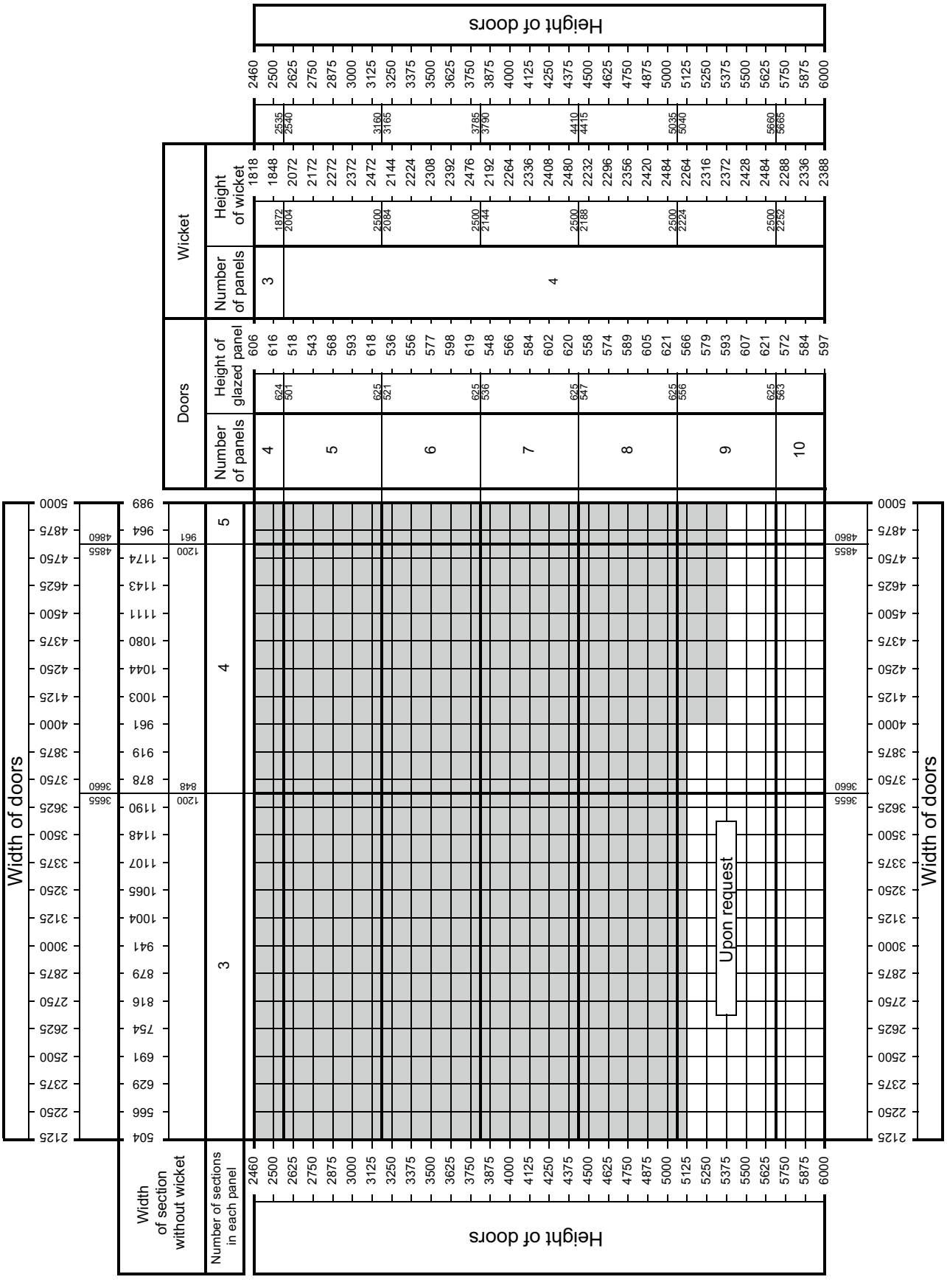
4.10.1. Standard dimensions of panoramic doors series AluPro without wicket. ALP type of door leaf



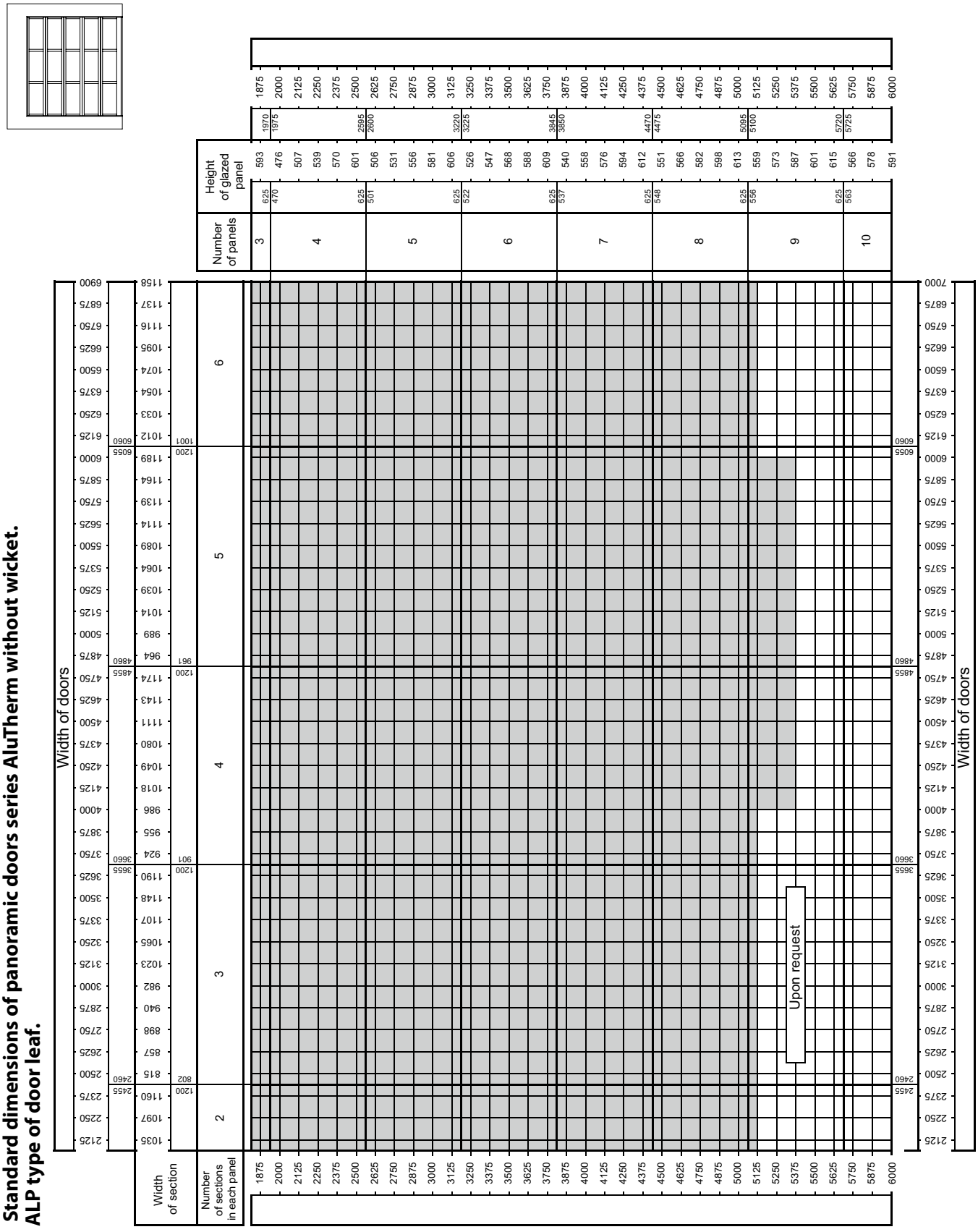
4.10.2. Standard dimensions of panoramic doors series AluPro with wicket with standard threshold. ALP type of door leaf



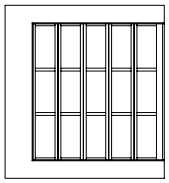
4.10.3. Standard dimensions of panoramic doors series AluPro with wicket with flat threshold. ALP type of door leaf

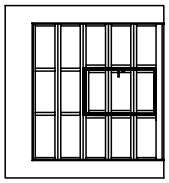


4.10.4. Standard dimensions of panoramic doors series AluTherm without wicket. ALP type of door leaf.

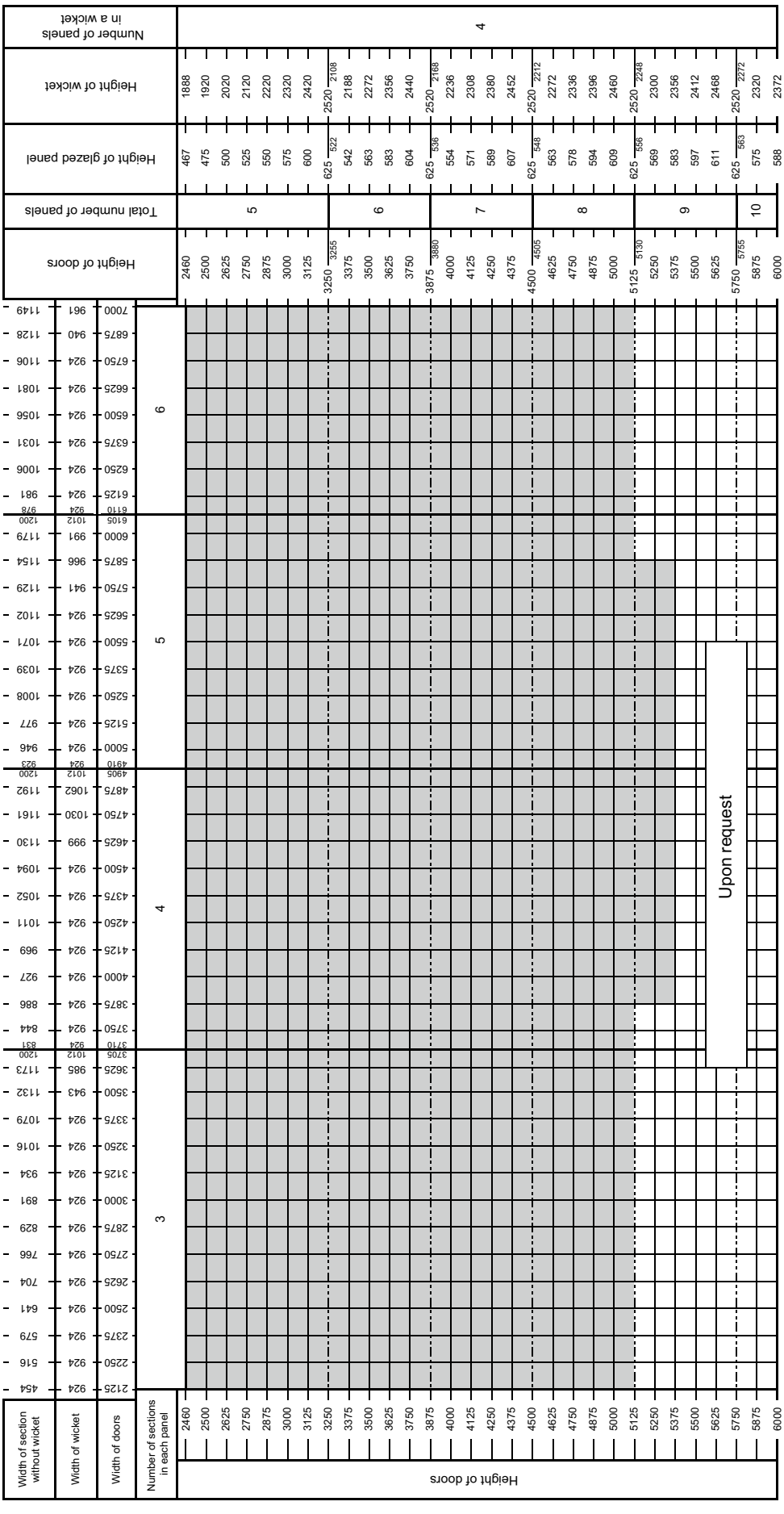


4.10.5. Standard dimensions of panoramic doors series AluTrend without wicket. ALP type of door leaf

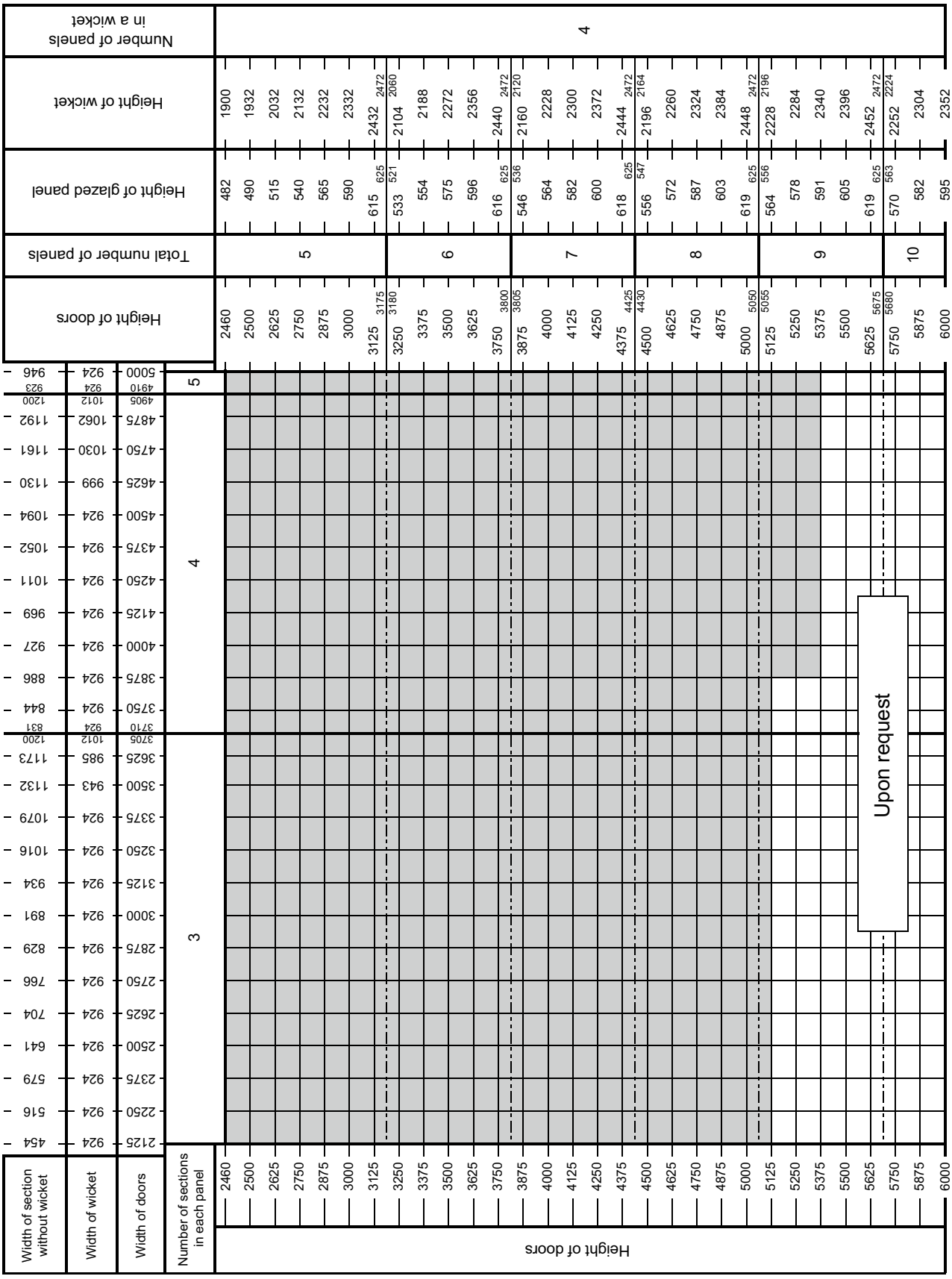




4.10.6. Standard dimensions of panoramic doors series AluTrend with wicket with standard threshold. ALP type of door leaf



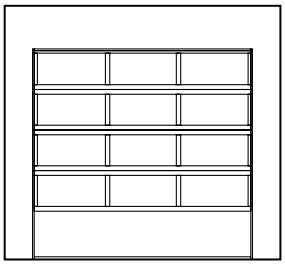
4.10.7. Standard dimensions of panoramic doors series AluTrend with wicket with flat threshold. ALP type of door leaf



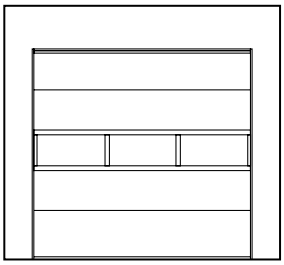
5. DESCRIPTION OF DOORS WITH COMBINED DOOR LEAF ALPS AND PO TYPES OF DOOR LEAF

5.1. TYPES OF DOOR LEAF

Doors are manufactured from two types of combined door leaf—ALPS and PO.



Type ALPS—door leaf with bottom part made from sandwich panel and the other sections from panoramic panels



Type PO—door leaf with one or more panoramic sections (except for the top and the bottom sections)

Two types of panoramic sections are used in a combined door leaf: one from the series AluPro, AluTrend, AluTherm as well as sandwich panels with patterns microwave and S-panel.

5.2. TYPES OF INFILL FOR PANORAMIC SECTIONS

5.2.1. Section infilling with transparent elements

Sections can be filled with translucent glazing inserts from polymer mix of sterol and acrylonitrile (SAN-plastic).

Door leaf from sections series AluPro:

- single insert with SAN-plastic 3 mm thick;
- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m^2;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m^2.

Door leaf from sections series AluTherm:

- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m^2;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m^2;
- triple insert 25 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-9.5-2-9.5-2). It is used on inserts till 0.5 m^2;
- triple insert 25 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-8-3-8-3). It is used on inserts over 0.5 m^2.

Door leaf from sections series AluTrend:

- single insert of SAN-plastic 3 mm thick;
- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m^2;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m^2.

It is not recommended to install dark panoramic doors AluTherm series doors on the sunny side of buildings as it can cause panel sagging and deteriorate door operation.

Double and triple transparent inserts are available with one or two sealing loops. It is recommended to use a double sealing loop if microclimatic conditions inside the premises can cause the generation of condensate in the transparent inserts. Transparent inserts with a double sealing loop have a sealing of the second loop.

5.2.2. Special infill (for doors with combined type of door leaf PO, ALPS)

5.2.2.1. Infill for AluPro sections

As special infill for **AluPro** sections, for which **single glazing** is chosen, the following options are available:

- composite panel 3 mm thick, consisting of two aluminium sheets, the space between them is filled with high pressure polyethylene. Outer and inner aluminium panel sheets are smooth;
- expanded mesh of galvanized steel 4 mm thick. Cross section of ventilation cuts—58%. Colour: natural colour of steel;
- square mesh 40×40 mm of galvanized steel 4 mm thick. Cross section of ventilation cuts—83%. Colour: natural colour of steel;
- perforated aluminium sheet 1.6 mm thick. Perforation: apertures 8 mm in diameter, the distance between the apertures—12 mm. Cross section of ventilation cuts—40%. Colour: natural colour of aluminium.

As special infill for **AluPro** sections, for which **double glazing** is chosen, the following option is available:

- composite panel 26 mm thick, consisting of two aluminium sheets, the space between them is filled with polyurethane foam. Outer and inner aluminium sheets have stucco embossment.

5.2.2.2. Infill for AluTherm sections

As special infill for **AluTherm** sections, for which **double glazing** is chosen, the following option is available:

- composite panel 26 mm thick, consisting of two aluminium sheets, the space between them is filled with polyurethane foam. Outer and inner aluminium sheets have stucco embossment.

As special infill for **AluTherm** sections, for which **triple glazing** is chosen, the following option is available:

- composite panel 26 mm thick, consisting of two aluminium sheets, the space between them is filled with polyurethane foam. Outer and inner aluminium sheets have stucco embossment.

