X-Ray Room Systems

DIBATEC®
Dienstleistung, Bau und Technik GmbH

DIBATEC

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1 Introduction to heavy-duty ceilings

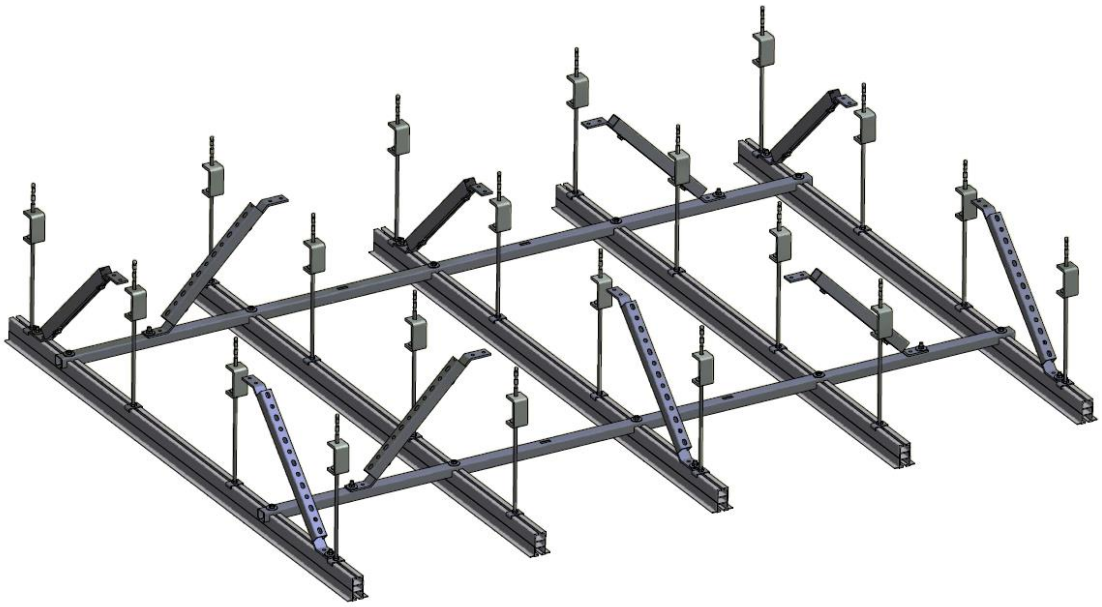
This multi-purpose heavy-duty ceiling system (aluminium supporting section system) was purpose-developed for X-ray rooms and laboratories for the support and fixing of diagnostics equipment and ancillary fittings. The system is designed to meet requirements of any type and magnitude.

Excelling by its high-quality design, the system of sections can be adapted quickly and flexibly to all changes necessitated by progress in medical technology. Retrofitting is also possible at any time without the need to alter the entire ceiling construction.

All standard proprietary fixtures, such as light fittings, fire and smoke detectors, suspended monitors, ventilation outlets etc. can be integrated into the system.

