

CLEAN ROOM

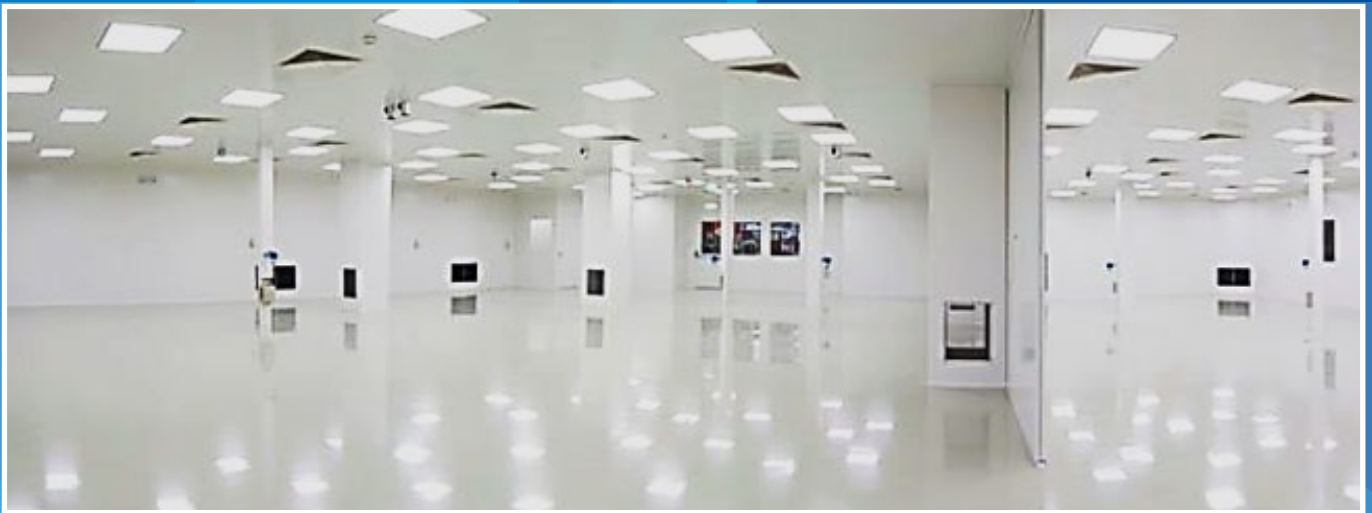


CLEAN ROOM

may be defined as the confined space made of the components for the system of clean room creation where the beforehand specified parameters of air condition are guaranteed. The rooms may be created using various technologies from various construction materials or construction systems. It goes without saying, each of them has its own benefits and advantages. From the point of view of long-term operation of clean rooms in various fields, it seems to be more suitable to apply modern flexible metal construction systems offering the whole range of benefits over the classic building constructions.



For the construction of such defined space, ENCO s.r.o. has the components in its production program which shall ensure the required operation conditions together with the relevant technology for the modification of required parameters or air condition. With their high utility value and design they meet the high demands for sanitary safety, easy cleaning and disinfection meeting the demanding requirements for the use in the h.u. fields.

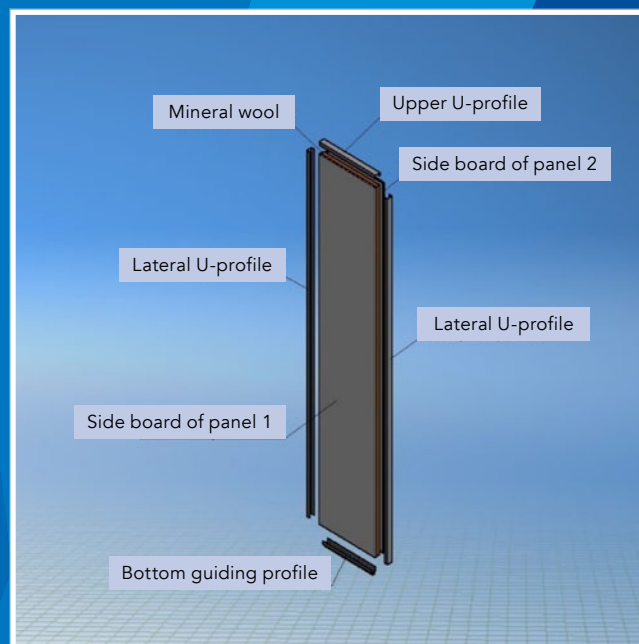


The construction system of clean rooms delivered by ENCO may be used when building the operation rooms, in the electric engineering, pharmaceutical, optical and food industry and in the field of fine mechanics, nuclear technology, bacteriology, virology and everywhere it is necessary to have the particle and microbial contamination of environment under control.

The components for the construction of clean rooms may be used also for the construction of premises where a high class of cleanliness of environment is not unconditionally necessary.

PARTITION PANELS

Sandwich type, composed of two lateral walls with internal filling made of mineral wool, lateral and top U-shaped profiles and bottom guiding profile. These elements are mutually bonded in a thermal press using single-component polyurethane adhesive. The panels may be full or glassed - PHARMA glass pane type. For these panels, the holes for air-conditioning, trans-loading cabins and various technological holes, reinforcements necessary for the installation of sliding door drives, technological devices or other elements may be prepared in advance according to the requests of the customer.



We recognize two types of systems, groove and tongue system and ENCO system. The ENCO panel connection system: the panels are interconnected using vertical installation channels, the standard width is 120 mm. The installation channels may serve for guiding several media or as the space for the reinforcement of walls with extreme dimensions. The groove and tongue joining system is done by the mutual insertion of panels. The other important elements for the composition of partition walls in clean room are above-door panels and by-door panels with the incorporated reinforcements for doorcase fixation. All the types of panels may comprise the conduits for the transition of electric conductors..

Technical parameters of panels

Thickness (mm)	Preferred height (mm)	Max. height of panel (mm)*	Standard width (mm)*	Panel weight (kg/m ²)
				Mineral wool filling
22	2600, 2800, 3100	4000	1080, 1200	19,5
32				20
42				21
52				21,5
60				22
72				22,5
102				24,5
122				25

* For walls higher than the max. height of panel, the walls shall be combine from several panels up to the required height.