5.2.2.3. Infill for AluTrend sections

As special infill for **AluTrend** sections, for which **single glazing** is chosen, the following options are available:

- composite panel 3 mm thick, consisting of two aluminium sheets, the space between them is filled with high pressure polyethylene. Outer and inner aluminium panel sheets are smooth;
- expanded mesh of galvanized steel 4 mm thick. Cross section of ventilation cuts—58%. Colour: natural colour of steel;
- square mesh 40×40 mm of galvanized steel 4 mm thick. Cross section of ventilation cuts—83%. Colour: natural colour of steel;
- perforated aluminium sheet 1.6 mm thick. Perforation: apertures 8 mm in diameter, the distance between the apertures—12 mm. Cross section of ventilation cuts—40%. Colour: natural colour of aluminium.

As special infill for **AluTrend** sections, for which **double glazing** is chosen, the following option is available:

- composite panel 26 mm thick, consisting of two aluminium sheets, the space between them is filled with polyurethane foam. Outer and inner aluminium sheets have stucco embossment.

Within one horizontal panoramic section, only one type of special infill may be used. All special infill inserts used in door leaf are painted in the same colour.

5.3. COLOUR RANGE

Section of series AluPro/AluTrend		
Type of door leaf	**Basic colour of profiles in panoramic sections***	**Colour of composite panels in special infill***
PO, ALPS	RAL 1015—light ivory RAL 3004—purple red RAL 5010—gentian blue RAL 6005—moss green RAL 7016—anthracite grey RAL 8014—sepia brown RAL 8017—chocolate brown RAL 9006—white aluminium RAL 9016—white A00-D6—silver**	RAL 1015—light ivory RAL 3004—purple red RAL 5010—gentian blue RAL 6005—moss green RAL 7016—anthracite grey RAL 8014—sepia brown RAL 8017—chocolate brown RAL 9006—white aluminium RAL 9016—white RAL 9006—white aluminium

Section of series AluTherm		
Type of door leaf	**Basic colour of profiles in panoramic sections***	**Colour of composite panels in special infill***
PO, ALPS	RAL 5010—gentian blue RAL 8014—sepia brown RAL 9006—white aluminium RAL 9016—white	RAL 5010—gentian blue RAL 8014—sepia brown RAL 9006—white aluminium RAL 9016—white

* Colours shown closely correspond to RAL scale.
Meshes and perforated aluminium infills are manufactured in colours of natural aluminium or galvanized steel as a default.

** For sections serie AluPro only.

To special order panoramic sections AluPro, AluTherm, AluTrend and special infill can be painted colours that closely correspond to RAL scale or ADS703 colour. The possibility of painting in dark colours, metallic colours, pearl and reflective colours will be considered on individual request. Composite panels can be painted in colours according to DB catalogue as well.

5.4. STANDARD SET OF COMPONENTS FOR DOORS WITH COMBINED DOOR LEAF

5.4.1. Elements supplied in a standard set:

- door leaf. Door leaf type ALPS includes a bottom section manufactured from sandwich panel and other sections—from panoramic panels. Door leaf type PO has one or several panoramic sections (except for the top and the bottom sections);
- panoramic sections have double transparent inserts with a single sealing loop;
- set of interpanel caps (art. P1013) for door leaf type PO with S-ribbed sandwich panels. Caps are installed under the side caps in the void at the junction of the sandwich panels;
- set of steel side caps installed on the ends of the sandwich panels. Side caps are painted white-grey (close to RAL 9002);
- top steel end profile for combined type of door leaf series PO. Top end profile is painted white-grey (close to RAL 9002);
- bottom steel end profile;
- bottom flexible sealing insert with a cavity for optic sensors installation;
- top flexible sealing insert installed on the door leaf except for doors of low and inclined low mounting types. For the mounting types mentioned above top sealing insert together with the front profile is installed on the headroom;
- set of adjustable side brackets made from stainless steel (doors with sections from series AluPro, AluTherm) or galvanised steel (doors with sections of series AluTrend);
- set of plates covers made from stainless steel (doors with sections from series AluPro, AluTherm) or galvanised steel (doors with sections from series AluTrend);
- set of intermediate hinges made from stainless steel (doors with sections from series AluPro, AluTherm) or galvanised steel (doors with sections of series AluTrend);
- set of bottom brackets. Brackets are equipped with special devices preventing the door leaf lowering and falling in the case of cables breaking or slackening. In automated doors the bottom brackets are equipped with microswitches* for connection to the automation system to switch off the electric drive in the case of an emergency and to prevent the cables jumping off the drums;
- set of adjustable top brackets made from stainless steel (doors with sections of series AluPro, AluTherm) or galvanised steel (doors with sections of series AluTrend);
- set of rollers with rolling bearings. A single shaft balancing system including continuous shaft (or two shafts with joint coupling), springs assembled with caps, intermediate bracket (or intermediate brackets depending on door weight and dimensions), cable drums, two galvanised lifting cables assembled with thimbles, brackets with safety ratchet clutch.

  Safety ratchet clutches are designed to block the shaft, stopping spontaneous rotation in the case of a spring breaking (thus the door leaf is protected from falling). Micro switches*, which are connected with the automation system and which disconnect the electric drive in the case of a spring breaking, are installed on ratchet clutches when using electric drives on doors.

  Torsion springs are supplied with protective polymeric coating.

  Specified minimal life time of springs is 25,000 open/close cycles. Upon request it is possible to supply doors with springs with a life time of 35,000, 50,000, 75,000 and 100,000 cycles.

  In the request it is necessary to specify technical parameters of the doors: door dimensions, type of mounting as well as to specify a complete list of accessories which are installed on the doors (see p. 4.5);
- set of angle bars with vertical tracks and side flexible EPDM sealing inserts;
- set of reinforcing brackets;
- set of horizontal tracks with radius profiles;
- system for hanging the horizontal tracks;
- spring locking bar;
- doors opening-closing handle:
  - for sectional doors of AluPro, AluTherm series:
    - single side or double side handle (customer's choice);
  - for sectional doors of AluTrend series:
    - single side handle for doors without inbuilt wicket door and/or reinforcing profiles on the door leaf;
- rope for manual opening of doors;
- a set of fixings for the doors assembly with a 3-layer anticorrosive coating (zinc layer, chemical conversion film, heat-treated ceramic layer);
- bearing steel beam and set of brackets for doors with high and vertical types of mounting with bottom shaft positioning.

* With electric drives supplied by ALUTECH Group of Companies.
In case the drive is supplied by other company, microswitches are not included in the delivery kit.

5.4.2. Variants from the standard set

If the doors width ***LDB*** is≥5 m, regardless of door weight, the following elements are supplied:

- longitudinal reinforcing steel profiles installed on each door panel except for wicket panel.

If the doors width ***LDB*** is>5 m, regardless of door weight, the following elements are supplied:

- double set of adjustable side and top roller brackets;
- set of longer roller plates instead of short plates;
- set of rollers with longer spindles;
- wider side caps mounted on the ends of the sandwich panels.

Reinforcing steel profiles are installed on door leafs more than 4.5 m wide using the following types of mounting:

- high with top/bottom shaft positioning;
- vertical with top/bottom shaft positioning;
- high inclined with top/bottom shaft positioning.

If it is not possible to manufacture a door with a single shaft balancing system, possibility to produce the door with double shaft balancing system is considered upon the customer's request (as an optional extra).

The double shaft balancing system includes two shaft blocks kinematically connected through two chain transmissions, chain stretchers, intermediate brackets, side brackets, cable drums, two galvanized cables assembled with thimbles, set of mounting brackets for installation of the double shaft balancing system. Each shaft block includes two shafts with adjustable coupling, springs with fittings, safety ratchet clutches.

On doors with a single shaft balancing system depending on door leaf weight ***P*** the following shafts are supplied:

- ***P***≤200 kg—hollow shaft Ø25.4 mm with key groove;
- 200 kg<***P***≤350 kg—solid shaft Ø25.4 mm with key groove;
- ***P***>350 kg—solid shaft Ø31.75 mm with key groove.

On doors with a double shaft balancing system solid shaft Ø31.75 mm with key groove is always supplied.

5.5. ADDITIONAL OPTIONS

5.5.1. Built-in wicket

5.5.1.1. Wicket parameters

Wicket is built into the leaf of types ALPS and PO made of sections series AluPro or AluTrend and microwave and S-ribbed sandwich panels. Wicket only opens outwards and can be supplied for right or left-handed opening. The lock on a wicket is built into the second panel from the bottom.

Wicket can consist of three or four sections depending on the doors' height.

Wicket width can be:

- 920 mm for doors leaf of type PO;
- from 920 to 1200 mm depending on the doors' width for door leafs of type ALPS.

Height of the wicket can be from 1800 to 2310 mm depending on the doors' height.

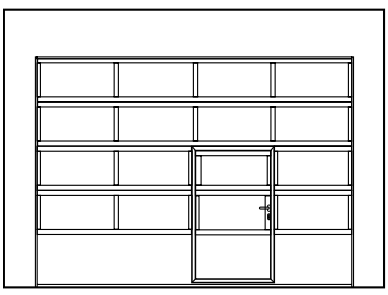
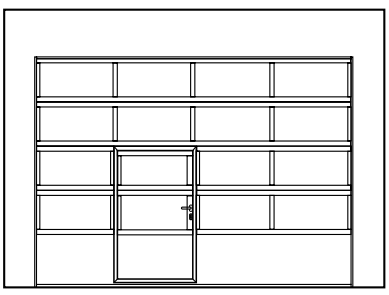
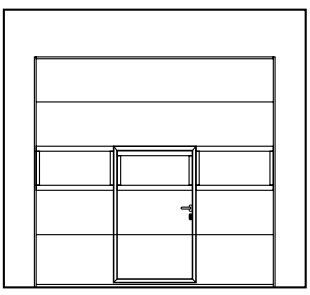
The choice of wicket positioning depends on the doors' width. The limitations are presented in the table below.

Door width, mm	Type of wicket	Type of a door leaf
from 2125 to 5000	with flat (18, 20 mm) threshold	PO, ALPS
from 2125 to 4500	with low (115 mm) threshold	PO, ALPS
from 4505 to 7000	with standard (160 mm) threshold	PO, ALPS

5.5.1.2. Dimensional limitations of doors with a wicket

Minimum width of doors with a wicket is 2125 mm. Minimum height of doors with a wicket is 2125 mm (for combined door leaf PO-type), 2460 mm (for combined door leaf ALPS-type). For doors of vertical mounting types with a wicket minimum door height is 2500 mm. Wicket installation into end sections of doors is not possible.

5.5.1.3. Possible variants for wicket installation

5.5.2. Set of caps for wicket WD2028K

Caps are installed under the wicket framing and passage framing in every groove of the S-ribbed panel from the outer side of garage and industrial doors. Caps provide additional sealing of the wicket passage.

5.5.3. Key lock

Lock is designed for locking the door leaf in the closed position (and replaces the locking bar set). It has a cylinder mechanism with a key. A crossbar lock is installed into door leaf of type PO on condition that the second section is made of sandwich panels.

5.5.4. Motor

A rack-type motor can be used on doors of low or inclined mounting type. A shaft mounted motor on used in other types of mounting.

5.5.5. Release mechanism for rail motor

Release mechanism is used for doors used in premises without secondary entrance equipped with rail motor. Release mechanism RM0104-4500 is fitted into the door panel and allows to release the motor and operate the door manually. Spring locking bar should not be installed in the door with the release mechanism.

5.5.6. Chain hoist

A chain hoist is installed on the torsion shaft and is used for opening industrial doors without a motor. Chain hoist transmission ratio is 1:4. Opening and closing of doors is done manually by steel chain. Standard chain length is 8 meters, which allows to operate doors with a torsion shaft placed at 4.5 meters above floor. If torsion shaft placement height is more than 4.5 meters, the chain hoist is fitted with a chain extender (not included in a standard set of the chain hoist).

5.5.7. Block for manual opening

A pulley block is used for doors that are not equipped with motor or chain hoist. The door is operated by rope passing over pulley and attached to bottom roller bracket. It is recommended to use the block for doors over 2 m height and door leaf area up to 15 m^2.

5.5.8. Anti-jacking system

An anti-jacking system is used for doors with shaft-mounted motor and prevents door lifting by burglars. Bottom roller brackets of special design are included in the option set for doors up to 5 m width and door leaf area up to 25 m^2. The special design of the roller brackets allows to adjust cables tensioning during installation and maintenance of the doors.

5.5.9. Optical sensors

Optical sensors are installed in the bottom sealing and connected to the motor. This safety option is designed for stopping the door leaf in case of hitting an obstacle.

5.5.10. False panel

False panels are used to cover partly the opening below the headroom. False panel may consist of several panels (depending on height). Each panel of a false panel for doors with combined door leaf of PO-type is made of sandwich panels framed by C-shaped profile. If false panel consists of several panels they are supplied unasambled. The design and colour of sandwich panels used for the false panel and the door leaf is the same.

The false panel is supplied complete with a set of brackets for fixing to the opening.

Correspondence between door leaf colour and false panel framing colour :

Colour of door leaf	Colour of false panel framing
RAL 8014 (sepia brown)* RAL 8016 (red-brown)* RAL 8017 (chocolate brown)* RAL 8019 (grey-brown)*	RAL 8019 (grey-brown)*
Other colours	A00-D6 (silver)

As an option false panel framing can be painted colours that closely correspond to the RAL, DB scale or ADS703 colour. The possibility of painting in dark colours, metallic colours, pearl and reflective colours will be considered on individual request.

The false panel which is used together with the type of door leaf ALPS is made of extruded aluminium profiles with a of translucent inserts.

Depending on the required height a false panel can consist of one or more panels. If a false panel consists of two or more panels, all the transparent sheets will have the same height. False panel minimum height for panoramic doors is 300 mm, maximum height is 4155 mm. False panel colour matches the colour of the door leaf.

The false panel is delivered together with a set of brackets for fastening it to the opening.

* Colours shown closely correspond to RAL scale.

5.5.11. Air grid

An air grid provides natural ventilation of premises, creating additional convenience. Recommended parameters and layouts for air grid positioning are presented in section 3.10.

5.5.12. Wicket emergency open mechanism for emergency exits (EN 1125)

Used for doors with panoramic sections AluPro when the wicket section with emergency open mechanism is made of sandwich-section. Anti-panic locks are used for doors, situated on fire escape routes from premises. An anti-panic lock is a device that keeps the wicket in the closed position and provides emergency opening of the wicket without using a key simply by pushing a **horizontal bar**, which is located on the inner side of the wicket, using your hand or body. Wicket doors are secured from outside with a cylinder lock and key. Anti-panic locks meet the requirements of: The European standard EN 1125:1997 'Building hardware—panic exit devices operated by a horizontal bar.

5.5.13. Wicket emergency open mechanism (*B* or *E* function) for emergency exits EN 179

The option is available for doors made from AluPro sections (ALPS and PO types of door leaf). The emergency open mechanism ('anti-panic') is used for wickets of emergency exits. Anti-panic handle provides possibility to open a wicket door quickly from inside without using a key by pressing the **lever-handle**. Anti-panic handles with ***B*** or ***E*** function correspond to the standards of EN 179: 2008-04 European Standard 'Building hardware—Emergency exit devices operated by a lever handle or push pad, for use on escape routes—Requirements and test method'.

Emergency open mechanism with ***B*** function is fitted with the **lever handles** both from the inside and outside. The option is available for doors of all types of mounting.

Emergency open mechanism with ***E*** function is fitted with the **lever handle** from the inside, and with the **fixed handle**—from the outside. The option is available for doors of all mounting types except for vertical and high types.

The wicket door is locked with the key from the outside.

5.5.14. Set of fixings

The set of fixings FS10×50D consists of nylon dowels with self-tapping screws and washers necessary for installing the door. The set of fixings is used for fixing doors to walls made of concrete, bricks, ceramsite concrete, natural stone and other similar material.

For mounting of the doors in the wooden opening screws and washers assemblies included in the set are used, while nylon dowels should not be used. Before tightening the screws it is necessary to drill holes in the wooden structure (5 mm in diameter, 50 mm deep; the wall should be no less than 100 mm thick).

Set of fixing elements FS10×60D includes nylon plugs with screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of concrete, natural stone, perforated and solid ceramic bricks, perforated and solid sand-lime bricks, lightweight concrete, aerated concrete. Reliable fixing even in the perforated materials.

Set of fixing elements FS8×25 includes 8 and 25 mm long self-tapping screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of metal.

5.5.15. Double side handle

The option is available for doors of AluTrend series without inbuilt wicket door and/or reinforcing profiles on the door leaf. Double side handle for doors with reinforcing profiles or inbuilt wicket door.

5.5.16. Scratch resistant covering

This is to protect glazing against possible damages (scratches) that may happen to doors after installation. Special surface coating will keep glazing transparent for a long time even after multiple cleaning. This coating is available for AluPro, AluTherm and AluTrend doors with double/triple glazing and single/double sealing.

5.6. SUPPORTING DOCUMENTS

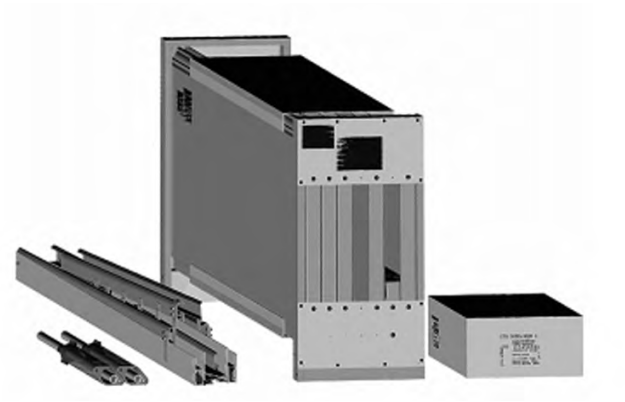
Doors are supplied with a product information label, safety label, product certificate, installation instruction and operation manual.

5.7. DOOR PACKING

Standard packaging generally includes 4 packing pieces:

- vertical pallet with panels (type and quantity of pallets depend on door sizes and weight);
- package with horizontal and vertical tracks;
- package with shafts and springs;
- box with kitting.

False panel (if available) is supplied as a separate packing piece. Motor (if available) is supplied in original packaging. Upon the request pallet packing can be reinforced in order to provide safer transportation and storing.



Door packing with vertical pallet

5.8. OPTIONAL ITEMS FOR DOORS FITTED IN DAMP PREMISES

The option is available for doors made of AluPro or AluTherm sections. 'Standard' set for extra humid premises includes the following components:

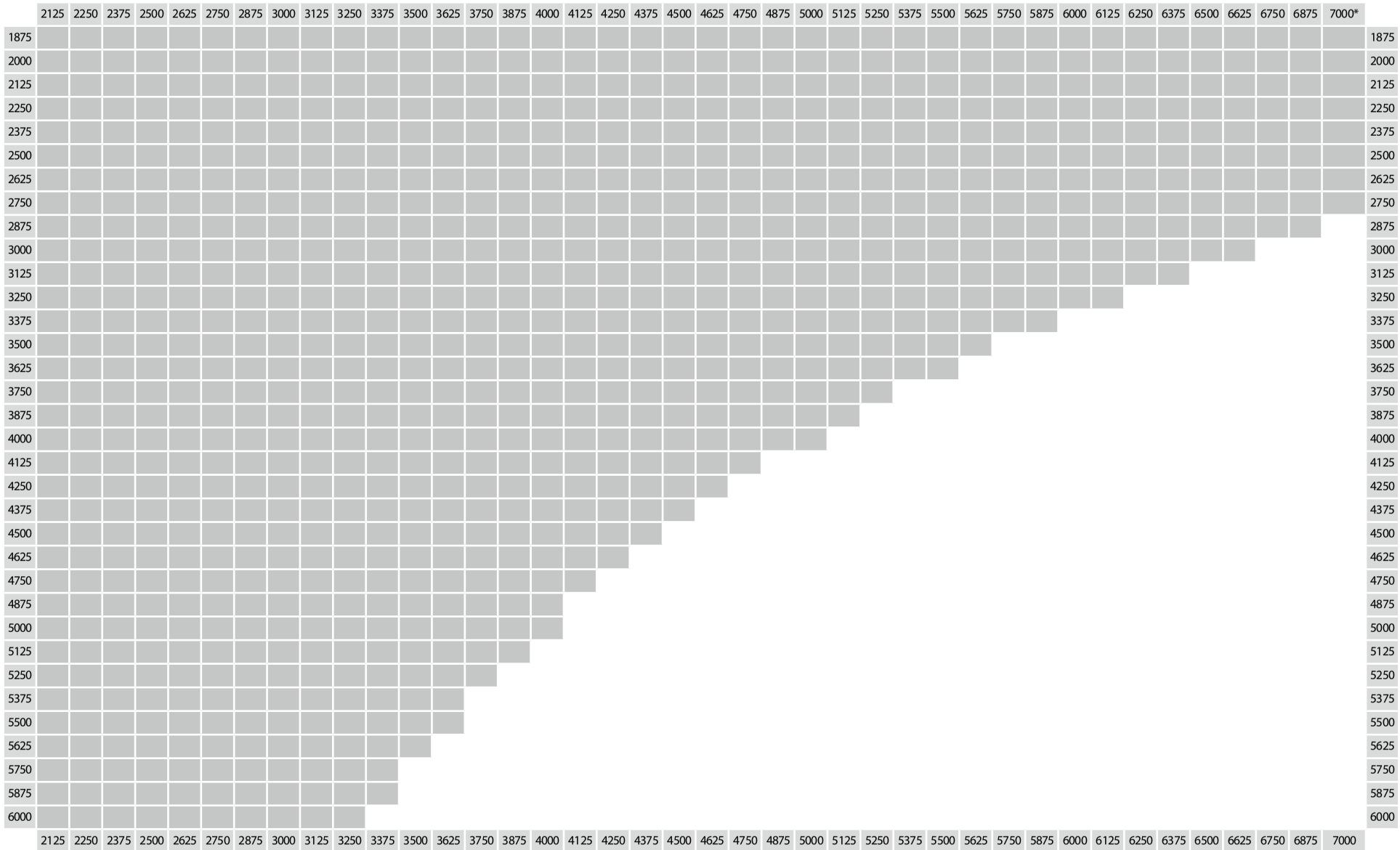
- stainless metalware for assembling the door leaf;
- stainless cables;
- track and hanger system with protective coating. Colour closely corresponds to RAL 9002;
- rollers with stainless spindle;
- transparent inserts with double sealing loop.