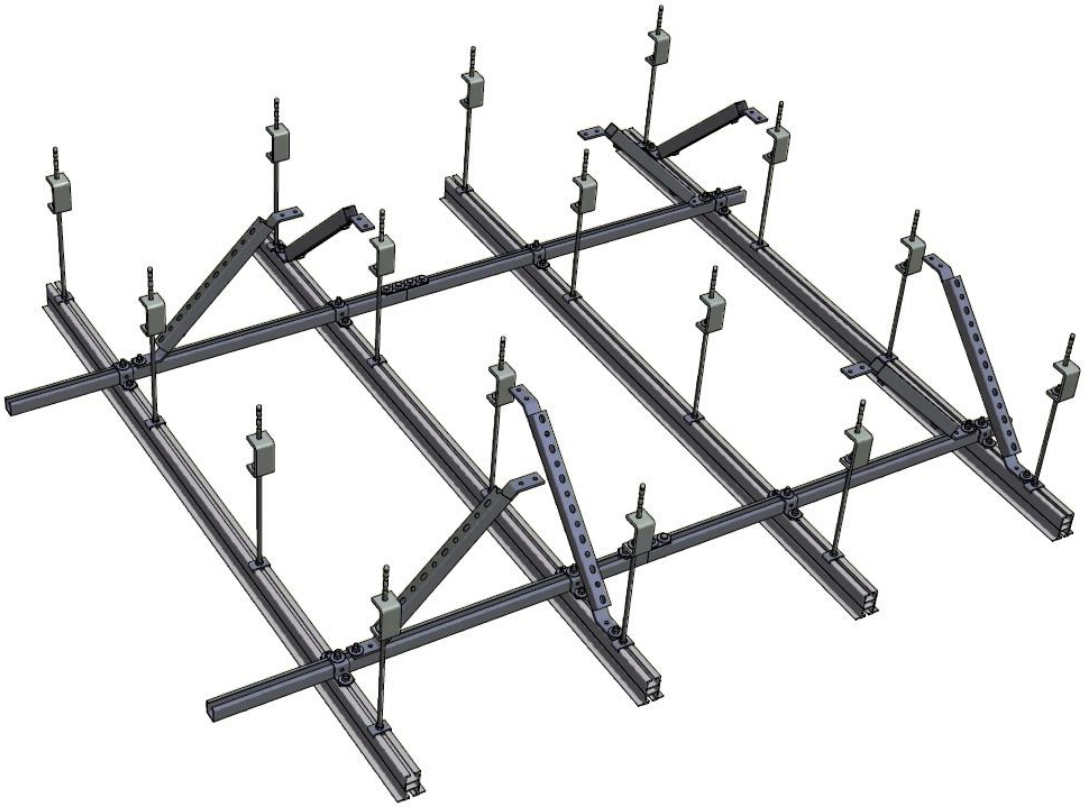
All standard proprietary 625 x 625 mm ceiling tiles can be used with the standard grid size (see Section 2). Ceiling tiles in other sizes can be laid in a variable grid (see Section 2).

2 System



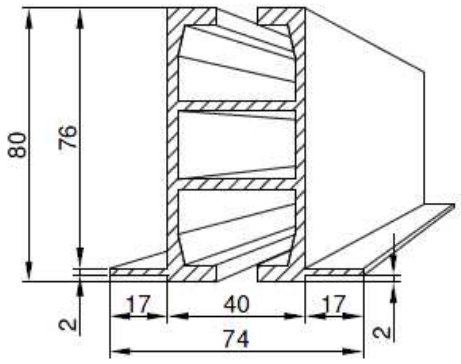
Schematic view of heavy-duty ceiling construction with fixed 675 mm grid.

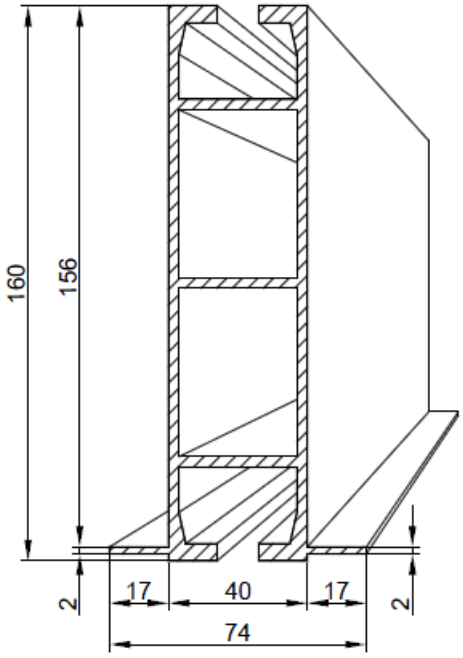
(Centre-to-centre distance of heavy-duty profiles)



Schematic view of heavy-duty ceiling construction with variable grid.