** The panels with other width than the standard must be custom made as ATYPIC.

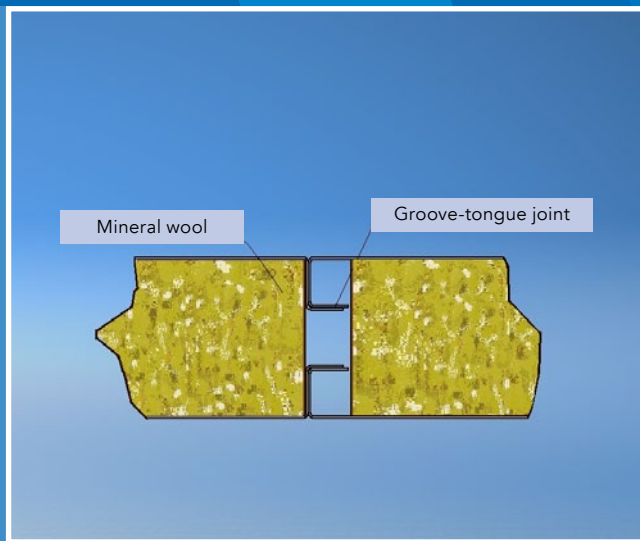
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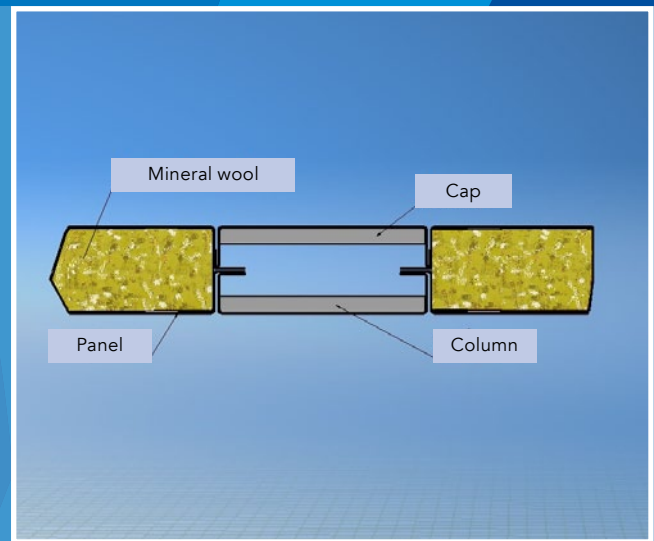
Partition panel filling

Filling	Thickness (mm)	Density (kg/m ³)	Thermal conductivity coeff.. K(W/m.K)	Maximum loading temperature (°C)
Mineral wool	20,30,40,50,58,70,100,120	100,150	0,040	B

Solid Floor Profile



Adjustable Floor Profile



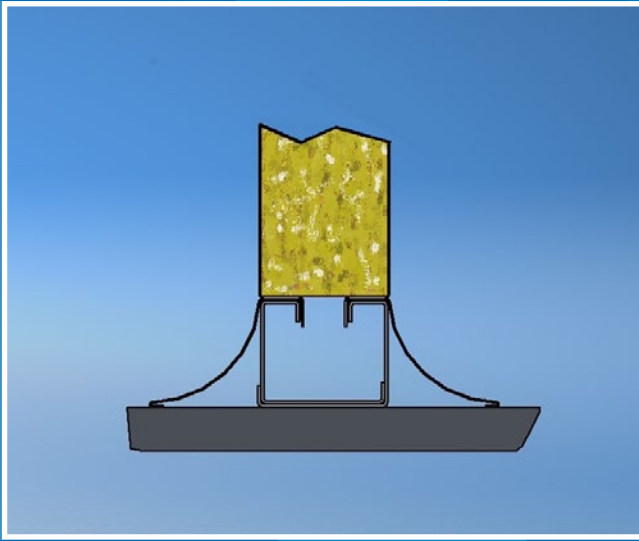
- The method of setting and assembly of panels is using bottom floor profile (fixed, adjustable), its width changes depending upon the used floor system anchored with dowels and screws into the floor.
- The panels are inserted into the groove in the bottom floor profile.
- Between each other, between the ceiling or using the ceiling structure using the system elements.



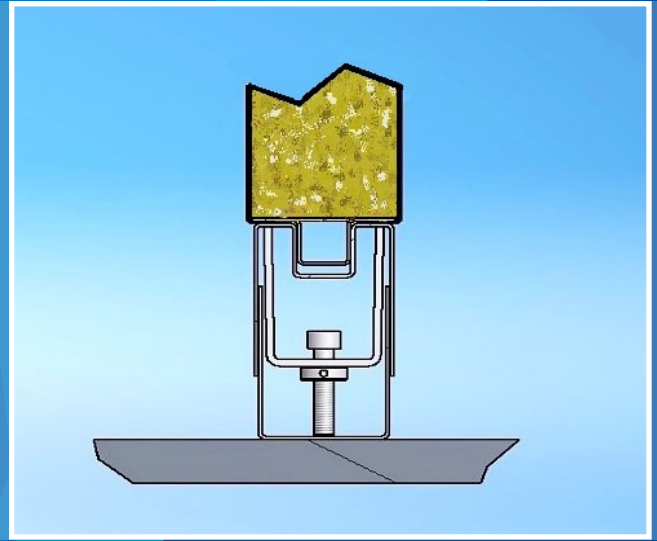
Accessories and used materials of partition panels

Element type	Basic type of material	Alternative version	Combination version	Standard dimension
Side panel	Bilaterally zinc-plated metal sheet 250 g Zn/m ² th.0.75 mm PVDF RAL 9010 protected with PE foil	PVDF RAL 9010, AISI 304 FIN 8 Protected by PE foil	RAL-RAL , RAL-AISI 304, AISI 304- AISI 304	The table of technical parameters of panels
U-shaped floor profile	Bilaterally zinc-plated metal sheet 250 g Zn/m ² th.0.75 mm PVDF RAL 9010 protected by PE foil	PVDF RAL 9010, AISI 304 FIN 8 Protected by PE foil	According to the version of panels-- partition wall	20 x 65 x 2500
Fixed floor profile	Bilaterally zinc plated metal sheet DX51D+Z200 th.1.5 mm	AISI 304 FIN 8 Protected by PE foil	According to the version 50 x 56 x 2500 of panels-partition wall	50 x 56 x 2500
Adjustable floor profile	Bilaterally zinc plated metal sheet DX51+Ze 25/25 th.1.5mm	Powder colour RAL 9010, AISI 304 FIN 8 Protected by PE foil	According to the version of partition wall	90 x 56 x 2500 possibility of adjustment from 75 up to 105 mm

Groove-tongue System of Panel Joining



ENCO System of Panel Joining



Advantages of ENCO System

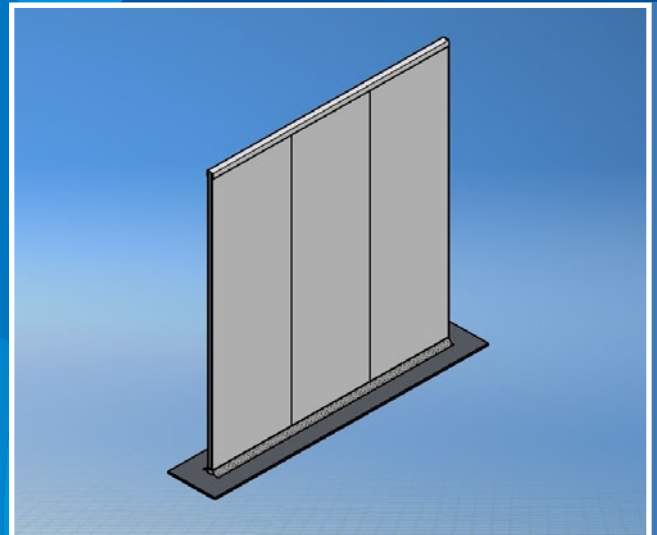
- More advantageous and simpler disassembly of partition wall panels for the purpose of relocation or addition of auxiliary necessary technology,
- Excellent complex view and finish,
- Sound and thermal insulation, and
- Simple maintenance.

Advantage of Groove - Tongue System

- Fast and simple assembly, and
- Lower price.