'Extra' set for extra humid premises includes the following components:

- track and hanger system with enhanced Interpon polymeric coating. Colour: anthracite;
- galvanized torsion springs and shaft elements with enhanced Interpon polymeric coating. Colour: anthracite;
- fittings for assembling the door leaf made of stainless steel with enhanced Interpon polymeric coating. Colour: anthracite;
- safety elements with 3-layer coating:
  - zinc layer;
  - chemical conversion film;
  - heat-treated ceramic layer;
- stainless cables;
- stainless metalware for assembling the door leaf;
- rollers with stainless spindle;
- transparent inserts with double sealing loop.

Upon request industrial sectional doors can be equipped with motors with high level of surface protection IP65.

5.8.1. Dimensional scale of AluPro and AluTherm series industrial doors with the option of 'Extra' set of components for extra damp premises art. ANCE-1, ANCE-2



* Maximum width of AluTherm series doors made of sections is 6900 mm.

5.9. TECHNICAL PARAMETERS OF DOORS WITH COMBINED DOOR LEAF

5.9.1. Technical features of industrial doors

Characteristics	Series AluPro	Series AluTherm	Series AluTrend
	Type of leaf ALPS	Type of leaf ALPS	Type of leaf ALPS
Thermal transmittance (U-value) of ALUTECH sectional doors, W/(m²K)*			
Doors without a wicket door			
double insert	4.07	3.11	3.95
triple insert	—	2.58	—
Resistance to wind loads			
without a wicket door	Class 4**	—	Class 4**
Air permeability			
without a wicket door	Class 2***		Class 3****
Resistance to water penetration			
without a wicket door	Class 1***		Class 2****
Door leaf without reinforcing profiles weight *****	up to 18.5 kg/m²		up to 18.3 kg/m²
Load on ceiling headroom	up to 32 kg/m²		

5.10. DIMENSIONS OF DOORS WITH COMBINED DOOR LEAF

Max doors dimensions depending on the type of mounting are shown in table below.

Type of mounting	Max door dimensions	
	Width, mm	Height, mm
Standard	7000	6000
Low	5000	
High with top shaft positioning	7000	
High with bottom shaft positioning	5500	
Vertical with top shaft positioning	7000	
Vertical with bottom shaft positioning	5500	
Inclined	7000	
Inclined low	5000	
Inclined high with top shaft positioning	7000	
Inclined high with bottom shaft positioning	5500	

Standard dimensions of doors with a combined door leaf are shown in tables below. From the dimensional matrix you can choose intermediate values of width and height with a step of 5 mm.

Doors are ordered by taking into account the following dimensions: opening width × opening height (LDB×RM).

Actual width of the door leaf exceeds the nominal width of the opening by 40 mm (by 20 mm on both left and right sides). Actual height of the door leaf exceeds the nominal height of the opening by 15 mm.

* The parameter is calculated for 25 m² doors on the basis of tests at ift Rosenheim GmbH.

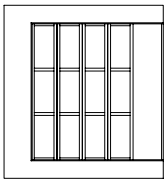
** The index is calculated on the basis of tests conducted by TÜV NORD CERT GmbH for doors with AluPro or AluTrend series sections, 2.5×2.5 m without options.

*** The tests have been conducted by NISI laboratory (Bulgaria).

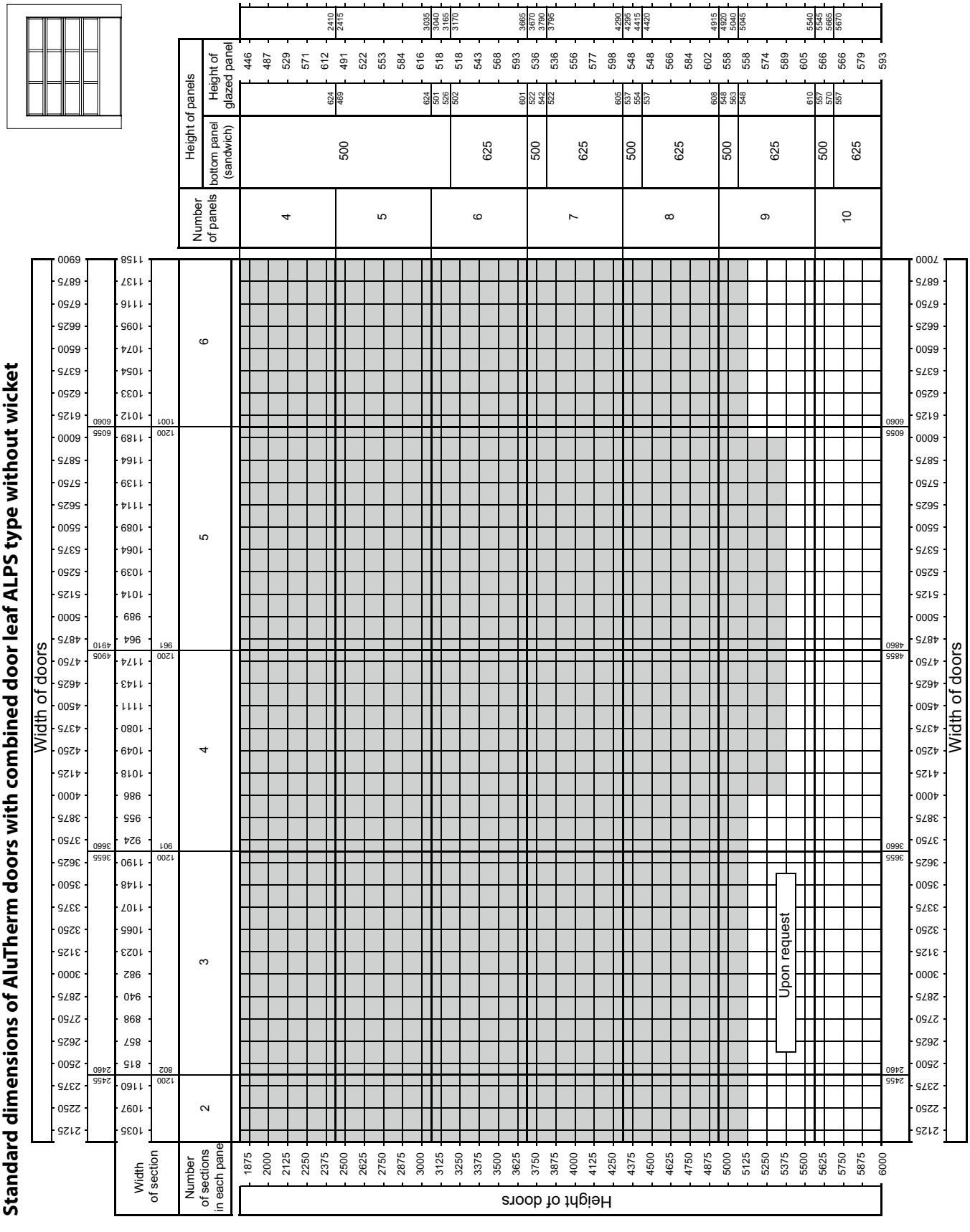
**** Tests have been conducted by TÜV SÜD Czech s.r.o.

***** Parameter of door leaf weight can vary depending on panels, additional elements and other factors.

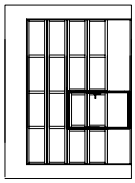
5.10.1. Standard dimensions of AluPro doors with combined door leaf ALPS type without wicket

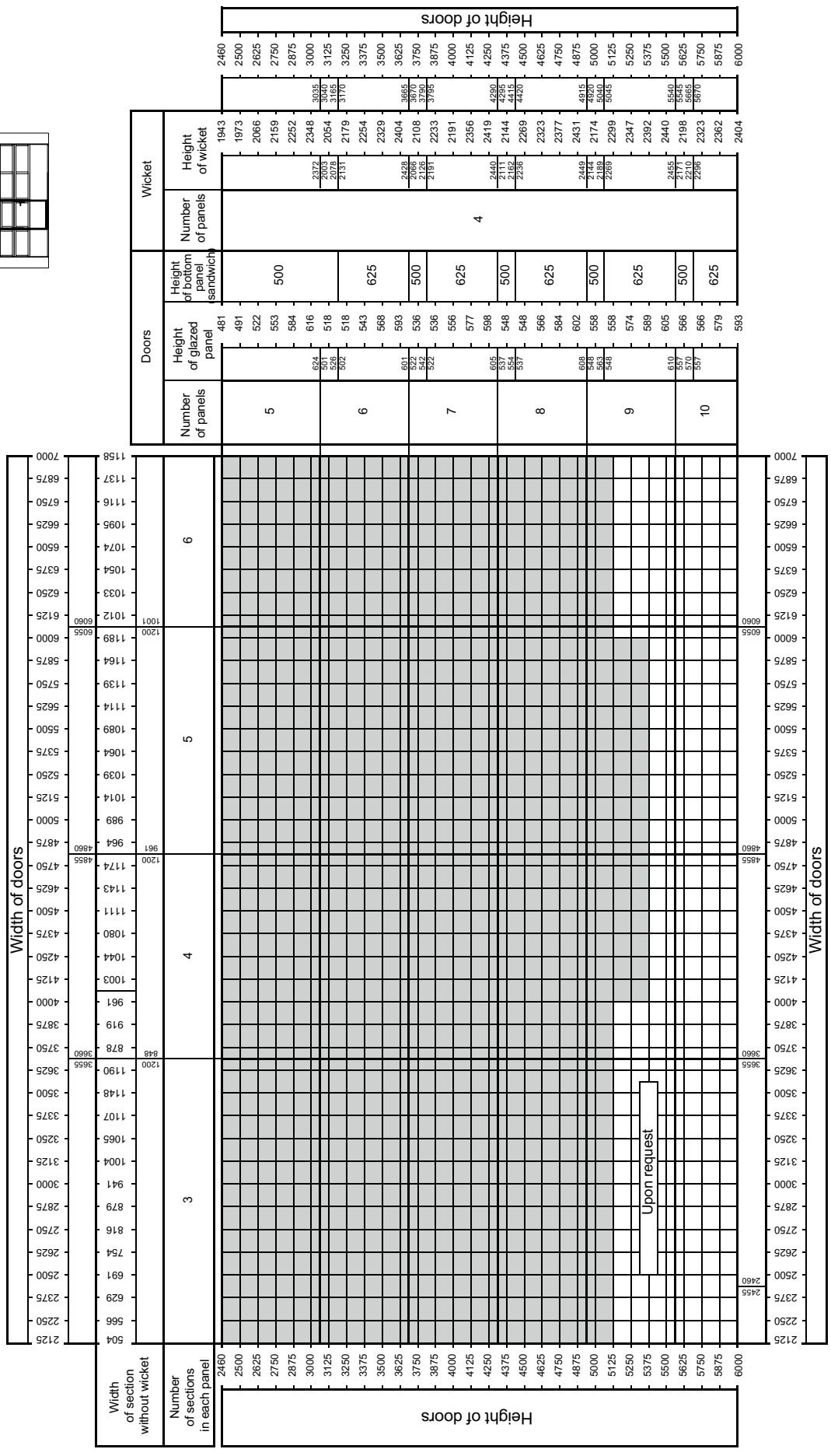


5.10.2. Standard dimensions of AluTherm doors with combined door leaf ALPS type without wicket

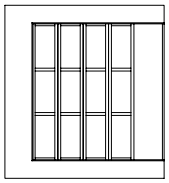


5.10.3. Standard dimensions of AluPro doors with combined door leaf ALPS type with wicket and either a low or standard threshold

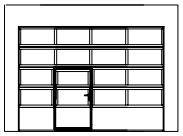


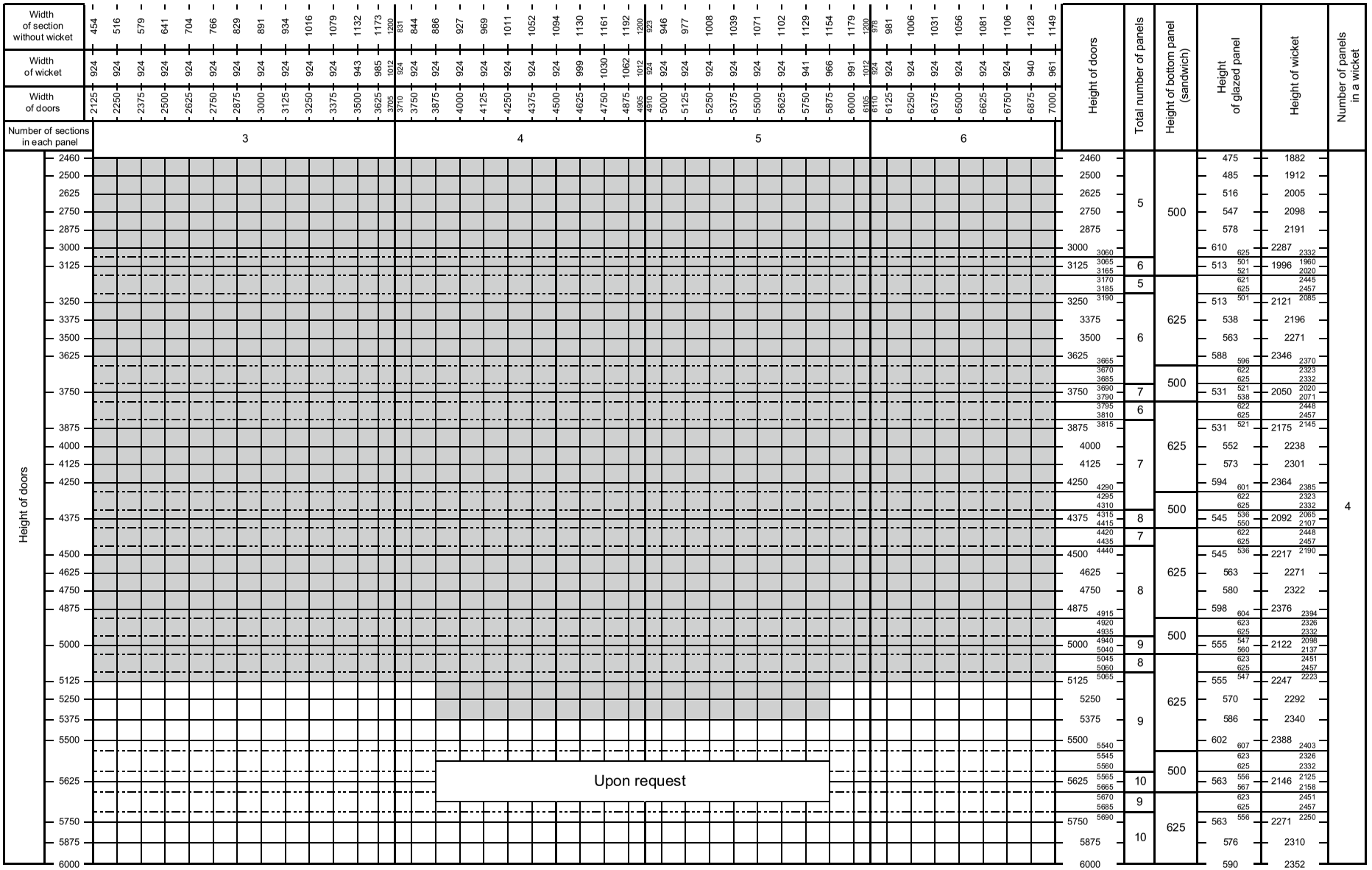


5.10.4. Standard dimensions of panoramic doors series AluTrend without wicket. ALPS type of door leaf



5.10.5. Standard dimensions of AluTrend doors with combined door leaf ALPS type with wicket and either a low or standard threshold





5.10.6. Standard dimensions of AluTrend doors with combined door leaf ALPS type with wicket flat threshold

Width of section without wicket	Width of wicket	Width of doors	Number of sections in each panel	Height of doors	Total number of panels	Height of bottom panel (sandwich)	Height of glazed panel	Height of wicket	Number of panels in a wicket
454	924	2125	3	2460	5	500	477	1885	4
516	924	2250	3	2500	5	500	487	1915	4
579	924	2375	3	2625	5	500	518	2008	4
641	924	2500	3	2750	5	500	550	2104	4
704	924	2625	3	2875	5	500	581	2197	4
766	924	2750	3	3000	5	500	612	2290	4
829	924	2875	3	3050	5	500	625	2329	4
891	924	3000	3	3055	6	500	501	1957	4
934	924	3125	3	3125	6	500	515	1999	4
1016	924	3125	3	3165	6	500	523	2023	4
1079	924	3170	3	3170	5	500	623	2448	4
1132	943	3175	3	3175	5	500	625	2454	4
1173	985	3250	3	3180	6	625	515	2124	4
1200	1012	3250	3	3250	6	625	501	2028	4
831	924	3375	3	3375	6	625	540	2199	4
844	924	3500	3	3500	6	625	565	2274	4
886	924	3625	3	3625	6	625	590	2349	4
927	924	3705	3	3665	6	625	598	2373	4
969	924	3710	3	3670	6	500	624	2326	4
1011	924	3750	4	3675	6	500	625	2329	4
1052	924	3750	4	3680	7	500	521	2017	4
1094	924	3750	4	3790	7	500	540	2074	4
1130	999	3795	4	3795	6	625	624	2451	4
1161	1030	3800	4	3800	6	625	625	2454	4
1192	1062	3875	4	3805	7	625	521	2142	4
1200	1012	3875	4	3875	7	625	533	2178	4
923	924	4000	4	4000	7	625	554	2241	4
946	924	4125	4	4125	7	625	575	2304	4
		4250	4	4250	7	625	596	2367	4
		4290	4	4290	7	625	602	2385	4
		4295	4	4295	7	500	624	2326	4
		4300	4	4300	7	500	625	2329	4
		4375	4	4305	8	500	536	2062	4
		4375	4	4415	8	500	552	2110	4
		4420	4	4420	7	625	624	2451	4
		4425	4	4425	7	625	625	2454	4
		4500	4	4430	8	625	536	2187	4
		4500	4	4500	8	625	546	2217	4
		4625	4	4625	8	625	564	2271	4
		4750	4	4750	8	625	582	2325	4
		4875	4	4875	8	625	600	2379	4
		4915	4	4915	8	625	605	2394	4
		4920	4	4920	8	500	624	2326	4
		4925	4	4925	8	500	625	2329	4
		5000	4	4930	9	500	547	2095	4
		5000	4	5040	9	500	561	2137	4
		5045	4	5045	8	625	624	2451	4
		5050	4	5050	8	625	625	2454	4
		5125	4	5055	9	625	547	2220	4
		5125	4	5125	9	625	556	2247	4
		5250	4	5250	9	625	575	2295	4
		5375	4	5375	9	625	587	2340	4
		5500	4	5500	9	625	603	2388	4
		5540	4	5540	9	625	608	2403	4
		5545	4	5545	9	500	624	2326	4
		5550	4	5550	9	500	625	2329	4
		5625	4	5555	10	500	556	2122	4
		5625	4	5665	10	500	568	2158	4
		5670	4	5670	9	625	624	2451	4
		5675	4	5675	9	625	625	2454	4
		5750	4	5680	10	625	556	2247	4
		5750	4	5750	10	625	564	2271	4
		5875	4	5875	10	625	578	2313	4
		6000	4	6000	10	625	591	2352	4

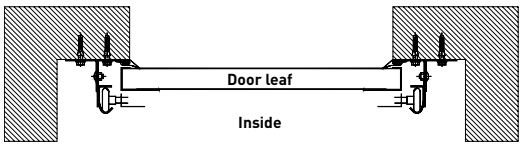
Upon request

6. REQUIREMENTS FOR OPENING PREPARATION AND TAKING MEASUREMENTS

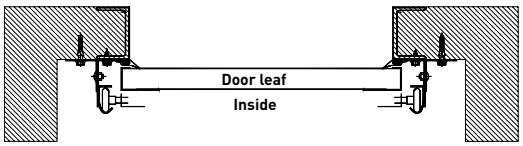
6.1. REQUIREMENTS FOR OPENINGS

Prepared openings should meet the following requirements:

- openings generally should be rectangular;
- the internal wall face should be straight and flat without rough uneven surfaces;
- the opening should not be out of square between the vertical and horizontal sides by more than 1.5 mm/m and not more than 5 mm over the full width or height;
- the whole wall face above the lintel and both reveals should be vertical and on the same plane horizontally;
- space required for door installation (see Door installation plans), should be free of building constructions, heat and ventilation pipelines etc.