3 Profiles





The heavy-duty profiles can be supplied with two different profile heights.

Either the 80 mm or the 160 mm high profile is used, depending on structural requirements.

Colour	RAL 9010 (standard)
Size	74 mm x 80 mm 74 mm x 160 mm
Length	up to 6,000 mm > 6,000 mm with longitudinal connector
Receiving slot	12 mm for M8, M10 and M12 nuts
Weight	2.85 kg/m 4.70 kg/m

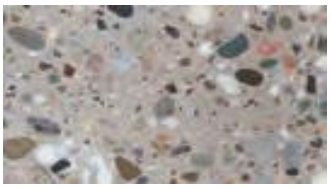
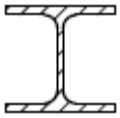
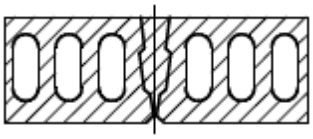
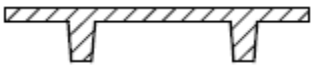
Profile		80	160
Permitted normal stress σ_B	[kN/cm²]	9.40	94.00
Permitted shear stress τ	[kN/cm²]	5.60	94.00
Modulus of elasticity E	[kN/cm²]	7,000	70,000
Section modulus W_x	[cm³]	15.25	43.80
Section modulus W_y	[cm³]	10.51	17.90
Second moment of area I_x	[cm⁴]	60.91	328.50
Second moment of area I_y	[cm⁴]	21.03	35.90

Profile type	Suspension spacing (mm) L [m] F L					
	3.0 kN	5.0 kN	7.5 kN	9.0 kN	12.0 kN	15.0 kN
74/80	1,250	900	750	650	500	-
74/160	1,750	1,500	1,350	1,250	900	750

4 Mounting types

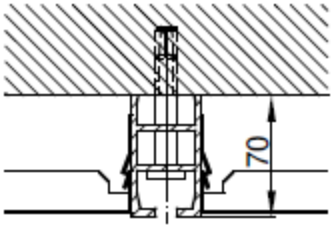
A Selection of a suitable mounting type depends on the nature of the room ceiling or any existing construction underneath. Due consideration must be given to the structural ceiling type and the suspension depth between structural and suspended ceiling (= bottom face of heavy-duty profile).

Structural ceiling types

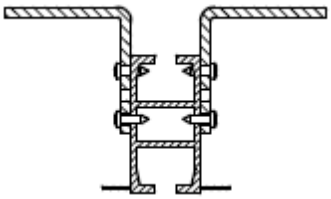
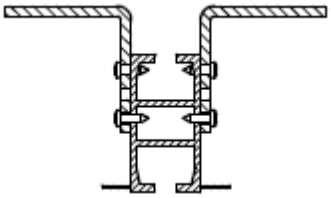
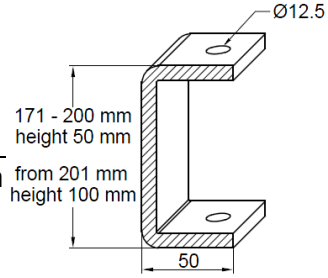
Structural ceiling types	Notes
Concrete 	For fixing to concrete, a concrete compressive strength > C20/25 is assumed. Please notify us in cases where this strength is not given.
Steelwork 	A variety of steelwork assemblies featuring different layouts and beam types may be encountered.
Hollow-core slab 	As special anchors for hollow-core slabs only offer a permissible load capacity of 3 kN, pairs of anchors must normally be fixed to accommodate higher loadings.
Coffer and ribbed slabs 	Here, the anchorage points must be positioned at a particular height on the side of the coffers or ribs.

Suspension depths

The suspension depth (distance between structural ceiling and bottom face of heavy-duty profile) is broken down into five ranges. This parameter determines the choice of suspension system.

Suspension depths	Notes
Less than 80 mm 	This constitutes a special case and is only ever adopted as a last resort and where low loads are imposed. One cavity of the heavy-duty profile must be milled off in this case.