Maintenance and Cleaning

- The surface of PVDF should be cleaned using common cleaning and disinfection means not comprising abrasive grains and solvents.
- The AISI 304 surface, with regards to the version: ground surface in the direction of grinding, polished surface using mild non-abrasive detergent.



PANEL BOARDS

The panel boards is another system element for clean room creation.

The panel is composed of the side panel and filling material - plaster cardboard.

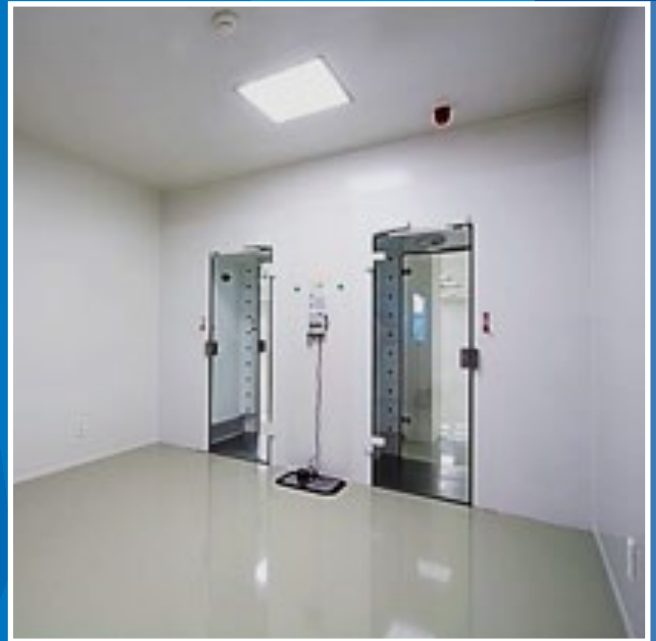
Such panels are fixed to the system support structure made of the basic bottom profile in which the assembly structure is located and anchored by the walls using dowels and screws.

All the joins between the panel boards are covered with caps with standard width of 60 mm. The surface of such made panel board wall is identical with the surface of partition panels. These elements are used as the panelling of the existing walls, their thickness is 16 mm and therefore they keep just very little space.

The grid of the supporting structure is on the basis of the dimensions and mechanical properties of plaster-cardboard boards 600 mm.

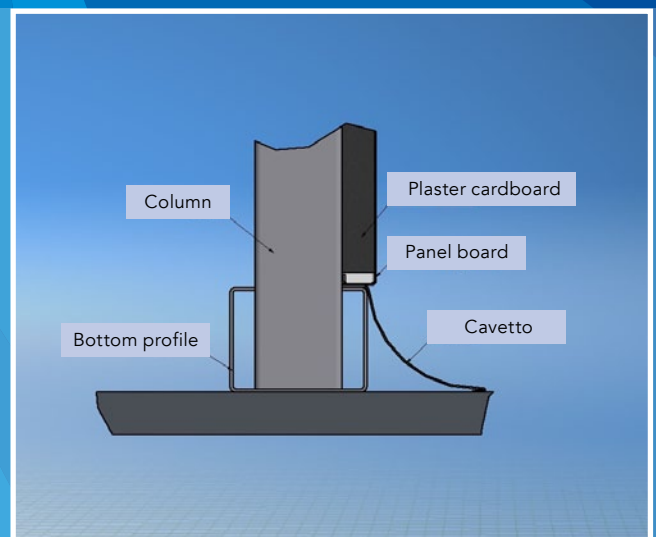
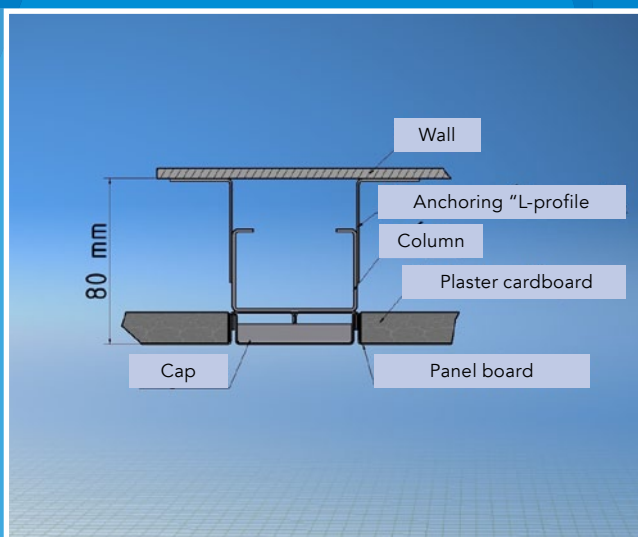
The area between the panelling and the wall is suitable for the location and guiding of necessary media, such as wiring, supply and discharge of liquids.

Overcoming of height dimensions above max. dimension of the panel boards is made by extending the panels and adapting the supporting structure.



Panel Board Joining

Panelling System



Technical parameters of panelling

Thickness (mm)	Preferred height (mm)	Maximum height of panelling (mm)*	Standard width (mm)	Weight of panelling (kg/m ²)
				Fire-resistant filling, plaster- cardboard boards, EI30
16	2600, 2800, 3100	4000	1200	18

* For walls higher than the max. height of panelling, the walls are composed of several elements up to the required height.

Accessories and used materials of paneling

Element type	Basic type of material	Alternative version	Standard dimension
Side panelling wall and cap	Bilaterally zinc-plated metal sheet 250 g Zn/m ² th.0.75 mm PVDF RAL 9010, protected with PE foil	AISI 304 FIN 8 Protected by PE foil	The table of technical parameters of panelling
U-shaped floor profile	Bilaterally zinc plated metal sheet DX51D+Z200 th.1.5 mm	Natur	69x50
Column of supporting structure	Bilaterally zinc plated metal sheet DX51D+Z200 th.1.5 mm	Natur	60x40

Maintenance and Cleaning

- The PVDF surface should be cleaned with mild non-abrasive detergent.
- The AISI 304 surface, with regards to the version: ground surface in the direction of grinding, polished surface using mild non-abrasive detergent.

TRANS-LOADING CABIN

The trans-loading cabins serve for the trans-loading of goods and materials between the neighbouring rooms with different cleanliness level. In order to prevent the contamination of clean room during the trans-loading, the cabin doors are mutually blocked, which shall prevent the opening of both doors at one time.

The cabins are made with mechanical and electromagnetic blocking, we classify them as active and passive. According to the location of the cabin in the centre of the partition wall or in the corner of a room, we differentiate direct cabins with opposite located doors or corner cabins with doors next to each other.



As long as there is a requirement of cleaning the internal space of the cabin with air (active cabin), the internal parts of the lid and bottom are perforated.

The supply of compressed air is located in the upper section of the lid and the discharge of air may be located in the bottom or the lid of the cabin, save the top lid, according to the given situation.

It is possible to locate HEPA filters in the lid of the rinsed cabins.