If the walls of the opening are constructed of solid material, e.g. concrete, stone, solid brick etc, it is acceptable to fit the fixings of the frames directly into this structure.



If the walls of the opening are made of soft materials e.g. soft blockwork, hollow bricks or lime concrete blocks into which the fixings for the frame are to be secured, a reinforcing plate may be required to strengthen the fixing points.

If the installation of metal reinforcing plates is not possible then the fixings should be bolted fully through the wall thickness i.e. through bolt or should be used fittings designed for mounting the doors into the openings made of soft materials.

6.2. TAKING MEASUREMENTS FOR INSIDE PREMISES AND ENTRANCE OPENINGS

Before taking measurements ensure the floor area is clean and level so the sizes can be measured accurately from the structural elements. Take the floor as a zero point and measure up from there.

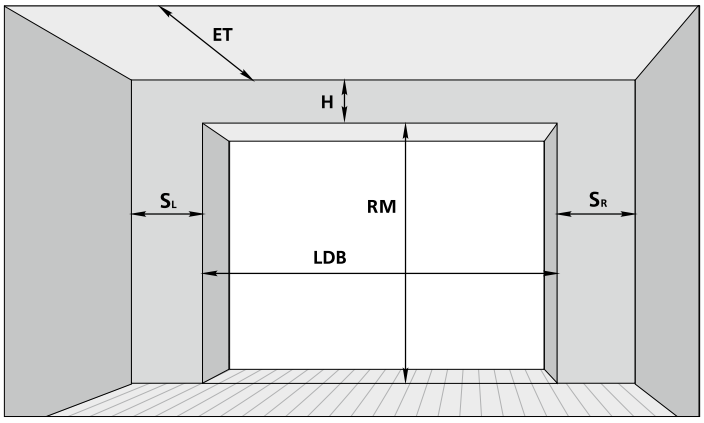
The passage is measured from the inside of the premises, as sectional doors are mounted on the inside surface of the passage. The passage is measured in 3 places on the reveals—top, middle and bottom, and also on the height—left, middle and right sides. The largest of the 3 dimensions is used for ordering the door sizes.

Using a spirit level check the floor and lintel are level and the walls are vertical. To check the opening is square check the diagonals using a tape measure. It is assumed that the lengths of the parallel walls, the distance between the lintel and the floor and the diagonals all must not differ by more than 5 mm each. If they are it is possible to overcome this with the fitting of a wider or higher door.

Check the depth of the premises between the floor and ceiling to ensure they are parallel and the roof or floor do not have an excessive slope which would affect the installation of the horizontal frame.

The dimensions of the opening you supply are used to calculate the dimensions of the doors and the mounting brackets.

6.3. MEASUREMENT PROCEDURE SCHEME

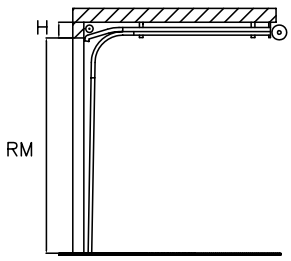


Door operation areas, stated in the corresponding installation plans, should be free of obstacles (systems of ventilation, water supply and heating).

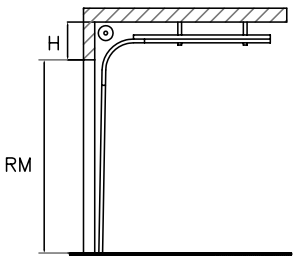
RM — opening height
LDB — opening width
H — headroom height
ET — depth of door entering into the premises
SL, SR — distance from the edge of the opening to the side wall

7. INDUSTRIAL DOOR ILLUSTRATIONS

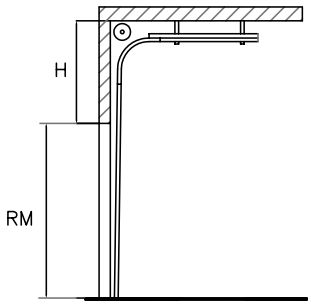
7.1. TYPES OF MOUNTING FOR DOORS WITH SINGLE SHAFT BALANCING SYSTEM FOR DOORS SERIES PROPLUS, PROTREND, ALUPRO, ALUTHERM, ALUTREND



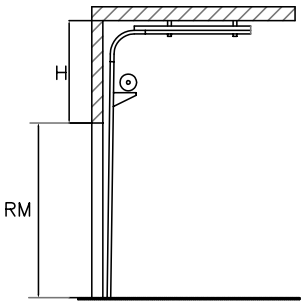
Low mounting type



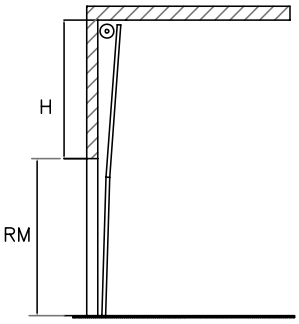
Standard mounting type



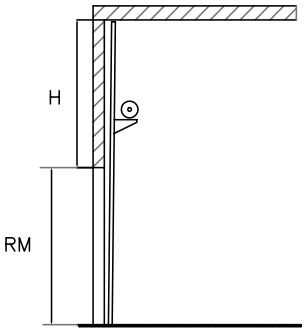
High mounting type
with top shaft positioning



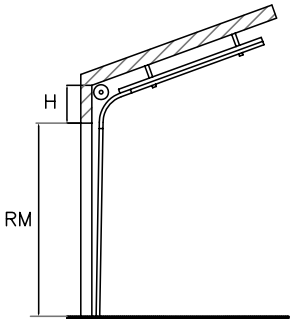
High mounting type
with bottom shaft positioning



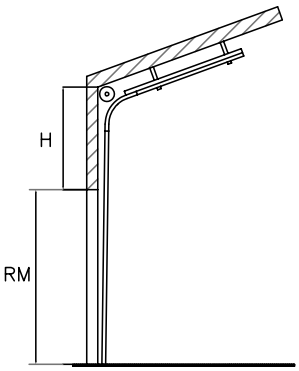
Vertical mounting type
with top shaft positioning



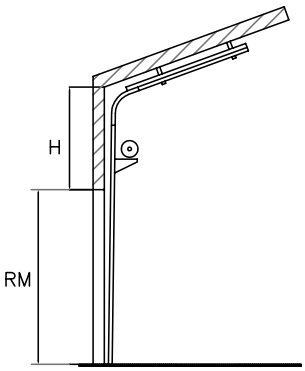
Vertical mounting type
with bottom shaft positioning



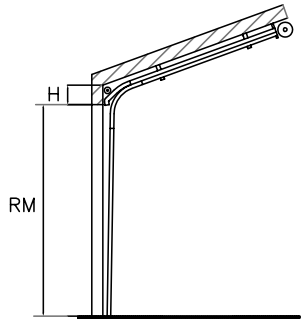
Inclined mounting type



Inclined high mounting type
with top shaft positioning



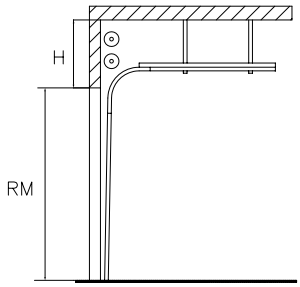
Inclined high mounting type
with bottom shaft positioning



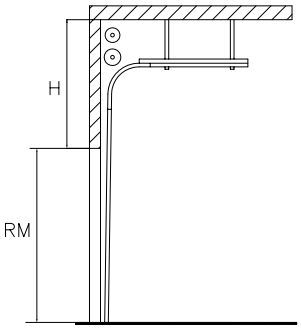
Inclined low mounting type

Minimum headroom height (H), mm	Type of mounting
230	Low mounting
410	Standard mounting
900	High mounting type with top shaft positioning
1795	High mounting type with bottom shaft positioning
RM+340	Vertical mounting type with top shaft positioning
RM+340	Vertical mounting with bottom shaft positioning
490	Inclined mounting type
900	Inclined high mounting type with top shaft positioning
1795	Inclined high mounting type with bottom shaft positioning
230	Inclined low mounting type

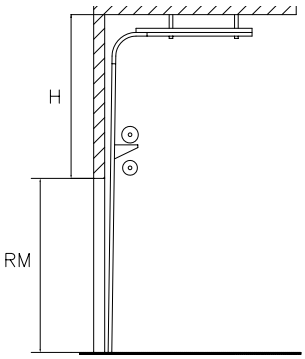
7.2. TYPES OF MOUNTING FOR DOORS WITH DOUBLE SHAFT BALANCING SYSTEM FOR DOORS SERIES PROPLUS, ALUPRO, ALUTHERM



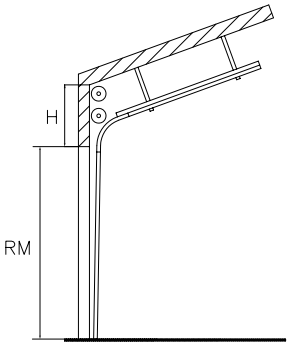
Standard mounting type



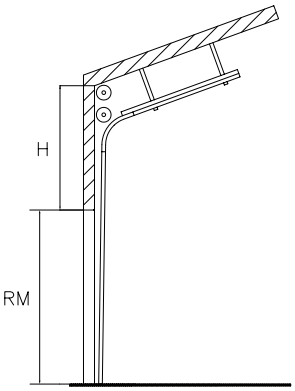
High mounting type
with top shaft positioning



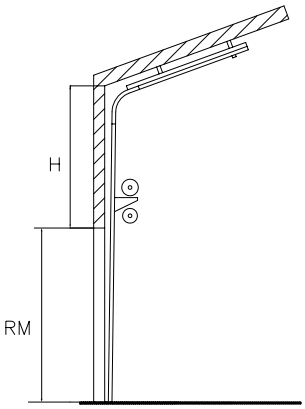
High mounting type
with bottom shaft positioning



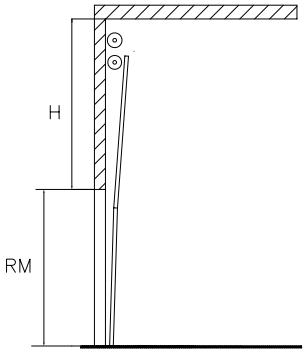
Inclined mounting type



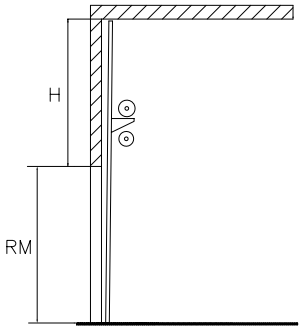
Inclined high mounting type
with top shaft positioning



Inclined high mounting type
with bottom shaft positioning



Vertical
with top shaft positioning



Inclined high mounting type
with bottom shaft positioning

Minimum headroom height (H), mm	Type of mounting
840	Standard
1275	High with top shaft positioning
2100	High with bottom shaft positioning
920	Inclined
1275	Inclined high with top shaft positioning
2100	Inclined high with bottom shaft positioning
RM+590	Vertical with top shaft positioning
RM+340	Vertical with bottom shaft positioning

8. MOUNTING DIAGRAMS FOR THE DOORS

8.1. GENERAL DIRECTIONS

Chose of door mounting type in case of several alternatives possible is done basing on plans for the use of internal space within the building, location of machines and equipment and other factors.

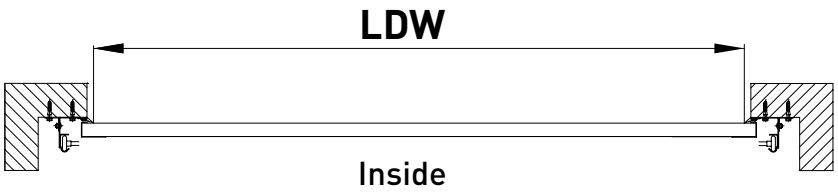
ATTENTION! When using mounting diagrams it is necessary to pay attention to the following directions:

- minimum side-room which is necessary for industrial door installation. It is the space on the right and/or on the left from the passage. It should be not less than the size indicated in the mounting diagrams;
- when using a chain hoist or electric drive on industrial doors the minimum side space on the side ofdriveplacement is increased to the size indicated in section9;
- side-room is not increased when using the block for manual door lifting HKU001.

8.2. MOUNTING PLANS SYMBOLS

Parameter	Description
RM	Passage height
LDB	Passage width
H	Headroom height
H1, H2	Parameters of door operating area
H3	Height to horizontal track
HL	Height of horizontal track positioning from the top of the opening
LDH	Clear dimension height
LDW	Clear dimension width
ET	Depth of door entering into the premises
W	Dimension for electric motor positioning
HR	Height of motor rail positioning
DM, DH	Positioning of fixing points
BW	Height to the shaft axis
S_{min}	Minimum side room for angle bars mounting

Passage width LDW is shown to the edges of the EPDM sealing insert wings (see the pic. below).

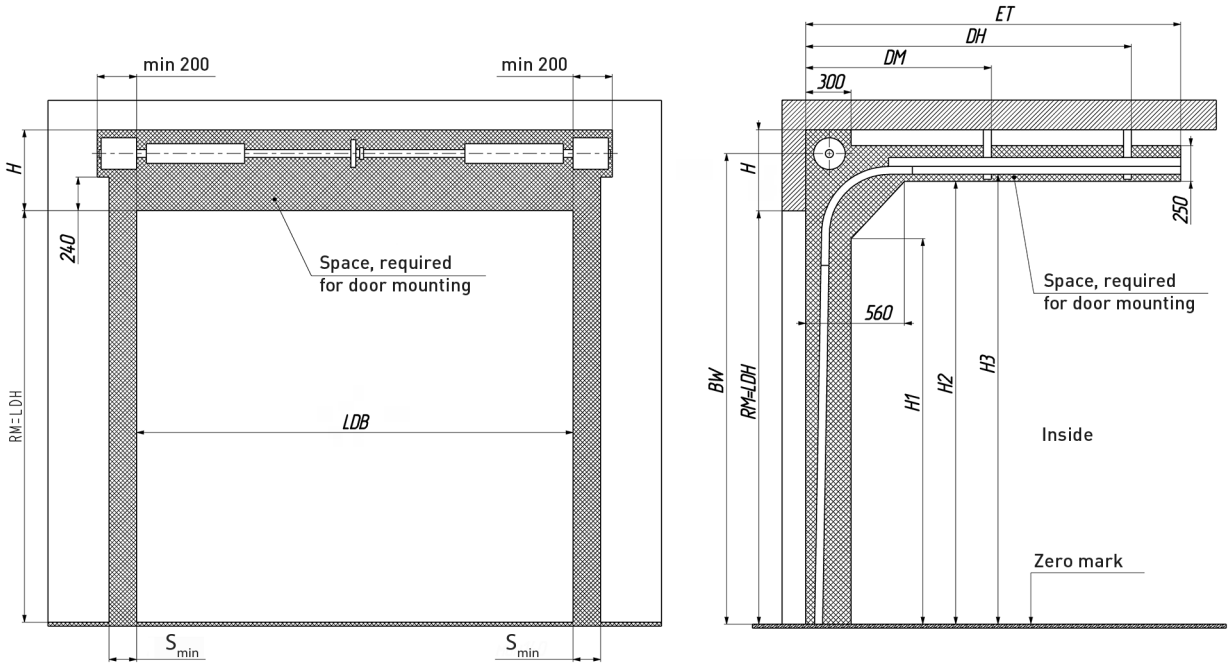


LDW=LDB−50

8.3. STANDARD MOUNTING

8.3.1. Standard type of mounting with single-shaft balancing system

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



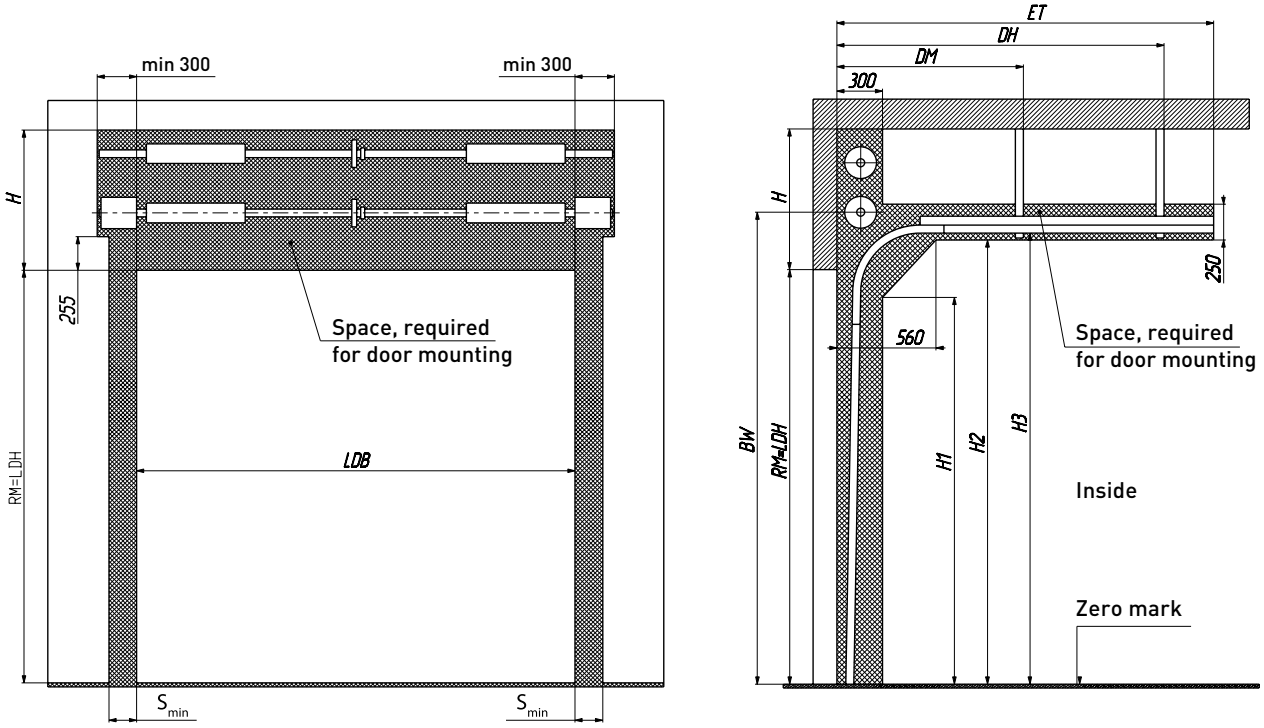
Parameter, mm	Description	Formula or value	
H	Headroom height	Door weight≤350 kg (door leaf area≤22 m²)	min 410 (RM≤3600)*
			min 430 (3600<RM≤4000)*
			min 460 (4000<RM<5570)*
		Door weight>350 kg (door leaf area>22 m²)	min 530
LDW	Height of clear dimension width	LDB−50	
BW	Height to the shaft axis	from RM+327 to RM+397	
DM	Positioning of fixing points	1050	
DH	Positioning of fixing points	RM+280	
ET	Depth of door entering into the premises	RM+510	
H1	Parameters of door operating area	RM−245	
H2	Parameters of door operating area	RM+145	
H3	Height to the horizontal track	RM+202	
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars	

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* In case of special door design (applying of optional extras) the minimum headroom requirements can be changed.