4 Mounting types

80 – 120 mm		This range requires direct mounting. Two angles fixed parallel to each other allow vertical adjustment of the system (see mounting types for steel beams, Solution 4, or mounting types for concrete slabs, solution…).
121 – 170 mm		The method adopted for this range is also classed as direct mounting. Various solutions are available for fixing the heavy-duty profile. (See mounting types on following pages.)
171 – 210 mm		The heavy-duty profile can be suspended using a threaded rod system and a 50 mm high adaptor bracket.
Exceeding 210 mm		For suspension depths ≥ 200 mm, a threaded rod system can be used in conjunction with the 100 mm high adaptor bracket. This represents the most frequently adopted method.

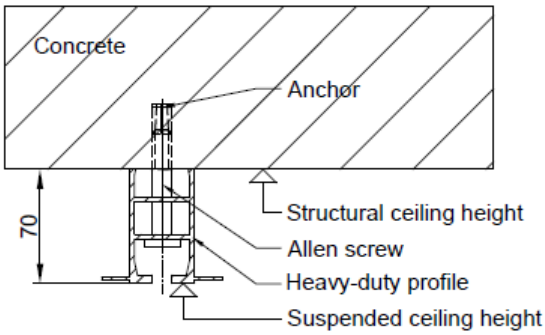
The ceiling suspension system is supplied as an all-in package, complete with all necessary adaptor brackets, nuts, bolts, washers and suitably approved anchors.

The following pages illustrate a number of mounting types that vary in terms of structural ceiling and suspension depth.

4 Mounting types

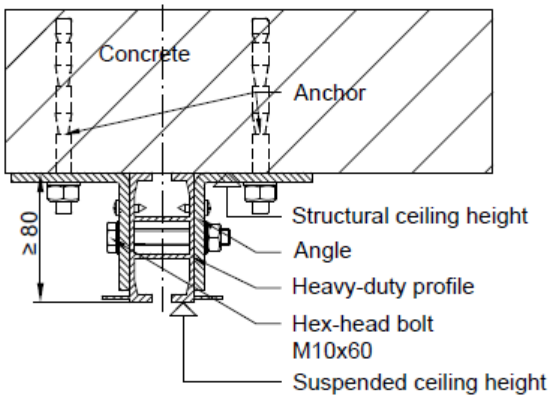
Mounting types for concrete slabs

Various suspension and fixing options are available for concrete slabs. These are geared to the structural ceiling and suspended ceiling heights. Chemical anchors are used for all mounting types for concrete slabs.



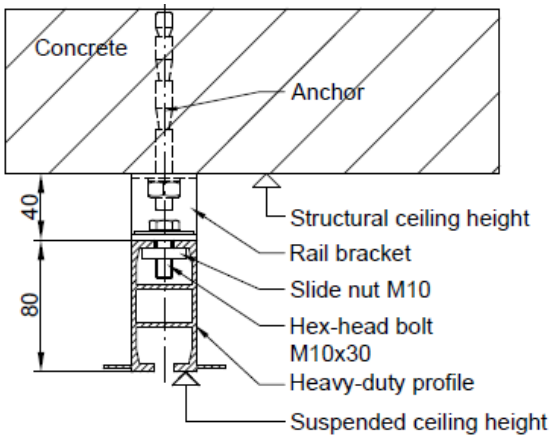
Solution 1
Direct mounting < 80 mm

This fixing solution is only ever adopted as a last resort and only where low loads are imposed, for suspension heights less than 80 mm. The heavy-duty profile is shortened at the top and directly anchored in the concrete with Allen screws.