<i>Material version of a cabin</i>			
<i>Element type</i>	<i>Basic type of material</i>	<i>Standard finish treatment</i>	<i>Alternative version</i>
<i>External jacketing, Door</i>	<i>Bilaterally zinc plated metal sheet DX51D+ZE 25/25 th.1.5 mm</i>	<i>RAL 9010</i>	<i>AISI 304 FIN 8 protected by PE foil or RAL, according to requests</i>
<i>Internal jacketing</i>	<i>AISI 304 FIN 8 Protected by PE foil</i>	<i>AISI 304 FIN 8 Protected by PE foil</i>	<i>AISI 304 FIN 8 Protected by PE foil</i>

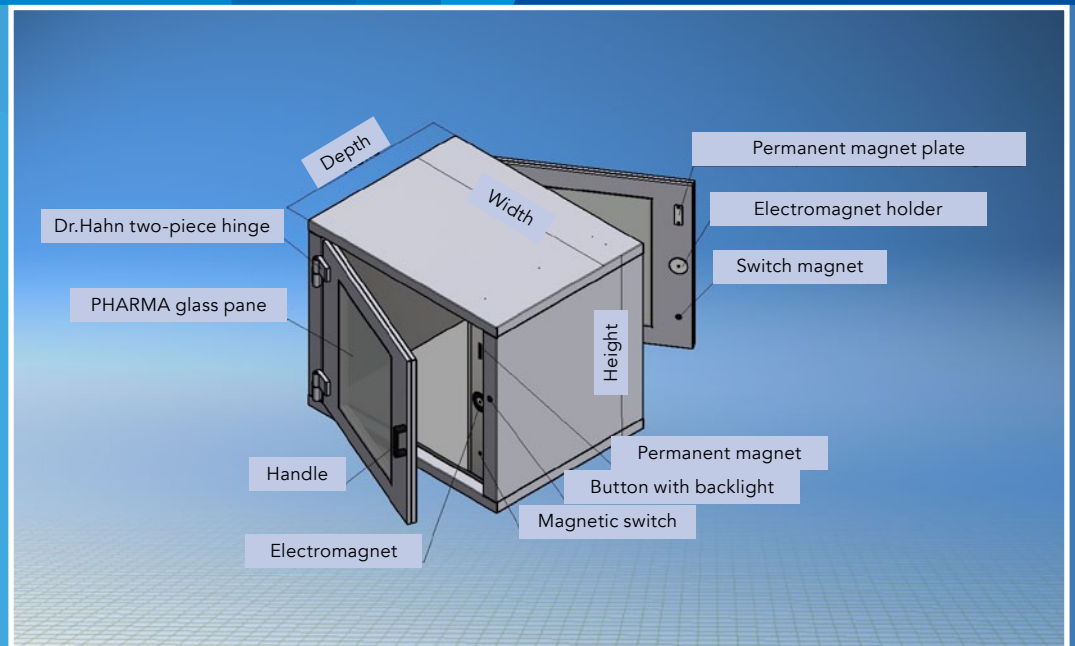
Technical parameters of a cabin

Dimensions:	Standard clear dimensions	Standard construction dimensions	Maximum Clear dimensions	Max.construction dimensions
Width (mm)	400, 500, 600	650, 750, 850	1000	1250
Height (mm)	400, 500, 600	527, 627, 727	1000	1127
Depth (mm)	400, 500, 600	464, 564, 664	1000	1064

Other dimensions than those ones stated in the table are made as atypical.

Maintenance and Cleaning

- The external surface of PVDF should be cleaned using common cleaning and disinfection means not comprising abrasive grains and solvents.
- The AISI 304 surface, with regards to the version: ground surface in the direction of grinding, polished surface using mild non-abrasive detergent.



Warning

Assembly, wiring and maintenance may be carried out only by the organisation having authorisation for such activity.

CLEAN ROOM DOOR

Clean room door ensure a high level of non-permeability for sound and air, as well as easy maintenance.

The non-permeability is ensured by seals in the doorcase from three sides and from the floor with falling seal, built-in the door.

The side panels of the door may be made of painted metal sheet, stainless steel sheet or zinc-plated metal sheet with surface finish using powder fire-burnt paint RAL according to the requirements of a customer.

The doorcase may be produced from zinc-plated metal sheet with surface finish using powder fire-burnt paint RAL, according to the requirements of the customer, or it may be made of stainless steel sheet with ground surface. The standard door is equipped with stainless steel fittings, hinges made by Dr. Hahn in white or eloxal-coated surface finish, with self-closing device made by Dorma in white or silver using RAL paint.

Glass pane is equipped with safety glass with thickness 6.3mm of PHARMA type. The versions of the door and doorcase are given in the table.

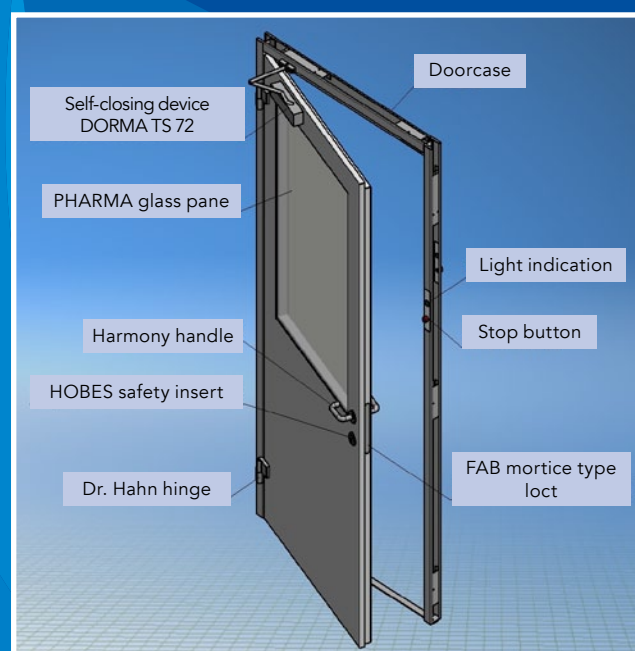


Technical Parameters of Door Closing Device

	Variants of door and doorcase	Type of standard material of door and doorcase	Standard colour version of door and doorcase	Alternative surface finishes of door and doorcase	Standard clear dimensions of door and doorcase W x H x T (mm)	Glass pane type
Single-wing *full * with glass pane	Blocked, not blocked	Bilaterally zinc-plated metal sheet 250 g Zn/m ² th.0.75 mm PVDF RAL 9010 Protected by PE foil	RAL 9010 Protected by PE foil	RAL According to the requirements AISI 304 FIN 8 protected with PE foil, the inter-combination of the given surfaces	W -- 600 -- 1150, H - 2000--2500, T - 60,72	* NO ** PHARMA ESG 6.3mm
Dvojkrídlové * plné ** presklené	Blocked, not blocked	Bilaterally zinc-plated metal sheet 250 g Zn/m ² th.0.75 mm PVDF RAL 9010 Protected by PE foil	RAL 9010 Protected by PE foil	RAL According to the requirements AISI 304 FIN 8 protected with PE foil, the inter-combination of the given surfaces	The classification of wings according to the requirements: W - 1200 - 2300, H - 2000-2500, T - 60,72	* NO ** PHARMA ESG 6.3mm
Jednokrídlová zárubňa	Blocked, not blocked	Bilaterally zinc plated metal sheet DX51D+ZE 25/25 th. 1.5mm	RAL 9010, powder paint	RAL According to the requirements AISI 304 FIN 8 protected with PE foil, the inter-combination of the given surfaces	W -- 600 -- 1150, H - 2000--2500, T - 60,72	NO
Dvojkrídlová zárubňa	Blocked, not blocked	Bilaterally zinc plated metal sheet DX51D+ZE 25/25 th. 1.5mm	RAL 9010, powder paint	RAL According to the requirements AISI 304 FIN 8 protected with PE foil, the inter-combination of the given surfaces	W - 1200 - 2300, H -- 2000-2500, T - 60,72	NO