8.3.2. Standard type of mounting with double shaft balancing system

For doors series ProPlus, AluPro, AluTherm



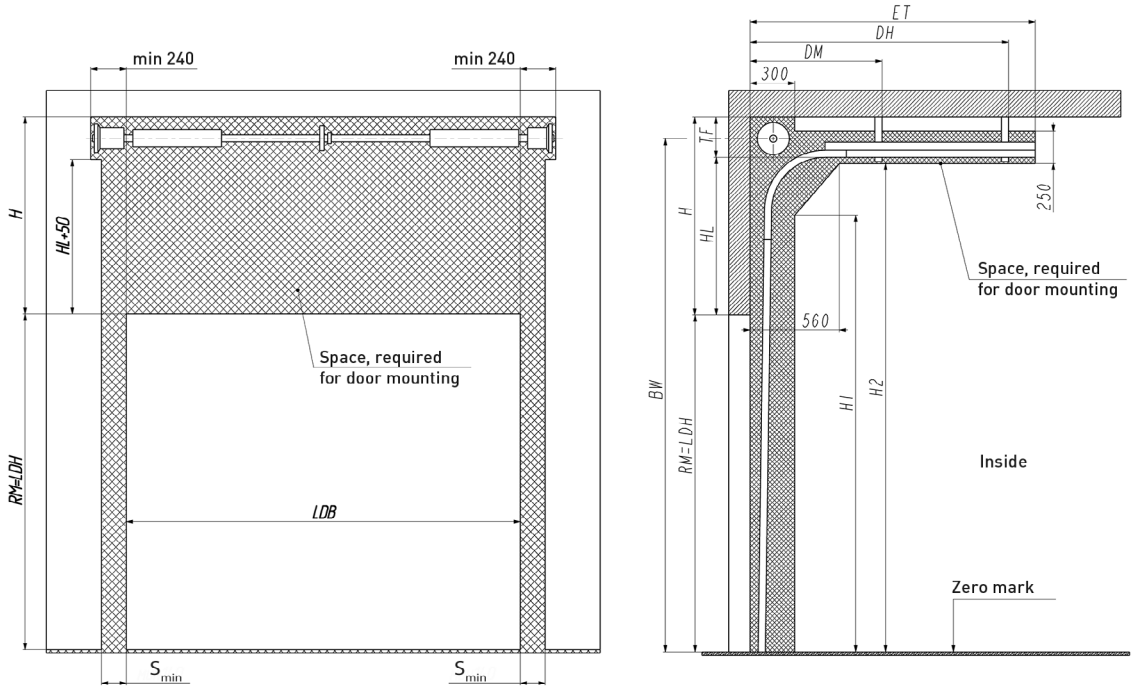
Parameter, mm	Description	Formula or value
H	Headroom height	min 840
LDW	Height of clear dimension width	LDB−50
BW	Height to the shaft axis	RM+400
DM	Positioning of fixing points	1050
DH	Positioning of fixing points	RM+280
ET	Depth of door entering into the premises	RM+510
H1	Parameters of door operating area	RM−245
H2	Parameters of door operating area	RM+145
H3	Height to the horizontal track	RM+202
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

8.4. HIGH MOUNTING WITH TOP SHAFT POSITIONING

8.4.1. High mounting with top shaft positioning with single-shaft balancing system

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



Height of the passage RM, mm	Height of the headroom H, mm	Minimum distance from the horizontal track to the top edge of the working area in area of shaft mounting TF, mm	Height to the shaft axis BW, mm
up to 4800	up to 1635	265	RM+HL+160
	up to 3365	305	RM+HL+180
	up to 4445	345	RM+HL+200
up to 5050	up to 3365	305	RM+HL+180
	up to 4445	345	RM+HL+200
more than 5050	up to 4445	345	RM+HL+200

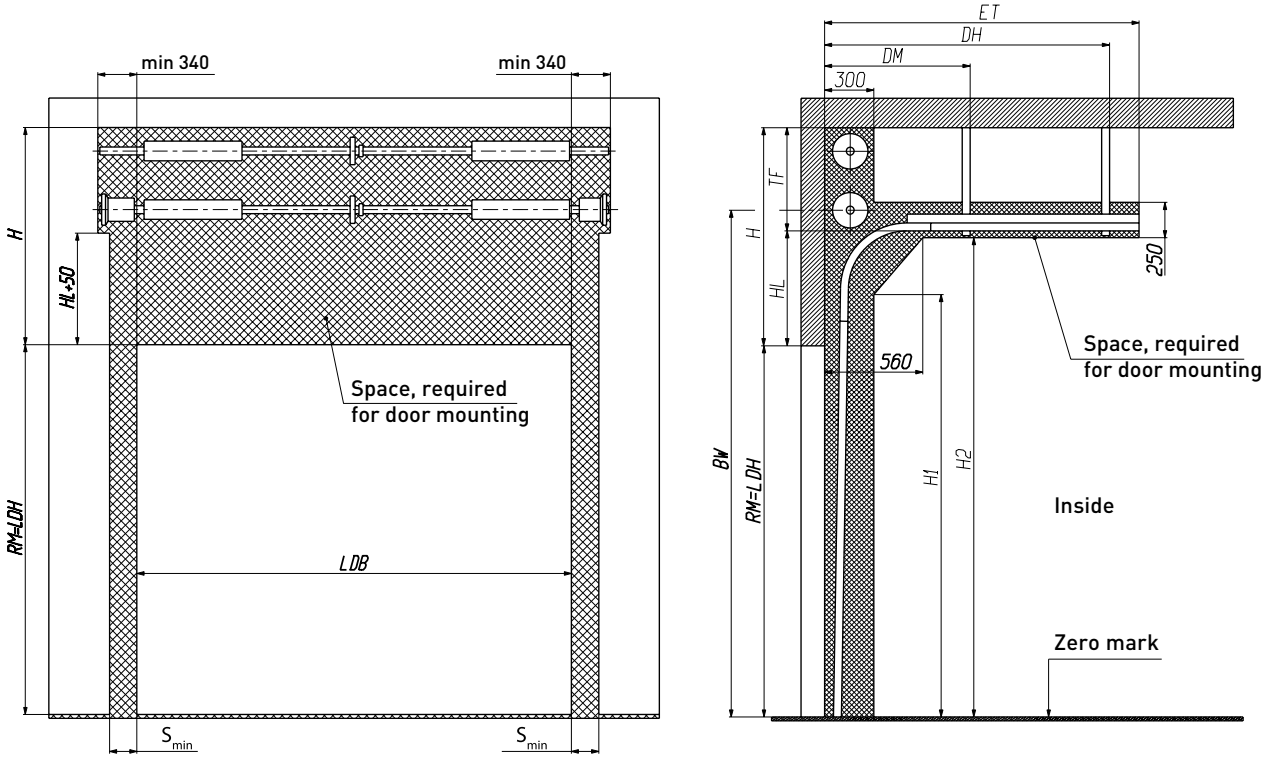
Parameter, mm	Description	Formula or value
H	Headroom height	min 900
HL*	Height of horizontal track positioning from the top of the opening	H−TF (max 4100)
ET	Depth of door entering into the premises	RM−HL+850
DH	Positioning of fixing points	RM−HL+620
DM	Positioning of fixing points	1050
H1	Parameters of door operating area	RM+HL−455
H2	Parameters of door operating area	RM+HL−55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* Doors with HL parameter 3000 mm and more are manufactured upon request. Parameter HL must be less than the door height.

8.4.2. High type of mounting with top shaft positioning with double shaft balancing system

For doors series ProPlus, AluPro, AluTherm



Parameter, mm	Description	Formula or value
H	Headroom height	min 1275
TF	Min distance from horizontal track to the top edge of operating area in area of shaft positioning	640
HL*	Height of horizontal track positioning from the top of the passage	H – TF (max 4100)
BW	Height to the shaft axis	RM+HL+200
ET	Depth of door entering into the premises	RM–HL+850
DH	Positioning of fixing points	RM–HL+620
DM	Positioning of fixing points	1050
H1	Parameters of door operating area	RM+HL–455
H2	Parameters of door operating area	RM+HL–55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

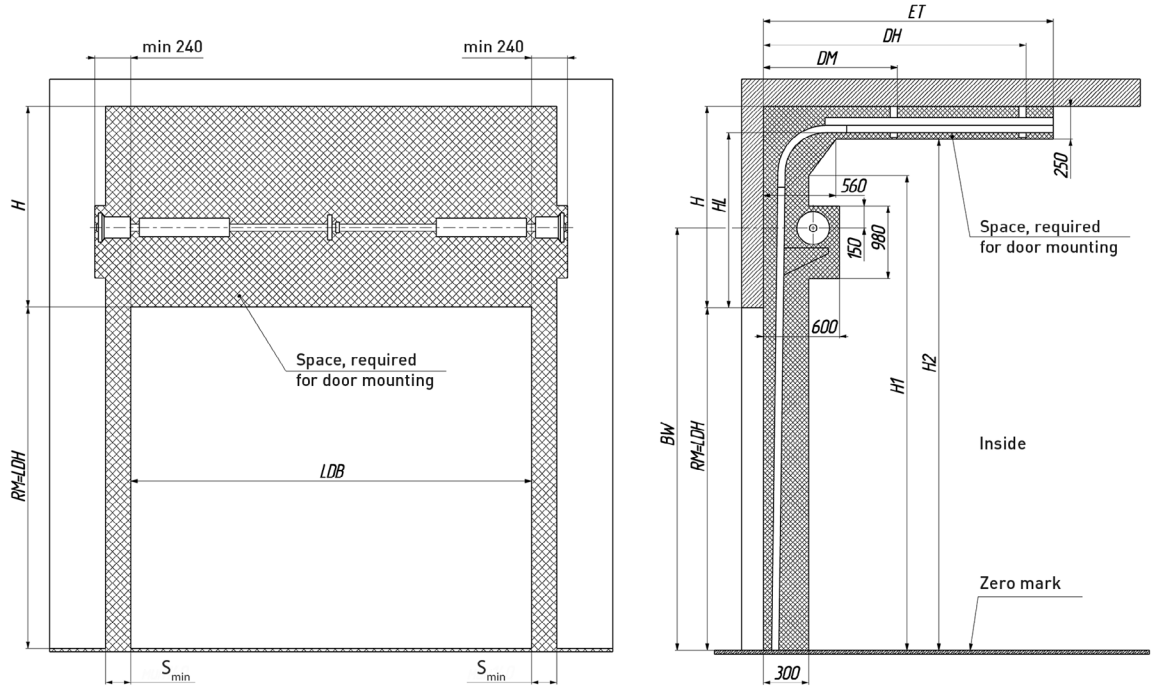
When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* Doors with HL parameter 3000 mm and more are manufactured upon request. Parameter HL must be less than the door height.

8.5. HIGH MOUNTING WITH BOTTOM SHAFT POSITIONING

8.5.1. High mounting with bottom shaft positioning with single-shaft balancing system

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



Parameter, mm	Description	Formula or value
H	Headroom height	min 1795
HL*	Height of horizontal track positioning from the top of the opening	from 1600 up to H−195 (max 4100)
BW**	Height to the shaft axis	from RM+1100 up to RM+HL−500
ET	Depth of door entering into the premises	RM−HL+850
DH	Positioning of fixing points	RM−HL+620
DM	Positioning of fixing points	1050
H1	Parameters of door operating area	RM+HL−455
H2	Parameters of door operating area	RM+HL−55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

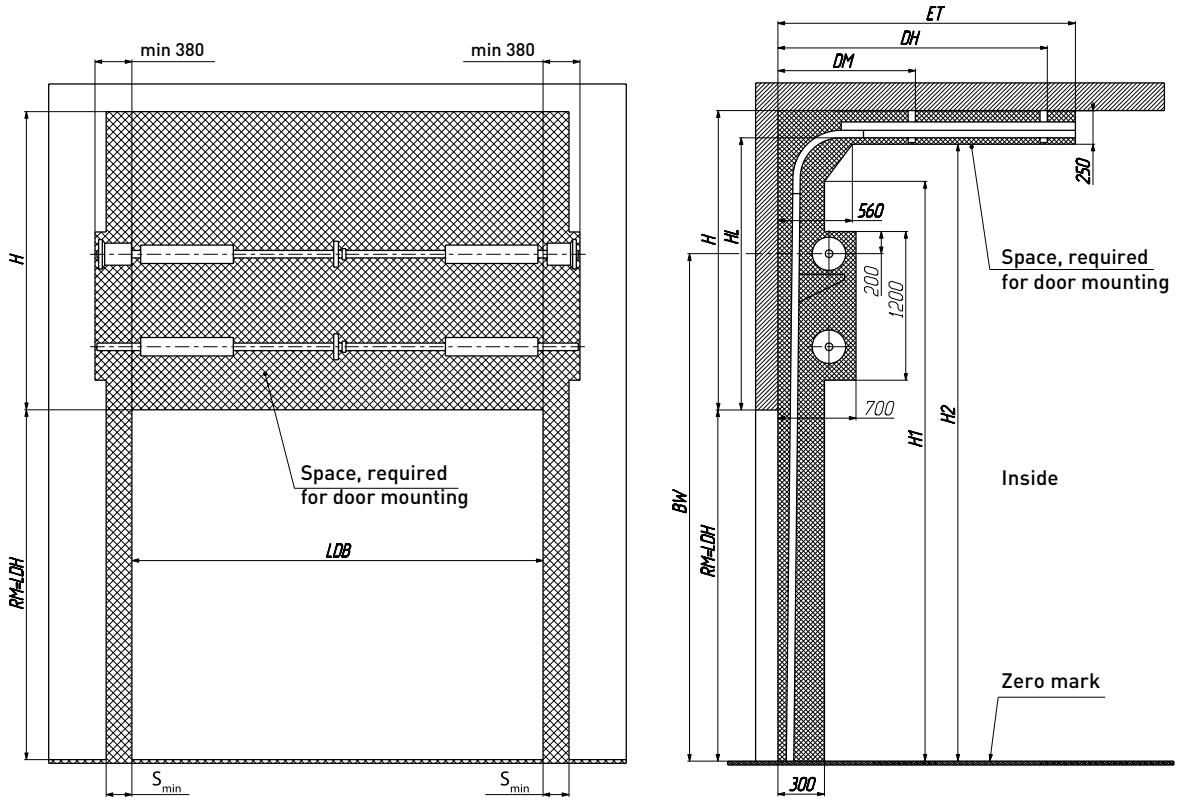
When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* Doors with HL parameter 3000 mm and more are manufactured upon request. Parameter HL must be less than the door height.

** The dimension is defined when placing the order. Value by default is BW=RM+1500 mm.

8.5.2. High type of mounting with bottom shaft positioning with double shaft balancing system

For doors series ProPlus, AluPro, AluTherm



Parameter, mm	Description	Formula or value
H	Headroom height	min 2100
HL*	Height of horizontal track positioning from the top of the passage	from 1905 to H−195 (max 4100)
BW**	Height to the shaft axis	from RM+1200 to RM+HL−400
ET	Depth of door entering into the premises	RM−HL+850
DH	Positioning of fixing points	RM−HL+620
DM	Positioning of fixing points	1050
H1	Parameters of door operating area	RM+HL−455
H2	Parameters of door operating area	RM+HL−55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

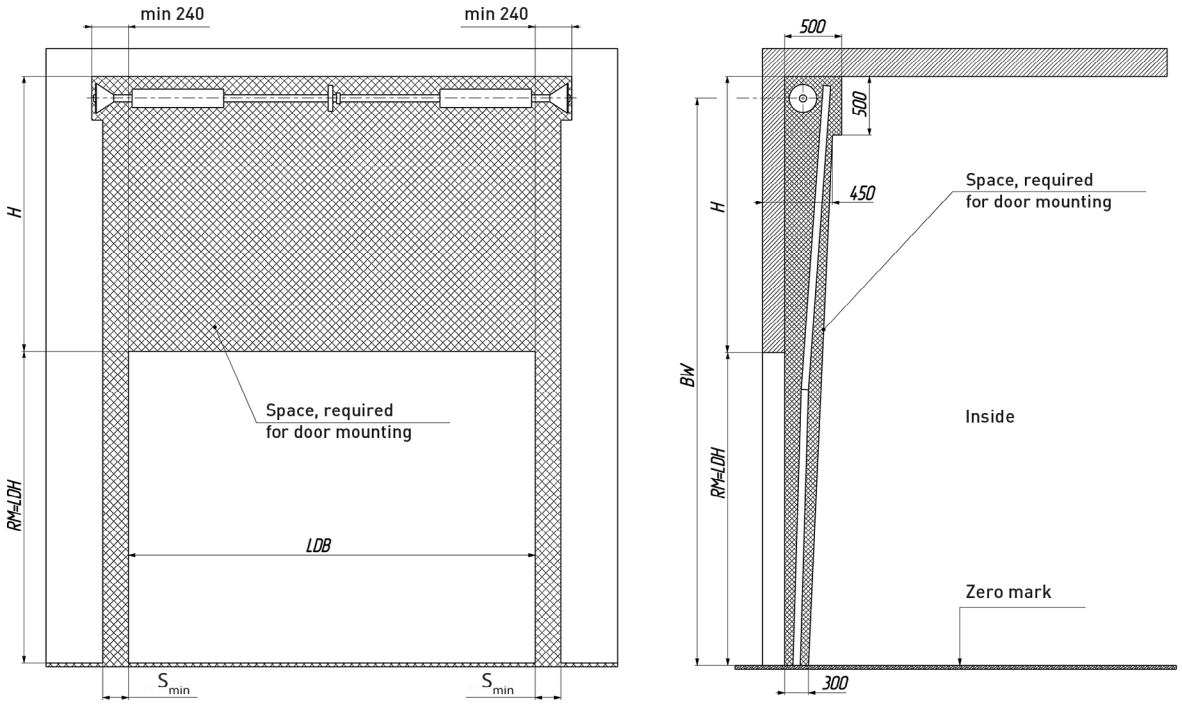
* Doors with HL parameter 3000 mm and more are manufactured upon request. Parameter HL must be less than the door height.