Solution 2
Direct mounting with angles

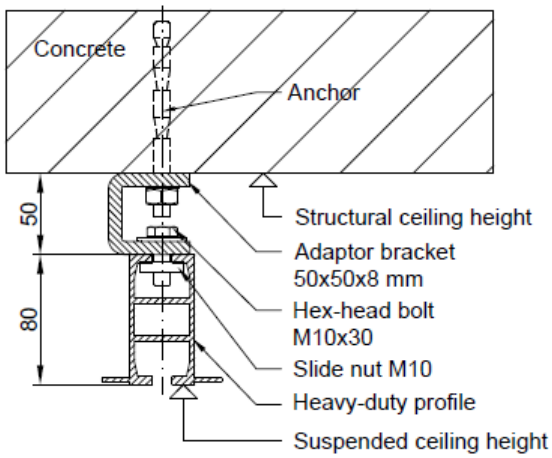
The system can be adjusted vertically with the side angles, which are available in a range of sizes. This then caters for suspension depths of up to 170 mm.



Solution 3
Direct mounting with rail bracket

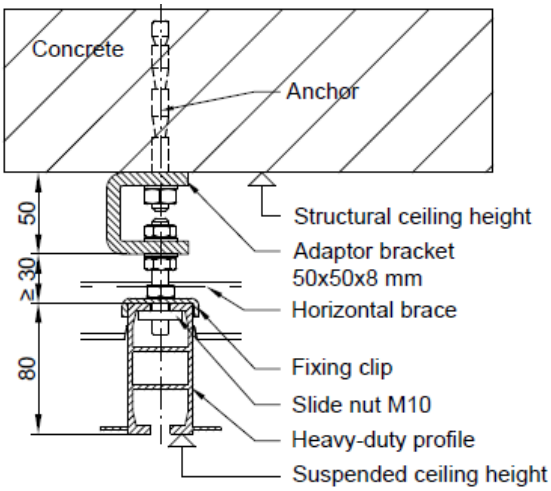
This mounting type may be appropriate for suspension depths even lower than those covered by Solution 4. This option thus caters for suspension depths of approx. 120 mm. Only minimal height adjustment is possible using steel shim plates here as well.

4 Mounting types



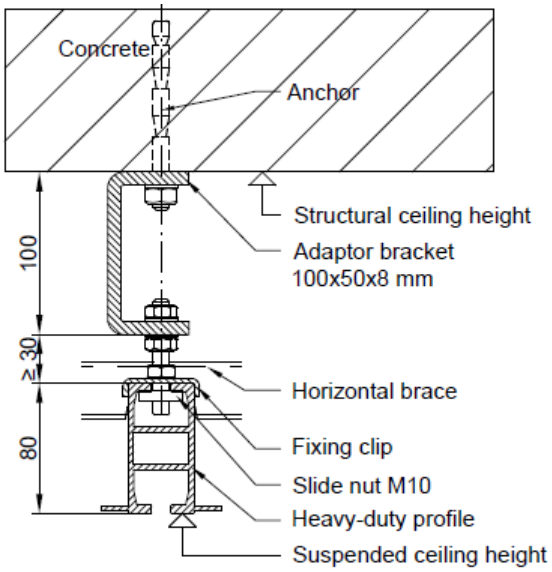
Solution 4
Direct mounting with adaptor bracket

This mounting type can be selected for suspension depths of approx. 130 mm. The heavy-duty profile is fixed directly to the adaptor bracket. Only minimal height adjustment is possible using steel shim plates.



Solution 5
Suspension with 50 mm adaptor bracket

This suspension method, which uses the 50 mm high adaptor bracket, can be adopted for suspension depths between 160 mm and 210 mm. The 100 mm high adaptor bracket is deployed for suspension depths upwards of 210 mm.



Solution 6
Suspension with 100 mm adaptor bracket

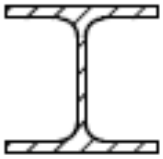
This suspension method, which uses the 100 mm high adaptor bracket for adjustment of the suspended ceiling level, can be adopted for suspension depths greater than 210 mm.