Standard Equipment of Door

- Door hinges made by Dr Hahn, surface finish RAL9010, silver ELOX
- Handle Harmony supply No. 102253741 made by **SCHACHERMAYER**
- The safety insert 30/55 white nickel, made by **FAB**
- Lock of mortice type 24026, made by **HOBES**
- self-closing device Dorma TS 72, TS 92, Surface finish RAL 9010, RAL 9006



Warning

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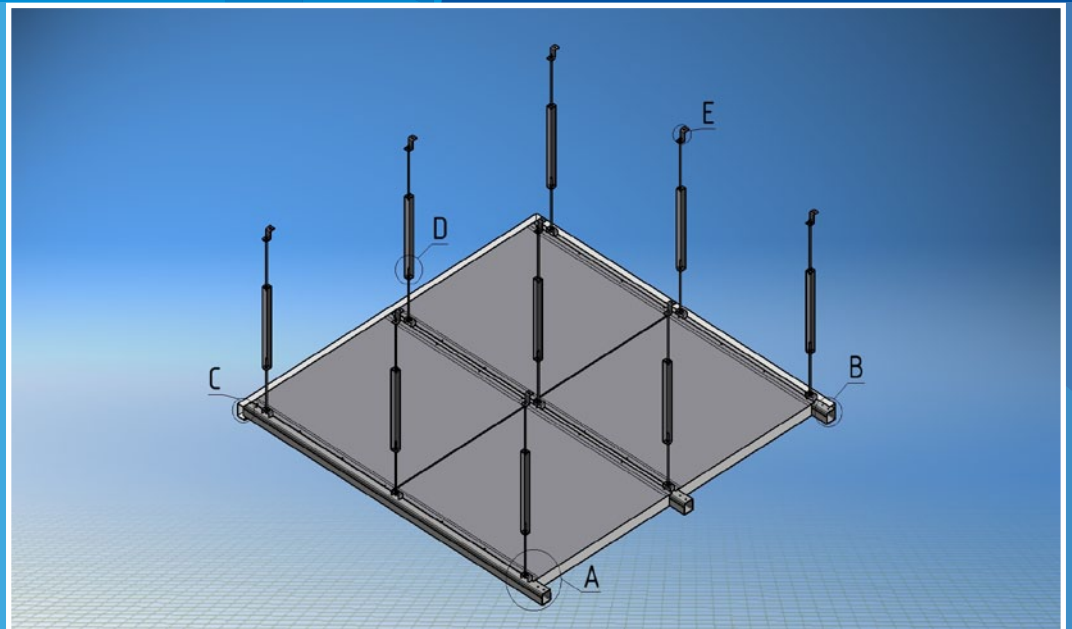
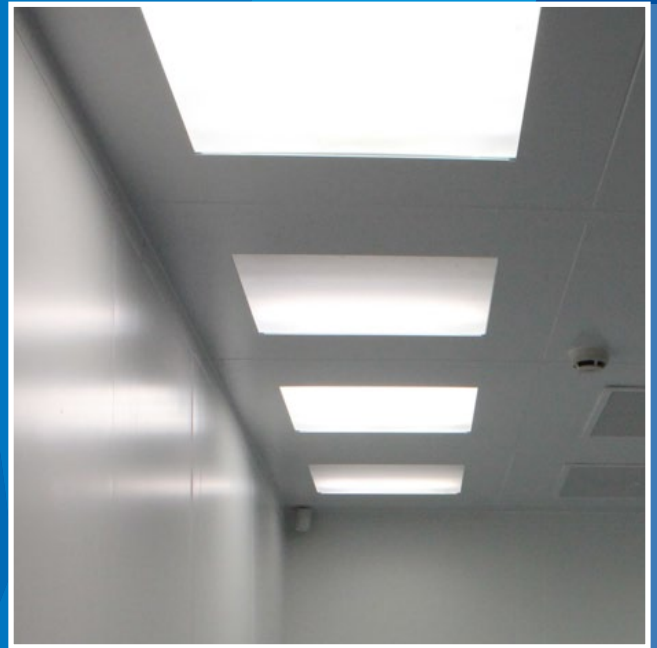
WALKING CEILING

The ceiling panels are intended for the construction of dropped ceiling, with no restricted movement of persons on their upper side during the assembly and servicing. When compared to impact and laying dropped ceiling with recognized beam, they are much stronger and they have also thermal insulation and anti-noise properties. After creating the necessary installation holes in the ceiling panels, it is possible to assembly lamps, filtration or air-conditioning extension pieces.

The assembly of walking ceiling is carried out by screening the beams and their anchoring in the ceiling or the supporting ceiling structure.