** The dimension is negotiated when placing the order. The initial dimension: BW=RM+1500 mm.

8.6. VERTICAL MOUNTING WITH TOP SHAFT POSITIONING

8.6.1. Vertical mounting with top shaft positioning with single-shaft balancing system

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



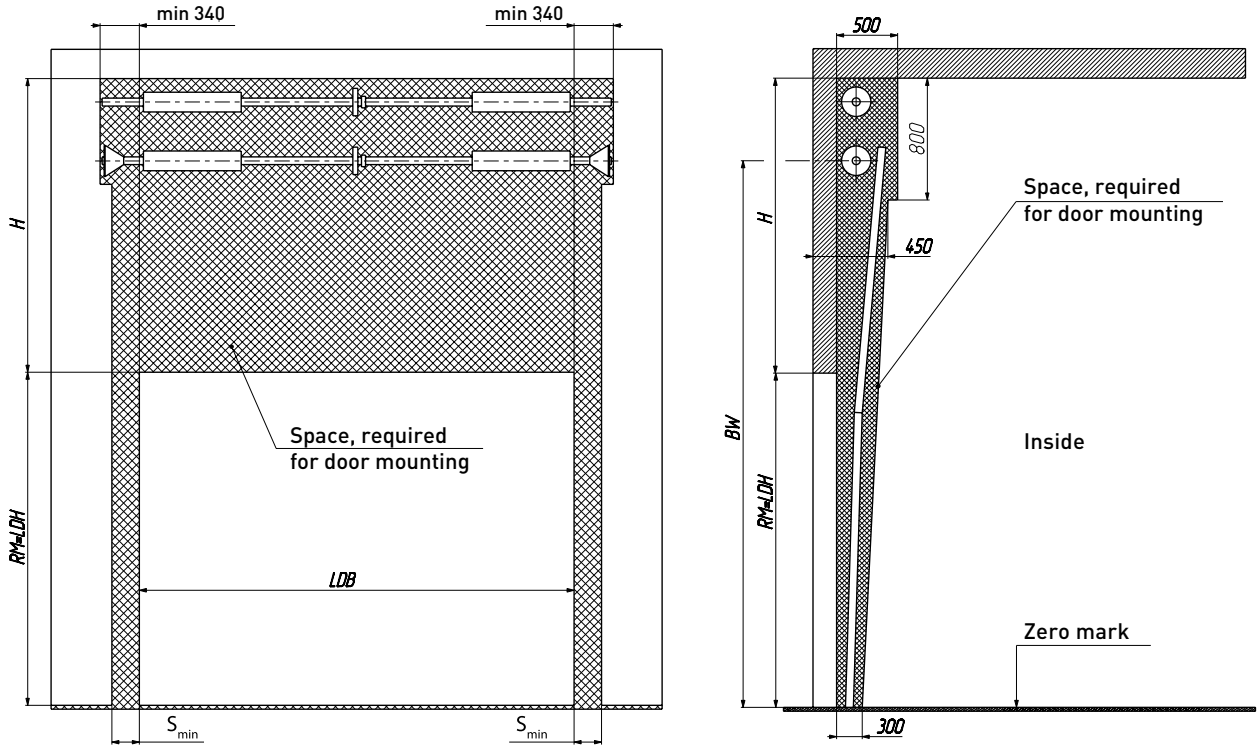
Passage height RM, mm	Height to the shaft axis BW, mm
up to 3300	2×RM+125
more than 3300	2×RM+145

Parameter, mm	Description	Formula or value
H	Headroom height	min RM+340
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

8.6.2. Vertical type of mounting with top shaft positioning with double shaft balancing system

For doors series ProPlus, AluPro, AluTherm



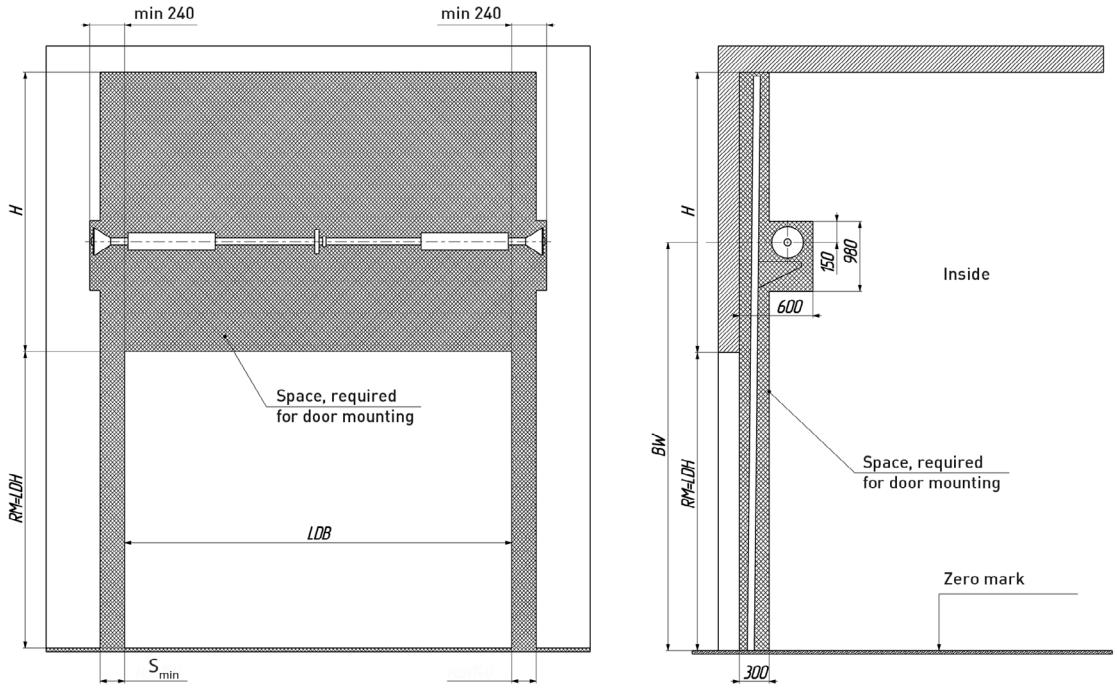
Parameter, mm	Description	Formula or value
H	Headroom height	min RM+590
BW	Height to the shaft axis	2×RM+145
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

8.7. VERTICAL MOUNTING WITH BOTTOM SHAFT POSITIONING

8.7.1. Vertical mounting with bottom shaft positioning with single-shaft balancing system

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



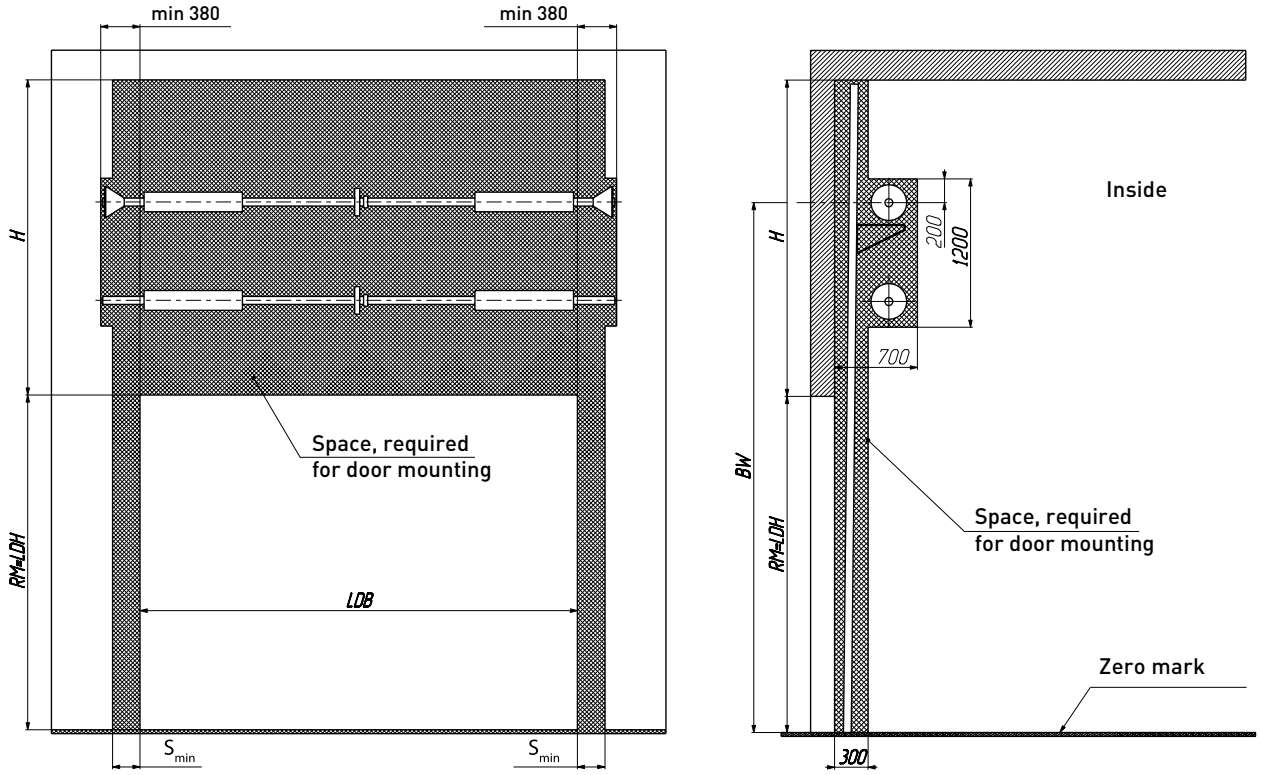
Parameter, mm	Description	Formula or value
H	Headroom height	min RM+340
BW*	Height to the shaft axis	min RM+1100
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* The dimension is defined when placing the order. Value by default is BW=RM+1500 mm.

8.7.2. Vertical type of mounting with bottom shaft positioning with double shaft balancing system

For doors series ProPlus, AluPro, AluTherm



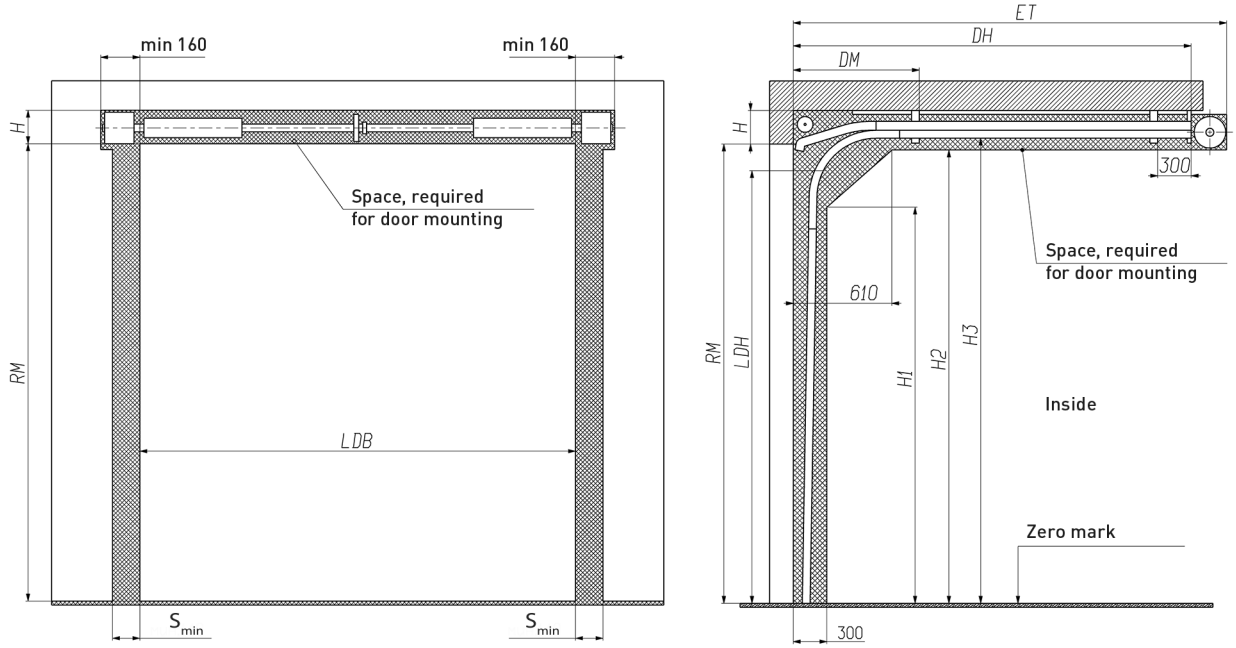
Parameter, mm	Description	Formula or value
H	Headroom height	min RM+340
BW*	Height to the shaft axis	from RM+1200 to RM−HL−400
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* The dimension is negotiated when placing the order. The initial dimension: BW=RM+1500 mm.

8.8. LOW MOUNTING

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



Passage height RM, mm	Dimension limiting the operating area H2, mm
up to 3680	RM−5
from 3680 up to 5335	RM−15
In some cases it is possible to increase the parameters up to	RM−85

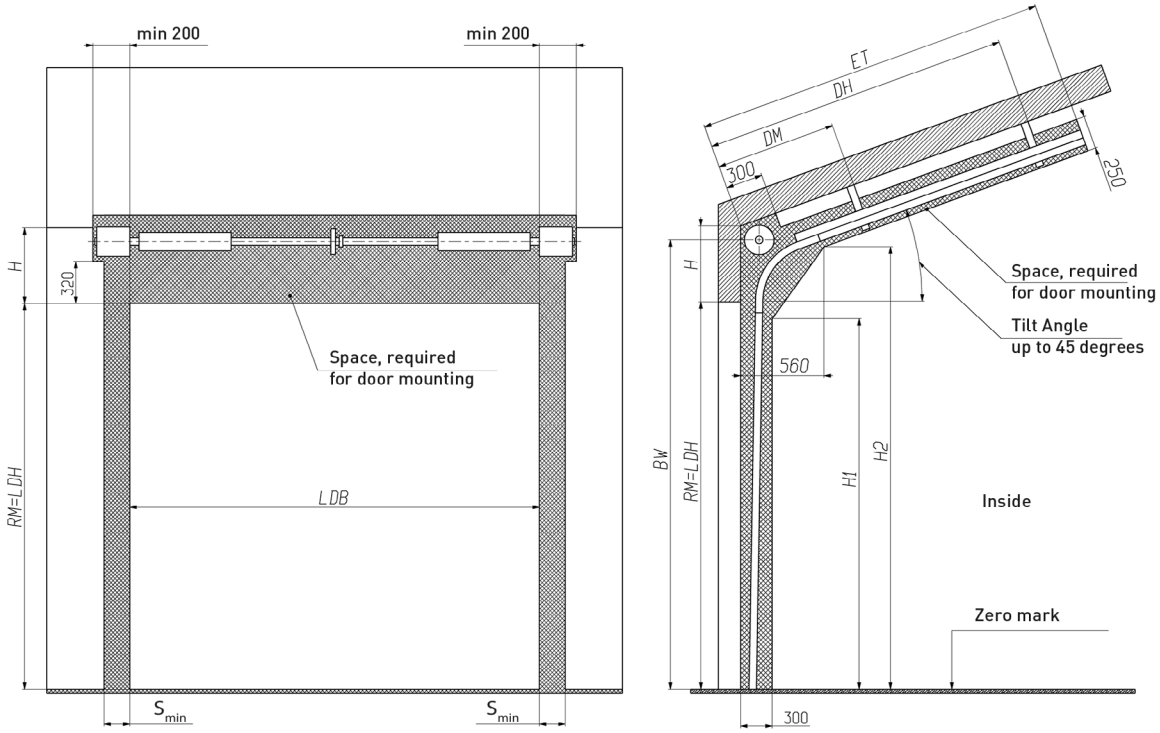
Parameter, mm	Description	Formula or value
H	Headroom height	min 230—for doors without wicket min 250—for doors with wicket
LDH	Clear dimension height	RM−135
DM	Positioning of fixing points	700
DH	Positioning of fixing points	RM+710
ET	Depth of door entering into the premises	RM+980
H1	Parameters of door operating area	RM−335
H3	Height to the horizontal track	RM+55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

8.9. INCLINED MOUNTING

8.9.1. Inclined mounting with single-shaft balancing system

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



Passage height RM, mm	Height to the shaft axis BW, mm
up to 5335	RM+423
In some cases it is possible to increase the parameters to	RM+467

Parameter, mm	Description	Formula or value	
H	Headroom height	tilt Angle: 5-40°	min 490 (RM<5335) min 600 (RM>5335)*
		tilt Angle: 45°	min 580 (RM≤3300) min 630 (RM>3300)
DM	Positioning of fixing points	1050	
DH	Positioning of fixing points	RM+280	
ET	Depth of door entering into the premises	RM+510	
H1	Parameters of door operating area	RM−245	
H2	Parameters of door operating area	RM+160	
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars	

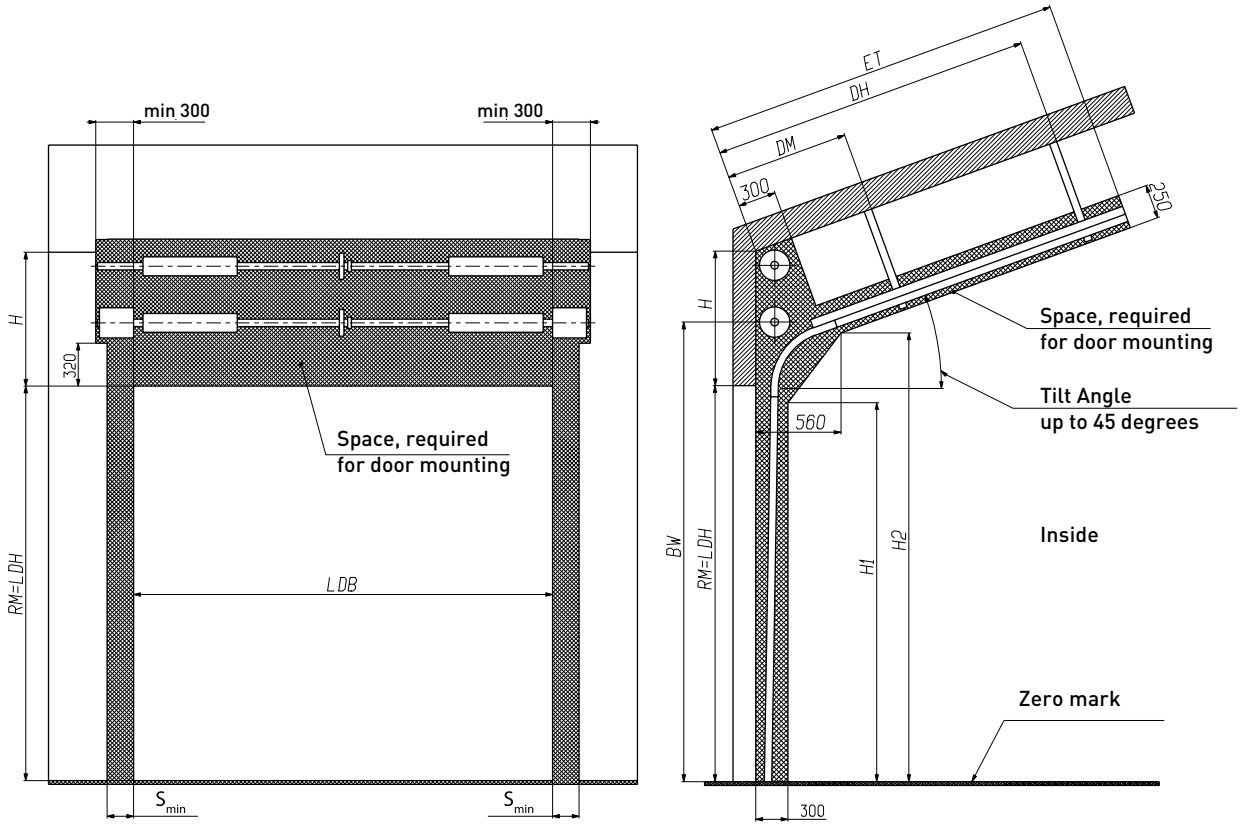
The required angle of inclination is agreed when placing the order in increments of 5° within the range from 5 to 45°. As a rule it is equal to the inclination of the ceiling.

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* The specified headroom size may be necessary for doors of nonstandard dimensions, options, etc.

8.9.2. Inclined type of mounting with double shaft balancing system

For doors series ProPlus, AluPro, AluTherm



Parameter, mm	Description	Formula or value
H	Headroom height	min 920
BW	Height to the shaft axis	RM+480
DM	Positioning of fixing points	1050
DH	Positioning of fixing points	RM+280
ET	Depth of door entering into the premises	RM+510
H1	Parameters of door operating area	RM−245
H2	Parameters of door operating area	RM+160
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

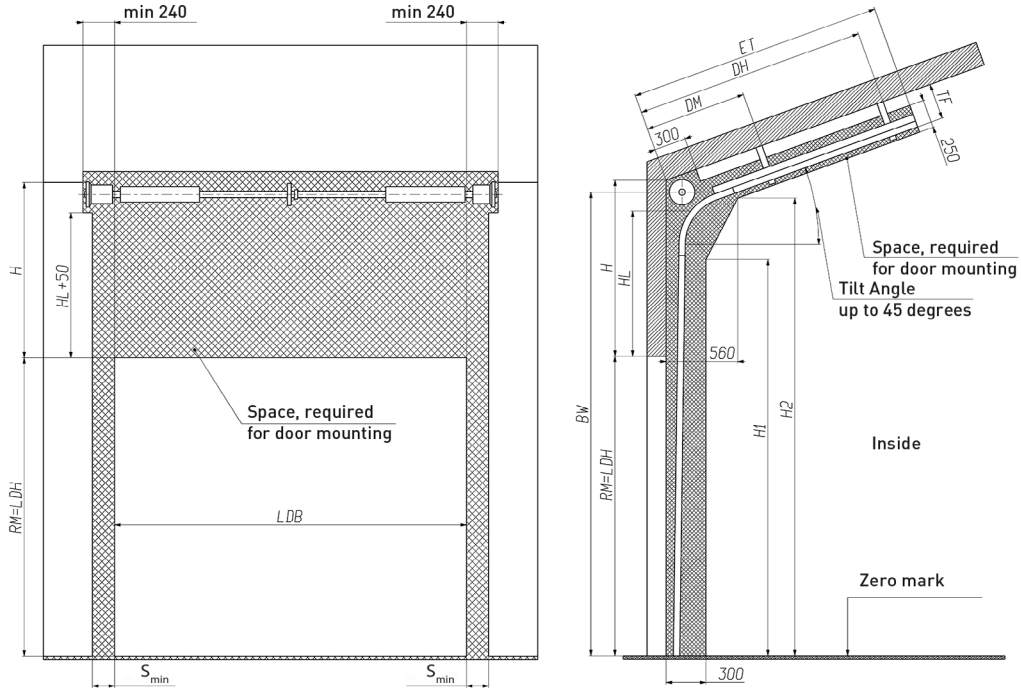
The required angle of inclination is agreed when placing the order in increments of 5° within the range from 5 to 45°. As a rule it is equal to the inclination of the ceiling.