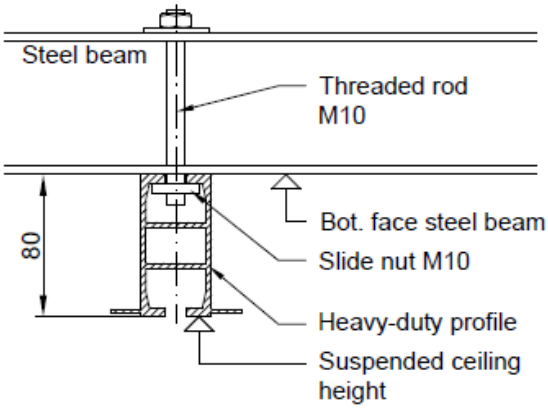
To accommodate larger suspension depths, the threaded rod fixed to the bottom flange of the adaptor bracket is accordingly longer. This then increases the distance between the top face of the heavy-duty profile and the bottom face of the adaptor bracket.
This solution represents the most frequently adopted fixing method.

4 Mounting types

Mounting types for steel beams

Various suspension and fixing options are available for steel beam constructions. These are geared, among other things, to the relative directions of the steel beams and heavy-duty profiles, suspended ceiling height, steel beam height within the room and space available for installation.

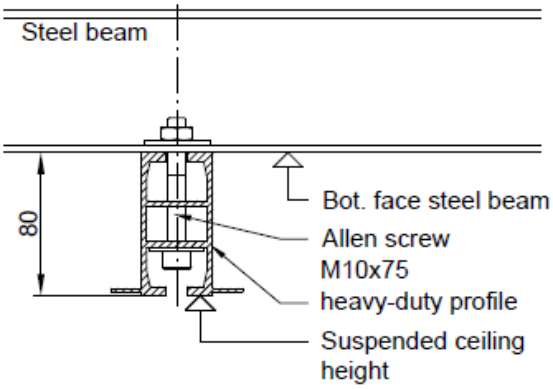




Solution 7
Direct mounting on top flange

This option can be adopted for direct mounting where it is possible to secure the heavy-duty ceiling from the top by means of through-fixings.

Alternatively, the heavy-duty profile can also be suspended in case a different suspended ceiling height is required.

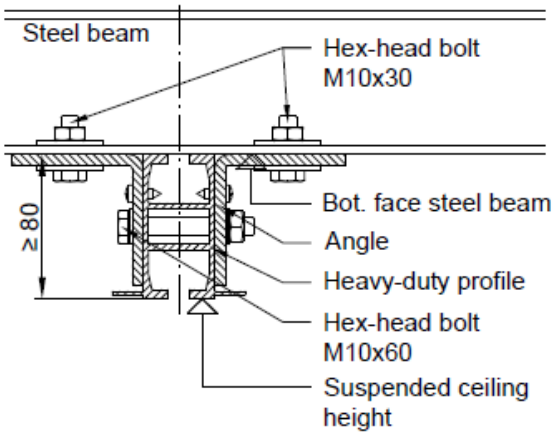


Solution 8
Direct mounting on bottom flange

Here, the heavy-duty profile is fixed to the flange of a T-beam or channel profile. This solution, which can likewise be used for direct or suspended mounting, is selected where there is no possibility of securing or suspending the heavy-duty profile from the top.

Caution! The screw fixing below the flange must not occupy the position at a location where subsequent installation of a nut is required for the equipment rails.