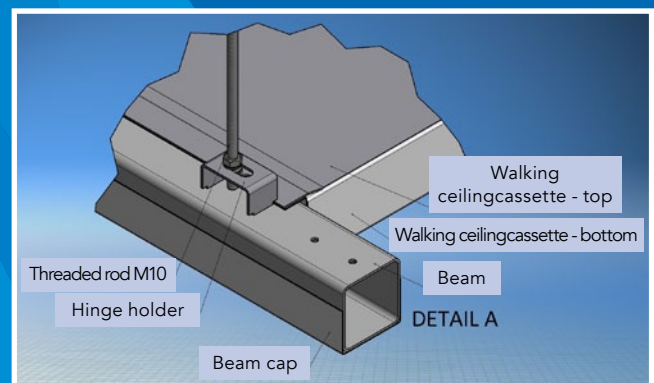
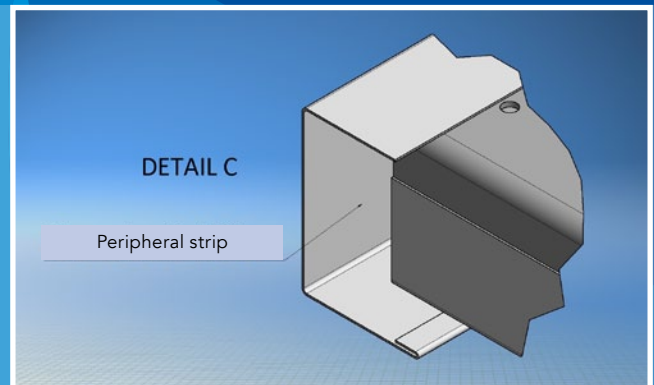
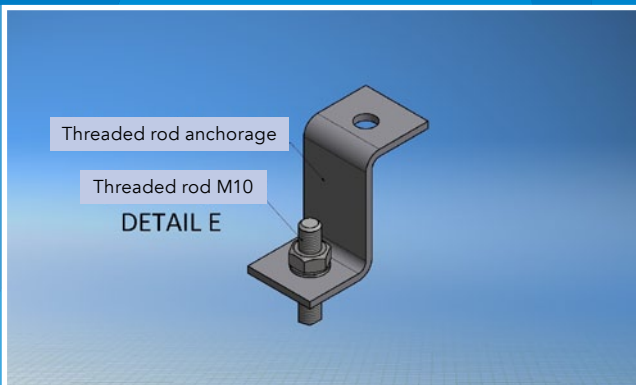
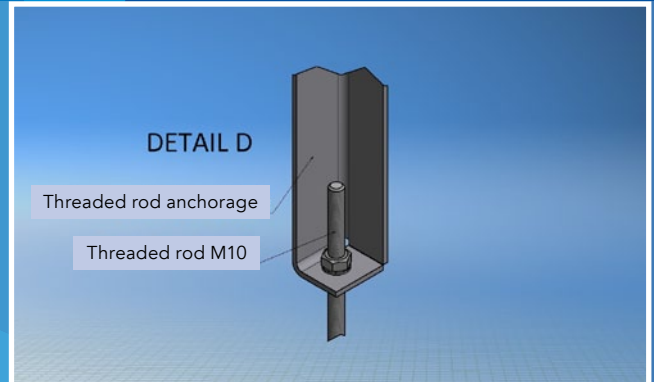
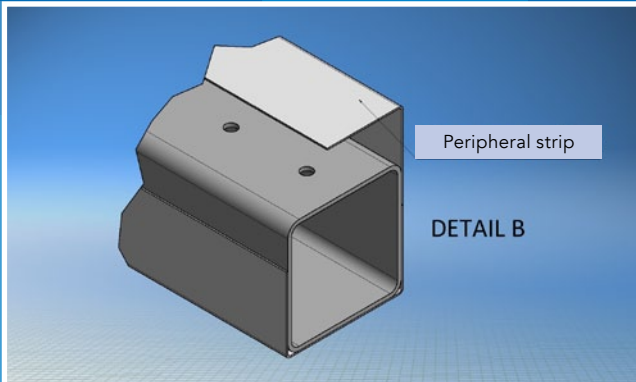
Ceiling panels are placed onto the anchored beams according to the construction design. They may be full or with holes, these ones should be assembled using screws to the beam. A cap is placed from the view side of the beam, it corresponds with the ceiling material.

Full walking ceiling panel is composed of two side panels, there is lacquered metal sheet from view side, or AISI 304 FIN 8 and zinc-plated metal sheet from upper reinforced - walking side.



Technical parameters of walking ceiling with bearing capacity of 120kg/m²

	Type of standard material of soffit side panel	Type of standard material of walking side panel	Alternative surface finishes of soffit side panels	Standard clear dimensions of ceiling panels W x H x T (mm)	Max dimension of a hole w x h (mm)	The filling of ceiling panels, th.58 mm	Standard dimension of a screen (mm)
Ceiling panel --- ull	Bilaterally plated metal sheet 250 g Zn/m ² th.0.75 mm PVDF RAL 9010 Protected by PE foil	Bilaterally zinc-plated metal sheet with th.1.5 mm DX51D+Z200	RAL According to requirements, AISI 304 FIN 8 Protected by PE foil	w -- 1000 h -- 940 th -- 60	NO	Mineral wool 120 kg/m ³	1000 x 1000
Ceiling panel --- with a hole	Bilaterally zinc-plated metal sheet 250 g Zn/m ² th.0.75 mm PVDF RAL 9010 Protected by PE foil	Bilaterally zinc-plated metal sheet with th.1.5 mm DX51D+Z200	RAL According to requirement, AISI 304 FIN 8 Protected by PE foil	w -- 1000 h -- 940 th -- 60	w -- 900 h -- 800	Mineral wool 120 kg/m ³	1000 x 1000



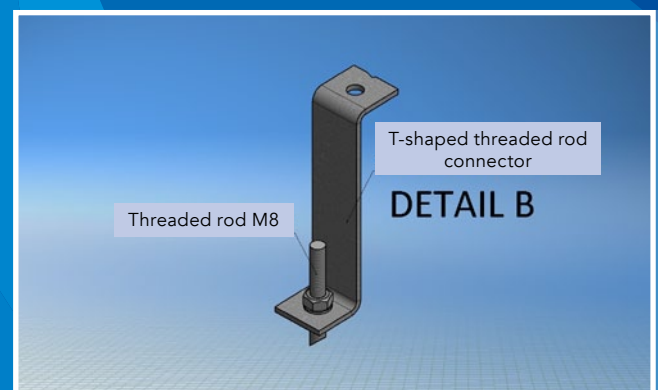
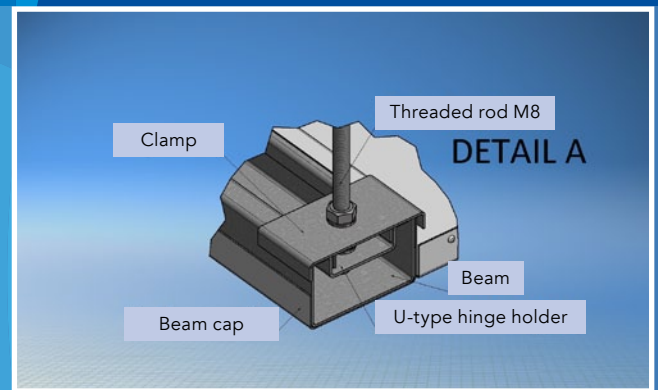
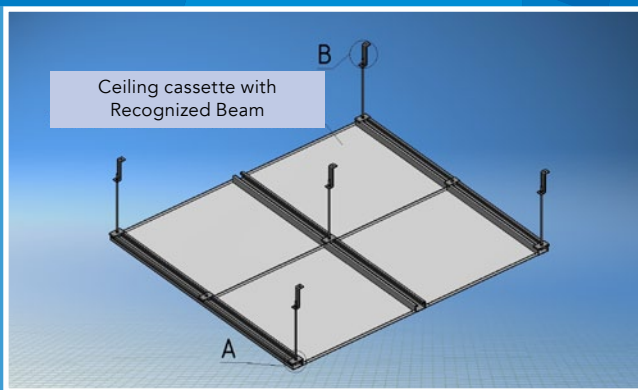
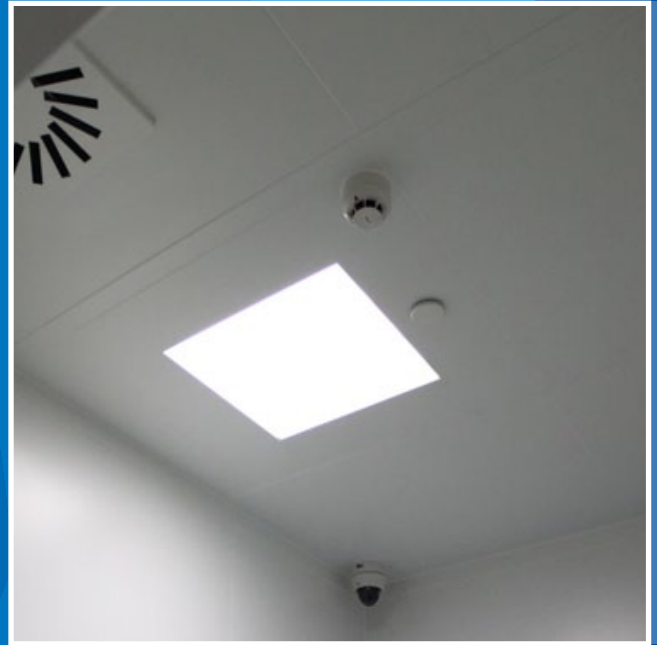
Laying Ceiling with Recognized Beam

This type of light-weight ceiling is used when closing the clean room rooms where there is no impact on thermal and sound insulation property, the structure of the ceiling allows the direct combination with walking ceiling enabling the creation of walking bridges in the light-weight structure for possible assembly, servicing and maintenance of installed air.-conditioning elements, lamps, etc.