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

8.10. INCLINED HIGH MOUNTING WITH TOP SHAFT POSITIONING

8.10.1. Inclined high mounting with top shaft positioning with single-shaft balancing system

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



Tilt Angle	Passage height RM, mm	Headroom height H, mm	Minimum distance from the horizontal track to the ceiling TF, mm	Height to the shaft axis BW, mm
5-40°	up to 4800	up to 1935	345	RM+HL+240
		up to 3365	385	RM+HL+260
		up to 4445	425	RM+HL+280
		up to 3365	385	RM+HL+260
		up to 4445	425	RM+HL+280
		up to 4445	425	RM+HL+280
45°	≤3300	up to 3365	375	RM+HL+260
	>3300	up to 4445	425	RM+HL+280

Parameter, mm	Description	Formula or value
H	Headroom height	min 900
HL*	Height of the horizontal track positioning from the top of the passage	H−TF (max 4100)
DM	Positioning of fixing points	1050
DH	Positioning of fixing points	RM−HL+620
ET	Depth of door entering into the premises	RM−HL+850
H1	Parameters of door operating area	RM+HL−455
H2	Parameters of door operating area	RM+HL−55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

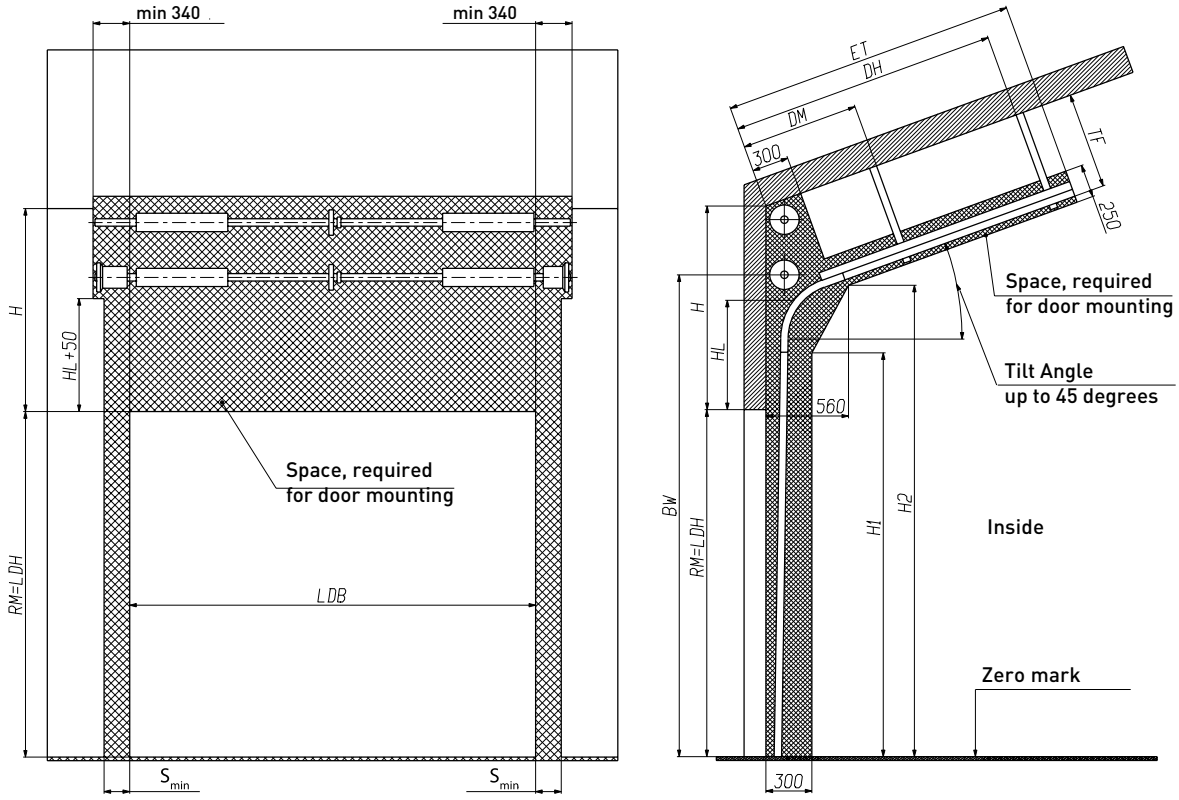
The required angle of inclination is agreed when placing the order in increments of 5° within the range from 5 to 45°. As a rule, it is equal to the inclination of the ceiling.

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* Doors with the parameter HL more 3000 mm are manufactured to special order. Parameter HL must be less than the door height.

8.10.2. Inclined high type of mounting with top shaft positioning with double shaft balancing system

For doors series ProPlus, AluPro, AluTherm



Parameter, mm	Description	Formula or value
H	Headroom height	min 1275
TF	Min distance from horizontal track to the top edge of operating area in area of shaft positioning	720
HL*	Height of horizontal track positioning from the top of the passage	H−TF (max 4100)
BW	Height to the shaft axis	RM+HL+280
DM	Positioning of fixing points	1050
DH	Positioning of fixing points	RM−HL+620
ET	Depth of door entering into the premises	RM−HL+850
H1	Parameters of door operating area	RM+HL−455
H2	Parameters of door operating area	RM+HL−55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

The required angle of inclination is agreed when placing the order in increments of 5° within the range from 5 to 45°. As a rule it is equal to the inclination of the ceiling.

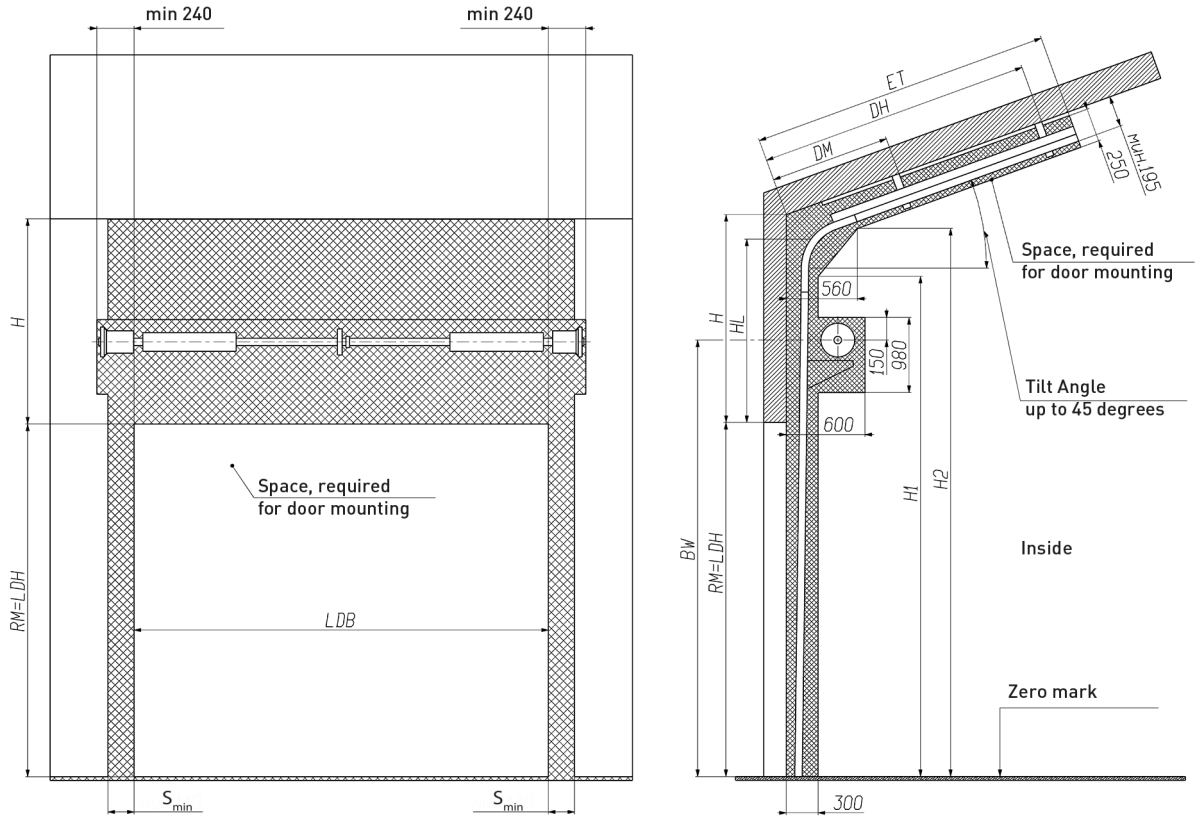
When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* Doors with the parameter HL more 3000 mm are manufactured under the order. Parameter HL must be less than the doors height.

8.11. INCLINED HIGH MOUNTING WITH BOTTOM SHAFT POSITIONING

8.11.1. Inclined high mounting with bottom shaft positioning with single-shaft balancing system

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



Parameter, mm	Description	Formula or value
H	Headroom height	min 1795
HL*	Height of the horizontal track positioning from the top of the passage	from 1600 to H−195 (max 4100)
BW**	Height to the shaft axis	from RM+1100 to RM+HL−500
ET	Depth of door entering into the premises	RM−HL+850
DH	Positioning of fixing points	RM−HL+620
DM	Positioning of fixing points	1050
H1	Parameters of door operating area	RM+HL−445
H2	Parameters of door operating area	RM+HL−55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

The required angle of inclination is agreed when placing the order in increments of 5° within the range from 5 to 45°. As a rule, it is equal to the inclination of the ceiling.

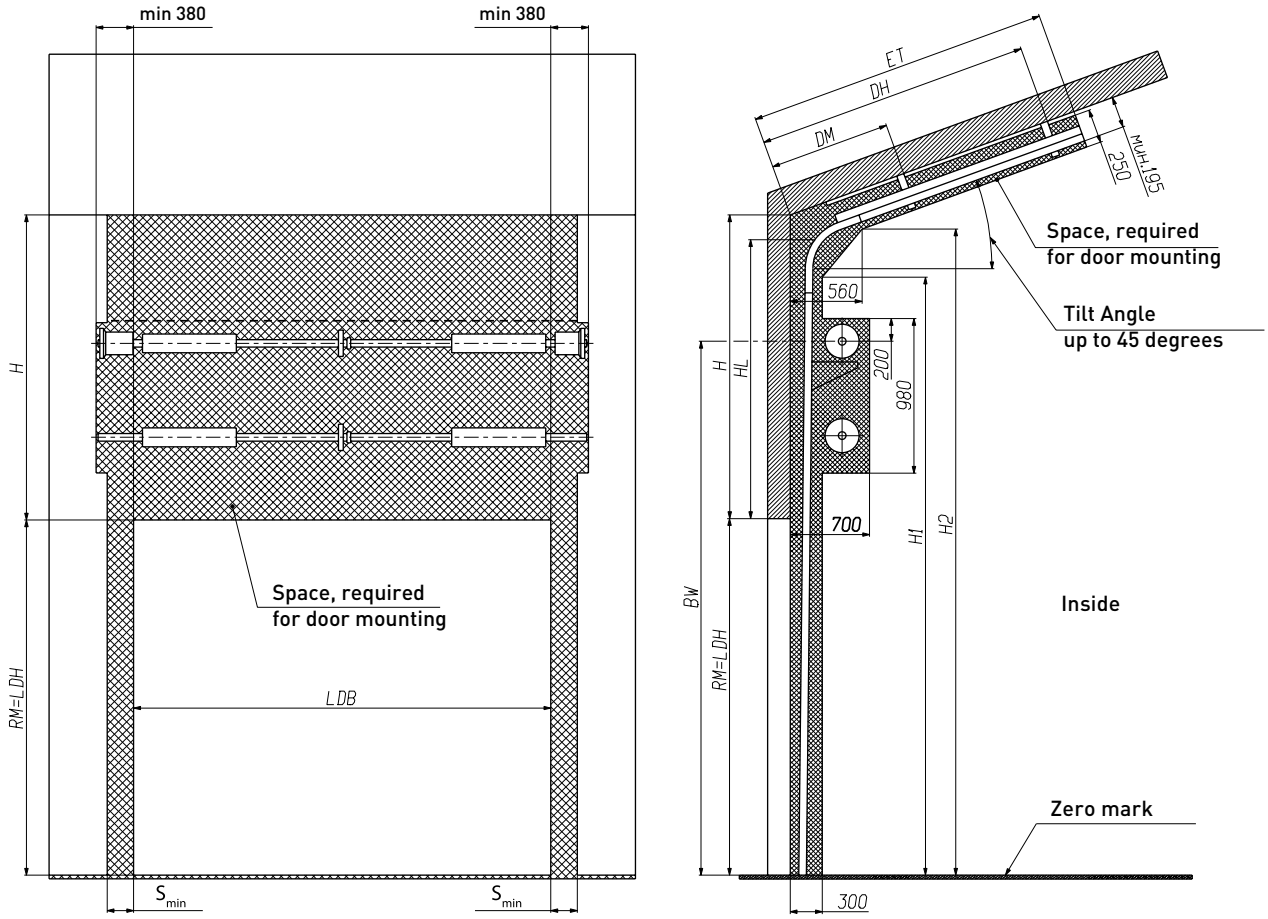
When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* Doors with the parameter HL more than 3000 mm are manufactured to special order. Parameter HL must be less than the door height.

** The dimensions are agreed when placing the order. Value by default is: BW=RM+1500 mm.

8.11.2. Inclined high mounting with bottom shaft positioning with double shaft balancing system

For doors series ProPlus, AluPro, AluTherm



Parameter, mm	Description	Formula or value
H	Headroom height	min 2100
HL*	Height of horizontal track positioning from the top of the passage	from 1905 to H−195 (max 4100)
BW**	Height to the shaft axis	from RM+1200 to RM+HL−400
ET	Depth of door entering into the premises	RM−HL+850
DH	Positioning of fixing points	RM−HL+620
DM	Positioning of fixing points	1050
H1	Parameters of door operating area	RM+HL−445
H2	Parameters of door operating area	RM+HL−55
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

The required angle of inclination is agreed when placing the order in increments of 5° within the range from 5 to 45°. As a rule it is equal to the inclination of the ceiling.

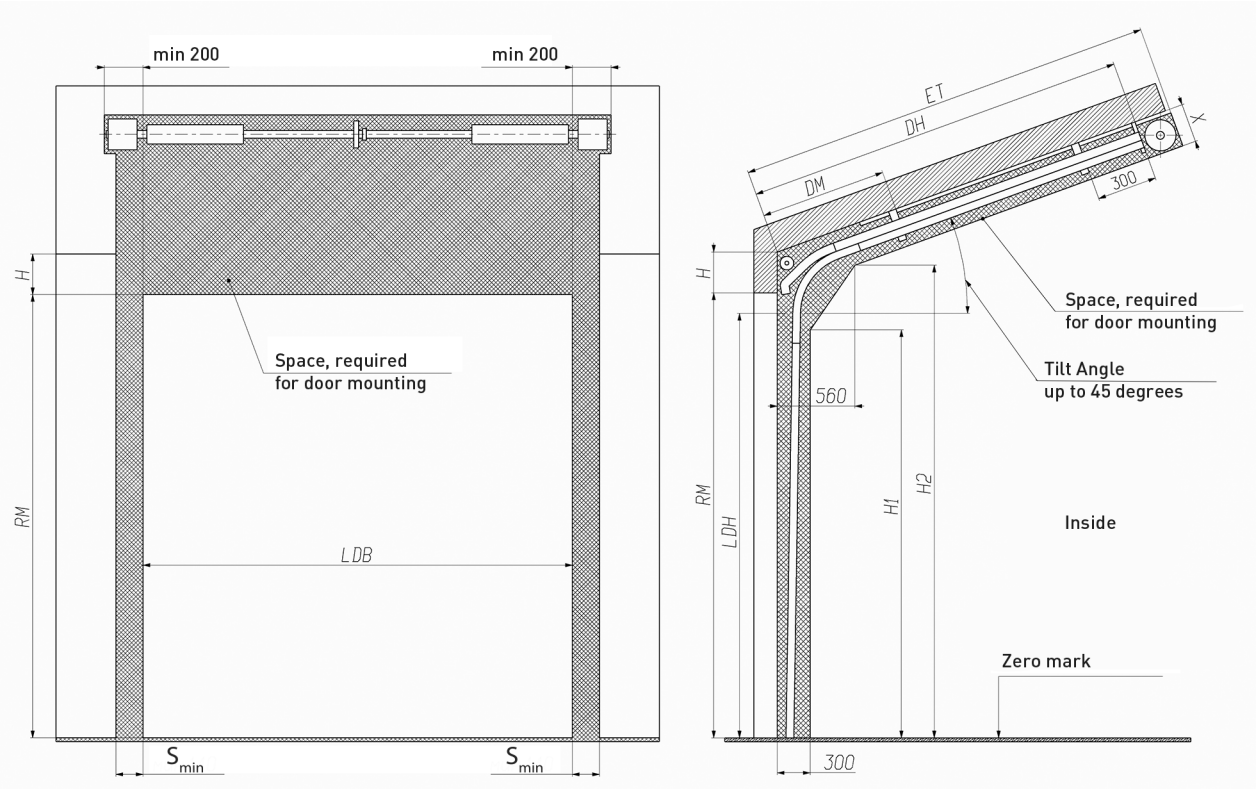
When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

* Doors with the parameter HL more than 3000 mm are manufactured to special order. Parameter HL must be less than the doors height.

** The dimension is negotiated when placing the order. The initial dimension: BW=RM+1500 mm.

8.12. INCLINED LOW MOUNTING

For doors series ProPlus, ProTrend, AluPro, AluTherm, AluTrend



Passage height RM, mm	Parameters of door operating area X, mm
up to 3680	250
more than 3680 to 5085	270
In some cases it is possible to increase the parameters up to	340

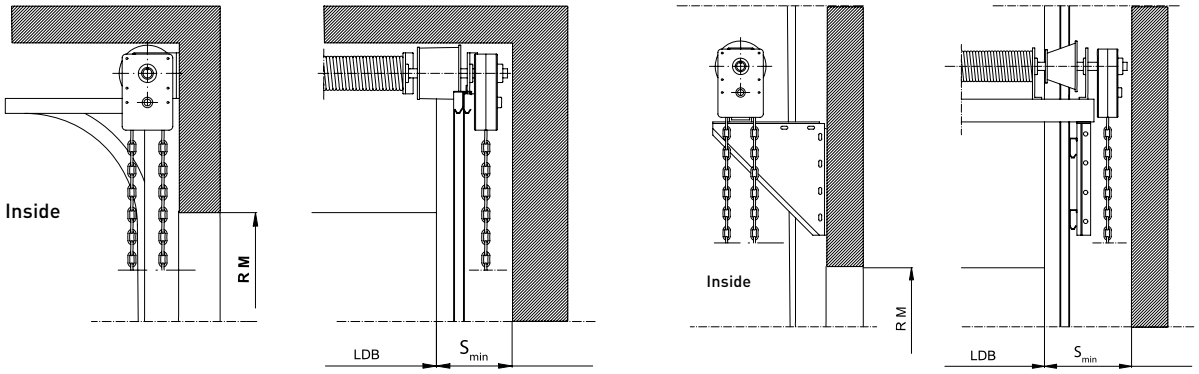
Parameter, mm	Description	Formula or value
H	Headroom height	min 230—for doors without wicket min 250—for doors with wicket
LDH	Clear dimension height	RM−135
DM	Positioning of fixing points	1050
DH	Positioning of fixing points	RM+520
ET	Depth of door entering into the premises	RM+980
H1	Parameters of door operating area	RM−335
H2	Height to the horizontal track	RM+145
S_{min}	Minimum side room for angle bars mounting	110—reinforcing brackets inside the bars; 140—reinforcing brackets outside the bars

The required angle of inclination is agreed when placing the order in increments of 5° within the range from 5 to 45°. As a rule, it is equal to the inclination of the ceiling.