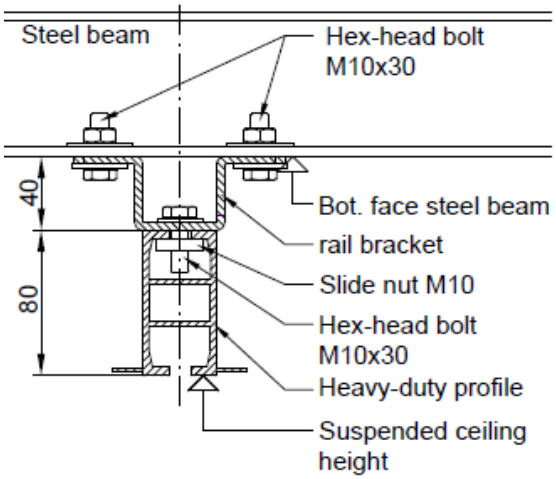
4 Mounting types



Solution 9

Direct mounting with side angles

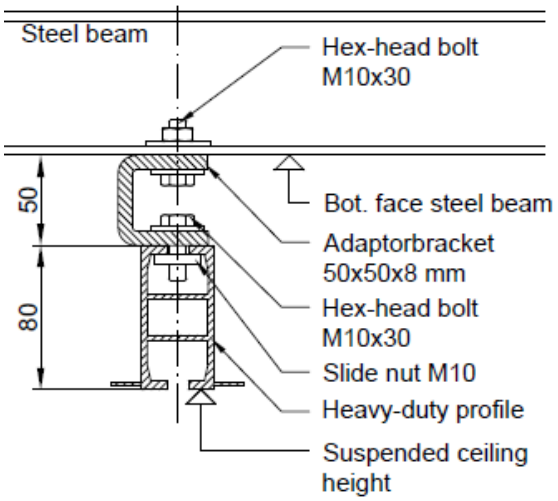
This solution can likewise be adopted where there is no possibility of securing or suspending the heavy-duty profile from the top. The side angles provide for any necessary adjustment.



Solution 10

Fixing with rail bracket

Solution 10 represents an alternative to Solution 11 and is primarily adopted for required suspension depths even lower than those covered by Solution 11. The suspension depth here is 120 mm.

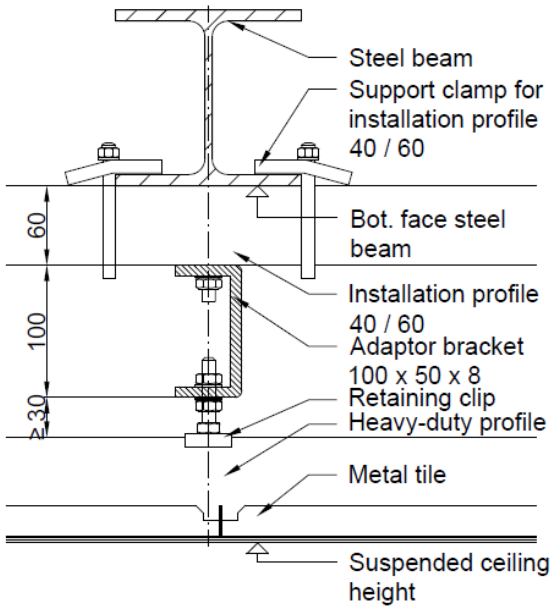


Solution 11

Direct mounting with adaptor bracket

This direct mounting option involves the use of a 50 mm high adaptor bracket. The suspension depth in this case is 130 mm.

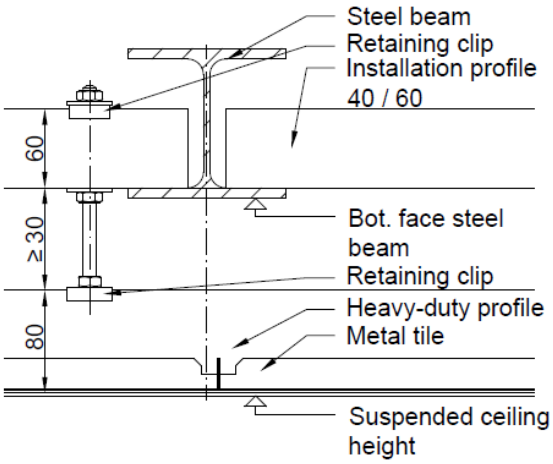
4 Mounting types



Solution 12

Suspension from clamped mounting profile

This solution can be used to fix heavy-duty ceilings imposing loads of up to 10.4 kN per pair of beam clamps.
Here, a mounting profile for the attachment of standard ceiling hangers is fixed to the steel beam by pairs of beam clamps. A suitable mounting profile is selected in line with the relevant point load.