Assembly Method

The assembly of laying ceiling is carried out by screening the beams and their anchoring into the ceiling or the supporting ceiling structure using Z-shaped connectors and the adequate connecting material.

The ceiling cassettes are placed on the carrying profile and they are screwed together using system elements, namely U-type suspension holder and threaded rod M8 with connecting material that can serve as the suspension places of the structure itself when necessary.



Technical parameters of the ceiling with recognized beam

	Type of standard material of ceiling cassette	Alternative surface finishes of ceiling cassettes	Standard clear dimensions of ceiling cassettes W x H (mm)	Max dimension of a hole w x h (mm)	Standard dimension of a screen (mm)	Min. assembly height (mm)
Ceiling cassette ---full	Bilaterally zinc-plated metal sheet 250g Zn/m ² th.0.75 mm PVDF RAL 9010 Protected by PE foil	RAL According to requirements ,AISI 304 FIN 8 Protected by PE foil	W - 750 H - 750	NO	815 x 750	150
Ceiling cassette --- with a hole	Bilaterally zinc-plated metal sheet 250g Zn/m ² th.0.75 mm PVDF RAL 9010 Protected by PE foil	RAL According to requirements ,AISI 304 FIN 8 Protected by PE foil	W - 750 H - 750	W - 600 H - 600	815 x 750	150

Maintenance and Cleaning

- The PVDF surface should be cleaned with mild non-abrasive detergent.
- The AISI 304 surface, with regards to the version: ground surface in the direction of grinding, polished surface using mild non-abrasive detergent.

IMPACT CEILING

The impact ceiling and its ceiling structure with hidden suspension system is intended in particular for the closure of clean rooms.

The type of ceiling is suitable for hospitals and laboratories, it is used also in the premises of pharmaceutical and electric engineering, food, chemical and machine engineering industry.

It is possible to embed lamps, filtration extension pieces and various air conditioning elements in the impact ceiling structure. For their simpler servicing and maintenance, there are also servicing cassettes in the ceiling structures, that allow access after being lifted off.



Standard cassette

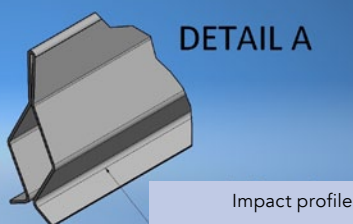
Cassette dimensions: 600 x 600 , 625 x 625
Surface from viewed side: RAL 9010, or AISI 304 FIN 8

Standard screen

Dimensions: 600 x 600 , 625 x 625

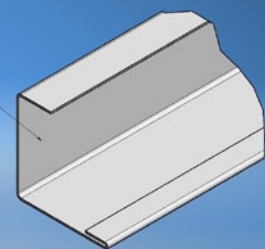
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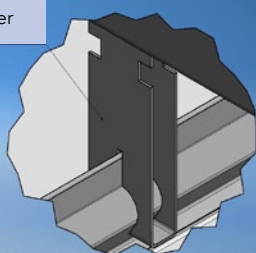
Peripheral strip

DETAIL B



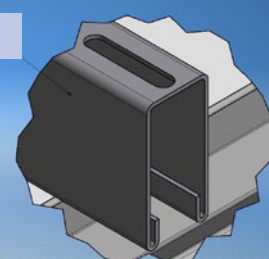
Impact profile carrier

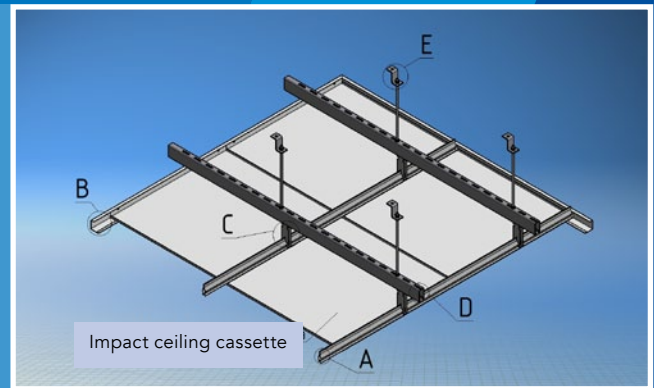
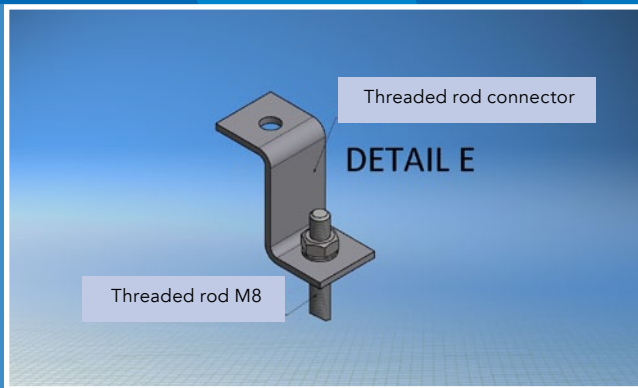
DETAIL C



Carrying profile

DETAIL D





Ceiling Construction

Beams, hinges and impact profiles are made of zinc-plated material.

Technical Data and Method of Assembly

- Minimum assembly height of ceiling is 172.5 mm, the height of the impact ceiling carrier is 1.3 mm. The length of carrying profiles of max 3m. Anchoring and setting of necessary clear height using threaded rods M6 (2000 mm) and connecting nuts anchored in the construction ceiling or the supporting structure using Z-profiles.
- The span of threaded rods is 1200 mm (max. 1500)
- Span of carrying profiles 1000 mm (max. 2000)
- Impact profile (length max. 3 mm)
- The individual standard and offset cassettes are inserted to the impact profile.