When using a chain hoist or motor the minimum side-room on one side increases to the size stated in section 9.

9. ADDITIONAL OPENING PARAMETERS FOR CHAIN HOST AND OPERATORS INSTALLATION

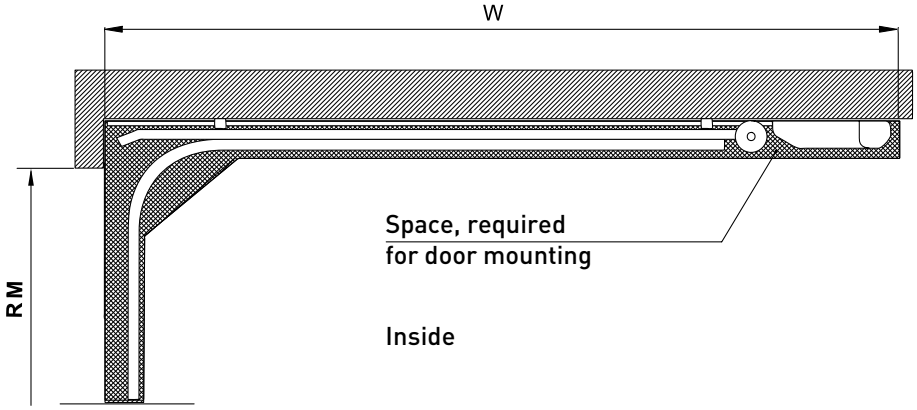
9.1. CHAIN HOIST



Doors with top shaft positioning			
Single shaft balancing system		Double shaft balancing system	
Shaft diameter, mm	Side distance S_{min}, mm	Shaft diameter, mm	Side distance S_{min}, mm
25.4	300	31.75	580
31.75	375		

Doors with bottom shaft positioning			
Single shaft balancing system		Double shaft balancing system	
Shaft diameter, mm	Side distance S_{min}, mm	Shaft diameter, mm	Side distance S_{min}, mm
25.4	370	31.75	580
31.75	440		

9.2. RAIL MOTOR FOR DOORS WITH LOW MOUNTING

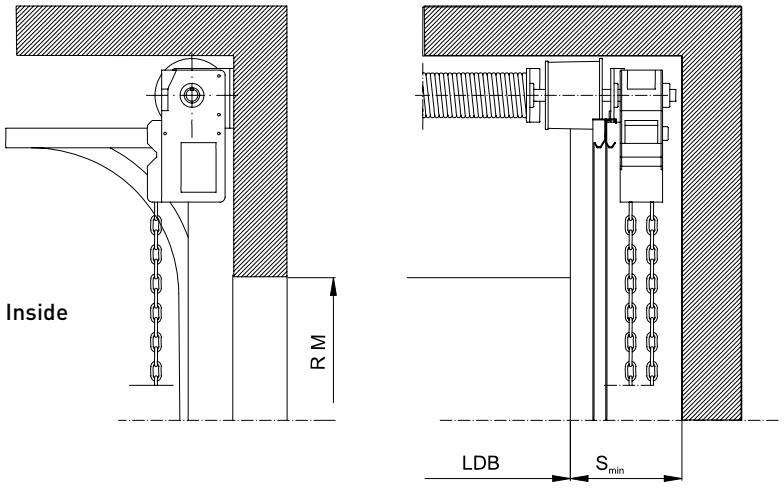


Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm
Comfort 50/60	to 2550	SZ-12SL (RU)	3750	130
Comfort 60L	to 3100	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2050	SZ-11SL	3300	
	to 2300	SZ-12SL	3550	
	to 2500	SZ-12SL (RU)	3750	
	to 3050	SZ-13SL	4300	
RT600/1000	to 2600	LGR-3600B	3900	
	to 3200	LGR-4200B	4500	
ASG600/1000	to 2550	ASGR3/3B	3700	135*/220
ASG1000	to 3250	ASGR4/4B	4400	
Levigato	to 2350	LGR-3300B/C	3650	130
	to 2650	LGR-3600B/C	3950	
	to 3250	LGR-4200B/C	4550	

* Only if to move a rail carriage to a rear door C-profile (the carriage shouldn't be moved beyond the rear door C-profile). Rail carriage design should be taken into consideration for installation of doors with the motor. Detailed information can be found in the motor installation manual.

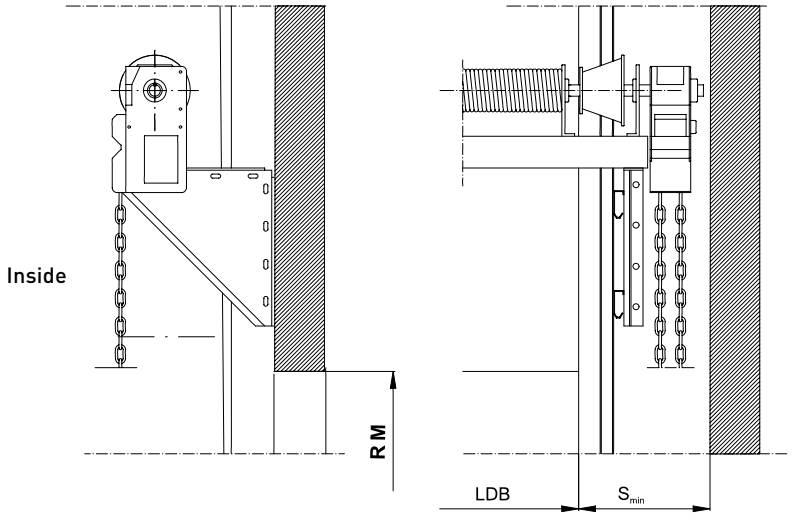
9.3. ELECTRIC DRIVE MOUNTED ON DOOR SHAFT

9.3.1. Doors with top shaft positioning



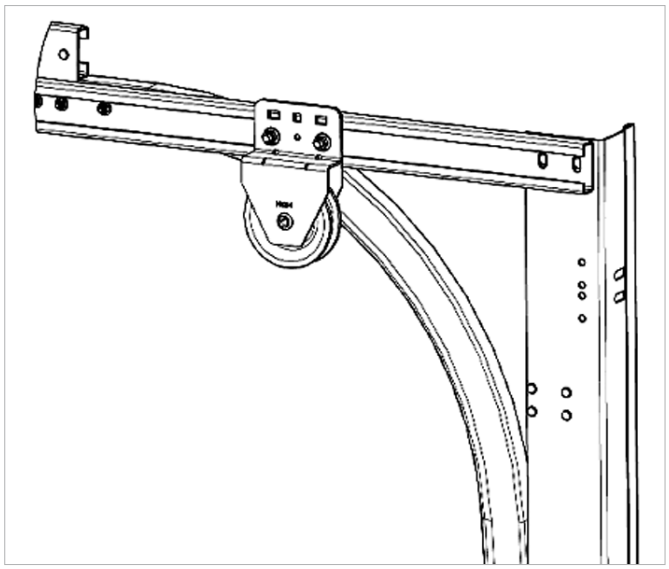
Series of electric drive	Single shaft balancing system		Double shaft balancing system	
	Shaft diameter, mm	Side distance S_{min}, mm	Shaft diameter, mm	Side distance S_{min}, mm
STA	25.4	310		
ASI50	25.4	390		
TR-3531-230	25.4	400	31.75	675
TR-5024-230				
TR-5024-400				
TR-10024-400	25.4	405	31.75	675
TR-13018-400	31.75	420		

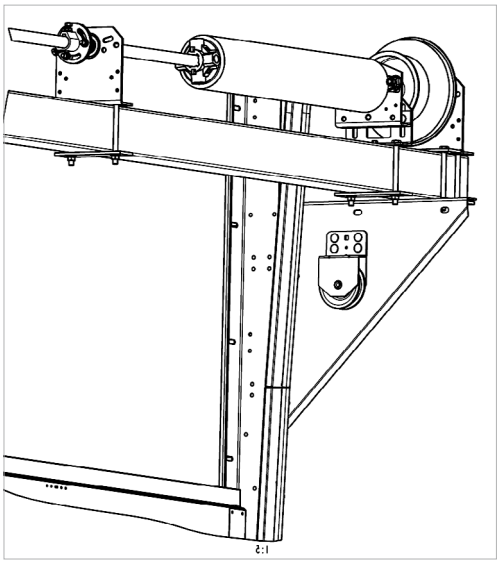
9.3.2. Doors with bottom shaft positioning



Series of electric drive	Single shaft balancing system		Double shaft balancing system	
	Shaft diameter, mm	Side distance S_{min}, mm	Shaft diameter, mm	Side distance S_{min}, mm
STA	25.4	330		
ASI50	25.4	410		
TR-3531-230	25.4	545	31.75	585
TR-5024-230				
TR-5024-400				
TR-10024-400	25.4	545	31.75	590
TR-13018-400	31.75	505		

9.4. BLOCK FOR MANUAL OPENING



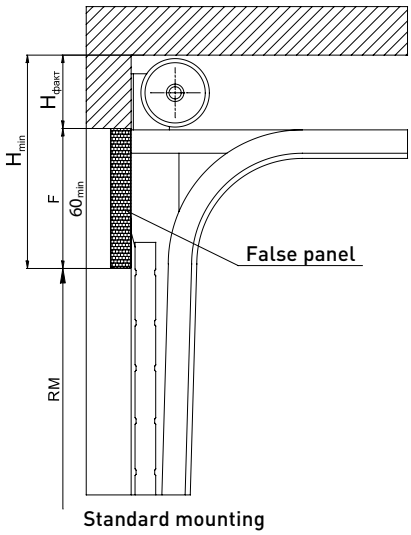


Block for manual opening does not require any side room.

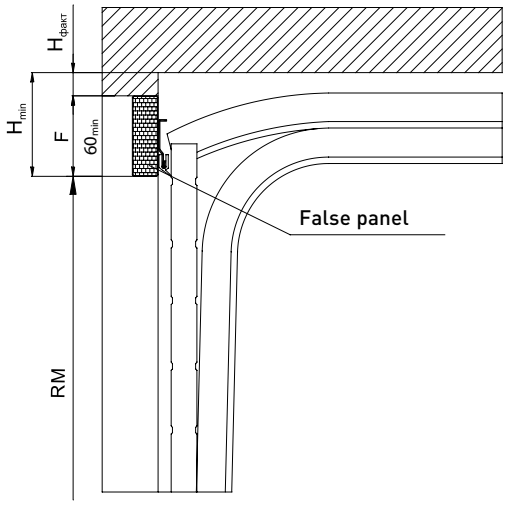
10. FALSE PANEL

10.1. USE OF FALSE PANEL FOR EXTENSION OF HEADROOM HEIGHT FOR STANDARD AND LOW MOUNTING

This variant can be used on doors with standard and low mounting with the headroom height less than stated in the section 8.



Standard mounting



Low mounting

The method of defining the height of false panel and ordered door height:

Measure actual height of the headroom–H_{fact}.

Compare actual height of the headroom with the minimum required–H_{min}.

If H_{fact} is less than H_{min}, define the required dimension of the false panel ***F*** using the following formula:

$$F=H_{min}-H_{fact}$$

Compare the result obtained with the permissible dimensions of the false panel. If the dimension obtained is less than permissible, it must be extended to the minimum permissible (F_{min}=60 mm false panel made of sandwich sections; F_{min}=300 mm for false panel made of panoramic sections). Maximum dimension of the false panel must not exceed 4155 mm.

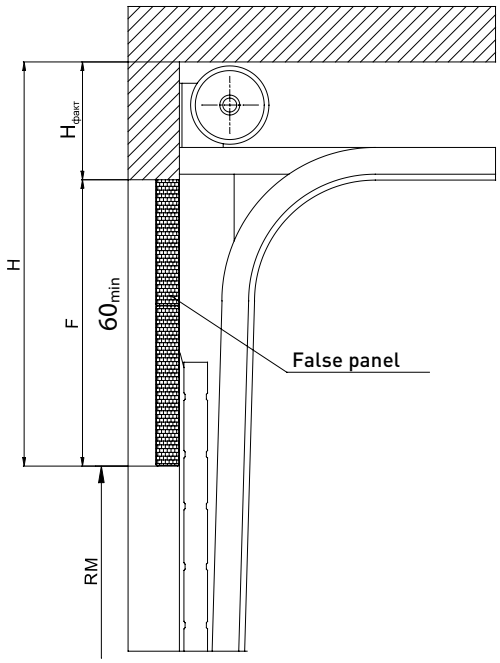
Define the ordered door height using the following formula:

$$RM=\text{Height to the ceiling}-H_{fact}-F$$

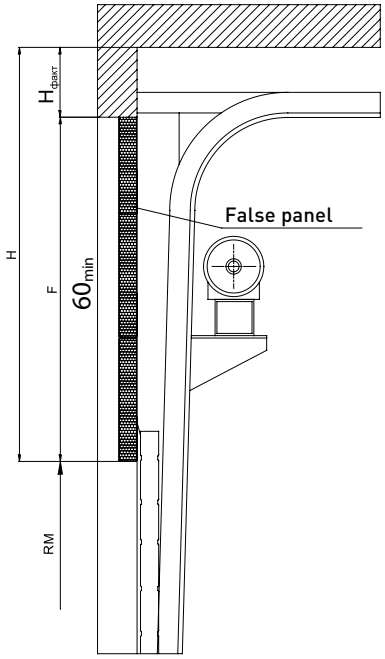
ATTENTION! It is forbidden to fasten the torsion shaft brackets to the false panel!

10.2. USE OF FALSE PANEL FOR EXTENSION OF HEADROOM HEIGHT FOR HIGH AND VERTICAL MOUNTING

The variant can be used on industrial doors with high and vertical types of mounting.



Top shaft positioning



Bottom shaft positioning

To define minimum parameter H_{fact} and maximum height of the false panel F_{max} it is important to use the following table:

Type of door mounting	Minimum parameter	Maximum height of the false panel F_{max}, mm
High and inclined high mounting with top shaft positioning	350	HL+55 (max 4155)
Vertical mounting with top shaft positioning	350	RM
High, inclined high and vertical with bottom shaft positioning	0	4155

The method of defining the height of false panel and ordered door height

Measure actual height of the headroom—H_{fact}.

Specify the required door height RM.

Define the necessary height of the false panel ***F*** using the following formula:

$$F=\text{Height to the ceiling}-H_{fact}-RM$$

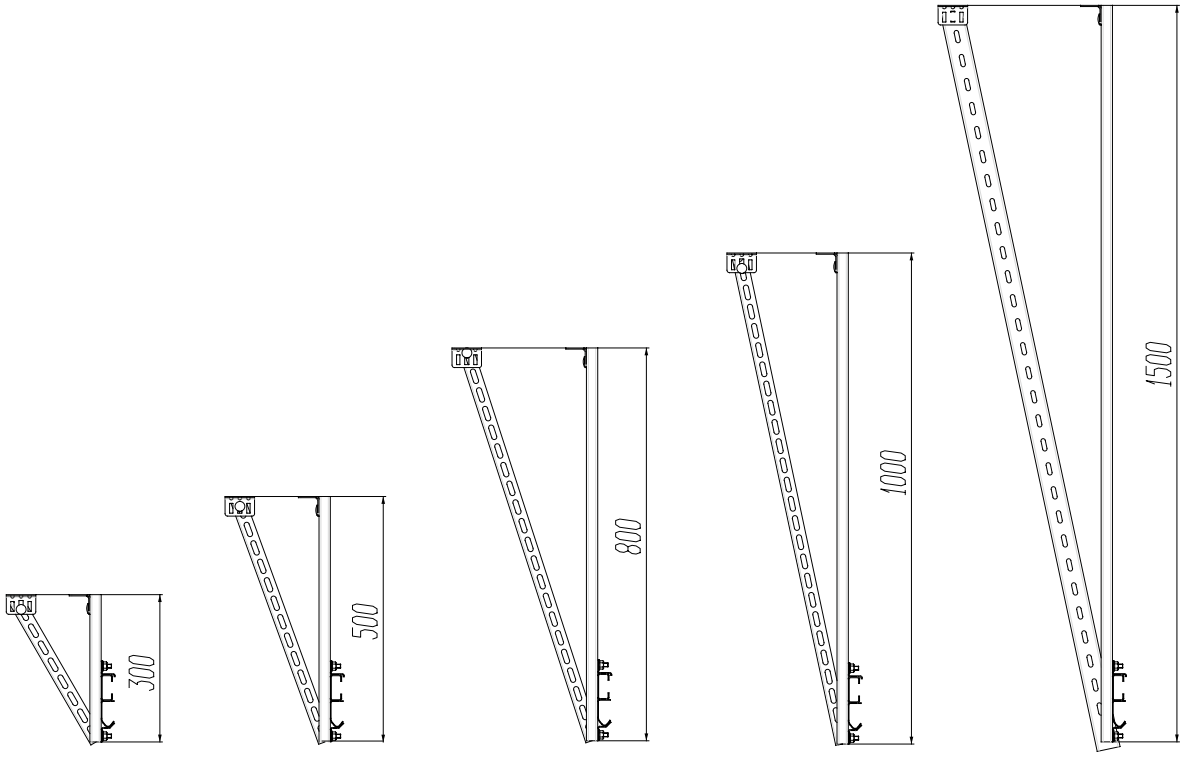
Compare the received result with the permissible dimensions of the false panel. If the received dimension is less than permissible, it must be extended to the minimum permissible (F_{min}=60 mm false panel made of sandwich sections; F_{min}=300 mm for false panel made of panoramic sections). Maximum dimension of the false panel must not exceed 4155 mm. If the result obtained is more than permissible, you have to choose another type of door mounting and define the height of the false panel once again.

If necessary correct the ordered door height using the following formula:

$$RM=\text{Height to the ceiling}-H_{fact}-F$$

For high types of mounting specify the parameter HL and compare it with other parameters stated in section 10 for each type of mounting.

11. TELESCOPIC HANGERS FOR INDUSTRIAL DOORS



Type CS-1 | Type CS-1 | Type CS-1 | Type CS-1 | Type CS-1

Type of mounting	Type of system on default
Standard mounting	CS-2*
High mounting with top shaft positioning	CS-2*
High mounting with bottom shaft positioning	CS-1*
Low mounting	CS-1*
Inclined mounting	CS-2*
Inclined mounting with top shaft positioning	CS-2*
Inclined mounting with bottom shaft positioning	CS-1*
Inclined low mounting	CS-1*

Number of hangers for horizontal tracks on one industrial door:

Number of hangers for horizontal tracks on one door for all types of mounting (except high and vertical types of mounting), pcs.	Doors height (RM), mm
4	RM < 3000
6	3000 ≤ RM < 4500
8	RM < 5000

Number of hangers for horizontal tracks on one door for all types of mounting (except high and vertical types of mounting), pcs.	Doors height (RM), mm
4	(RM−HL)<3000
6	3000≤(RM−HL)<4500
8	(RM−HL)<5000

Hangers for horizontal tracks are not used for doors with vertical types of mounting. Moreover, for doors with low and inclined low types of mounting additional hangers for the torsion shaft are used. The number of such hangers is defined using the program depending on the door dimensions and the number of springs (not less than 3 and not more than 6):

Number of hangers for torsion shaft on one door, pcs.	Number of springs, pcs.	Doors width (LDB), mm
3	2	LDB<4000
4	2	LDB ≥ 4000
4	3	LDB < 4000
5	3	LDB ≥ 4000
5	4	LDB < 4000
6	4	LDB ≥ 4000

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