Maintenance and Cleaning

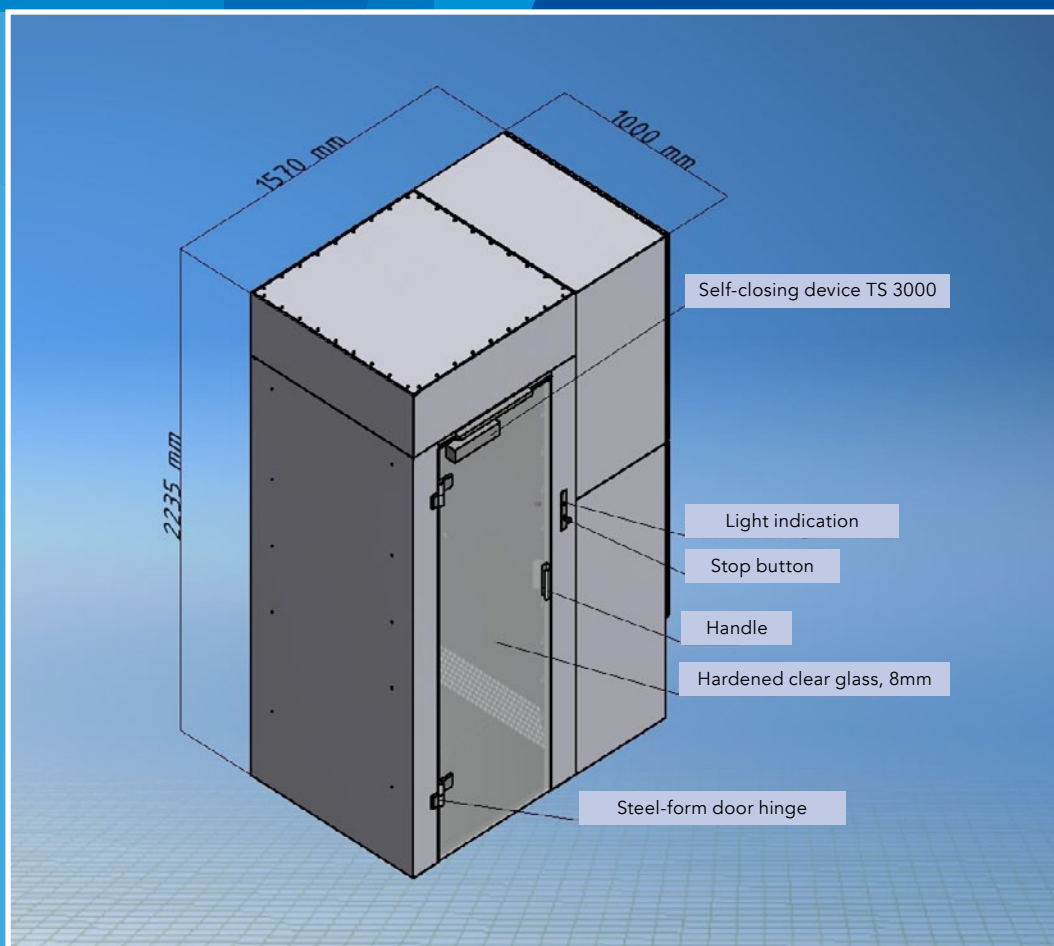
- The PVDF surface should be cleaned with mild non-abrasive detergent.
- The AISI 304 surface, with regards to the version: ground surface in the direction of grinding, polished surface using mild non-abrasive detergent.

AIR SHOWER

Air shower is stable closed cabin with glass paned door serving for the cleaning of persons entering the area with higher class of cleanliness from contaminated area.

The doors are inter-blocked and controlled for accidental entrance during the cleaning process.

The cleaning of persons is carried out by compressed air circulating via HEPA filter inside the cabin.



Shower Dimensions

External dimensions: Width 1570 mm

Depth 1000 mm

Height 2235 mm

Door clear span: 650 mm

Internal dimensions: Width 990 mm

Depth 980 mm

Height 1980 mm

Material Version

The shower body is made of steel metal sheets with powder paint finish. Floor is made of stainless ground metal sheet.

The door is made of clear hardened glass with 8 mm thickness.

Technical Data

- Input 400 V AC/50Hz
- Power consumption 9.7 KW
- Output 400 V AC/50Hz and 24 V DC/1A
- Air flow speed 10-.20 m/sec.
- Filter dimensions: 915 x 915 x 150

Maintenance and Cleaning

- Air shower must be kept in a clean condition.
- After the contamination of "filters", they should be replaced according to need.
- External and internal parts of air shower should be cleaned with non-abrasive disinfectants in order to prevent their damage.

Warning

Assembly, wiring and maintenance may be carried out only by the organisation having authorisation for such activity.

PULL-OUT TRANS-LOADING WINDOW

The element is used for trans-loading materials from higher class of cleanliness to lower class of cleanliness and vice versa.

The most frequent use of the pull-out trans-loading window is in health care, in operation rooms.

The pull-out window may be built into the walls made of partition panels, as well as the walls with solid supporting structure or plaster cardboard.

There is a cavity in the upper part of the structure of the pull-out window with a mechanism as well as the space for pulling out the glass paned frame.

The mechanism is composed of chain transmissions and weights serving for the balancing of the weight of glass-paned frame and thus the simple and fine movement upwards and downwards.

There is the bristly sealing in the vertical parts of window frame. P-type sealing is used in the bottom part of the glass frame for silent operation and fine setting on the sill.

The size and width of the sill may be adjusted according to the requirements of the customer and width of construction wall. Material version of a sill AISI 304 FIN 8.

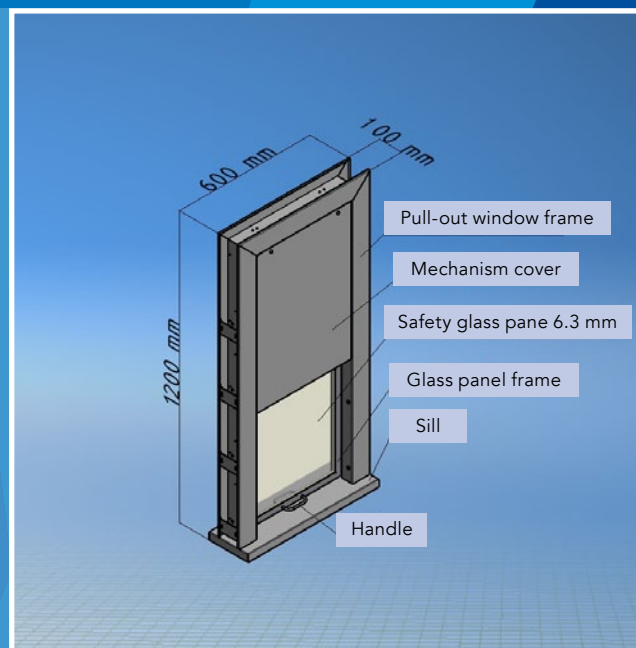


Standard Dimensions of Pull-out Re-loading Window

<i>Material version of pull-out trans-loading window</i>				
<i>Element type</i>	<i>Basic type of material</i>	<i>Standard Surface treatment</i>	<i>Alternative version</i>	<i>Glass pane type</i>
<i>External jacketing, frame of glass-paned window</i>	<i>Bilaterally zinc plated metal sheet DX51D+ZE 25/25 th. 1.5mm</i>	<i>RAL 9010</i>	<i>AISI 304 FIN 8 protected by PE foil or RAL, according to requests</i>	<i>One glass ESG 6.3 mm</i>

Technical parameters of pull-out trans-loading window

Dimensions:	Standard clear trans-loading dimensions	Standard construction dimensions
Width (mm)	435, 635, 895	600, 800, 1100
Height (mm)	420, 620, 820	1200, 1400, 1600
Depth (mm)	100	100



Maintenance and Cleaning

- Lacquered PVDF surface should be cleaned with mild non-abrasive detergent.
- The AISI 304 surface, with regards to the version: ground surface in the direction of grinding, polished surface using mild non-abrasive detergent.

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