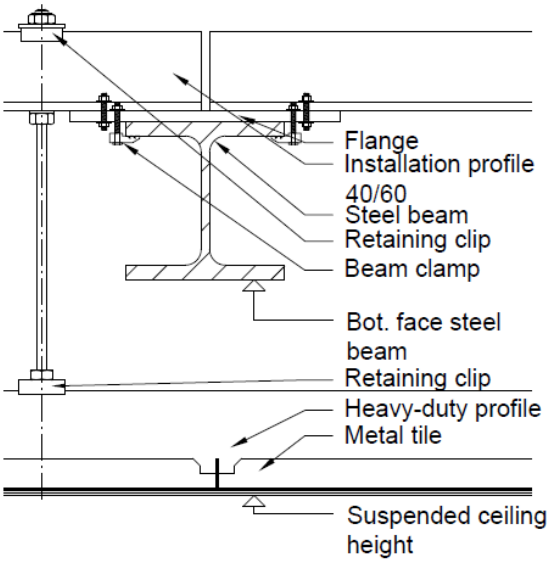


Solution 13

Suspension from mounting profiles laid between steel beam flanges

This solution involves the insertion of mounting profiles between two steel beams so that they bear on and are fixed to the bottom flanges. The ceiling hangers are then fitted to the mounting profiles. As the height of the heavy-duty ceiling can be adjusted using the nuts on the mounting profile, no adaptor brackets are needed for this purpose. A suitable mounting profile is selected in line with the relevant point load.

4 Mounting types



Solution 14

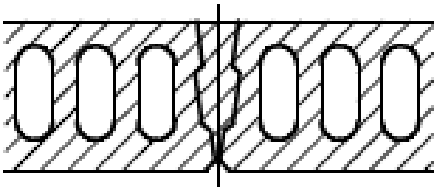
Suspension from mounting profiles laid above steel beams

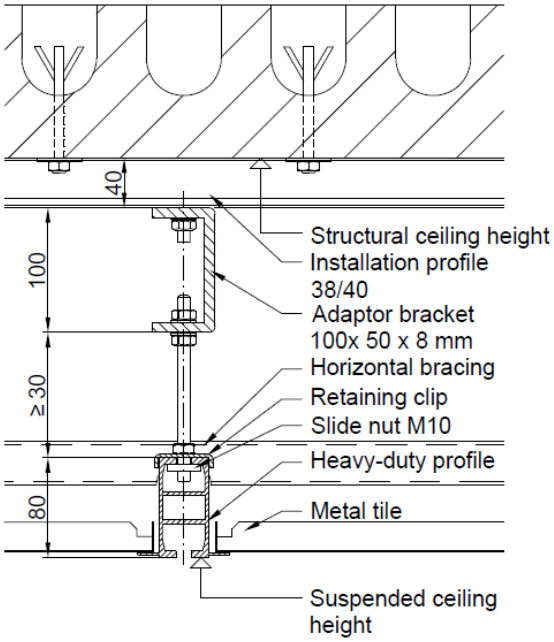
This method can be adopted where fixing above the steel beams is possible. Here, the mounting profiles are laid above and fixed to the steel beams. The ceiling hangers are then fitted to the mounting profiles. As for the previous solution, no adaptor brackets are needed and a suitable mounting profile is selected in line with the relevant point load.

4 Mounting types

Mounting types for hollow-core slabs

Various suspension and fixing options are available for hollow-core slabs. These are geared, among other things, to the relative directions of the cavity axes and heavy-duty profiles, suspended ceiling height and structural ceiling height. Normally, an intermediate construction is adopted in conjunction with anchor pairs to distribute the loads.

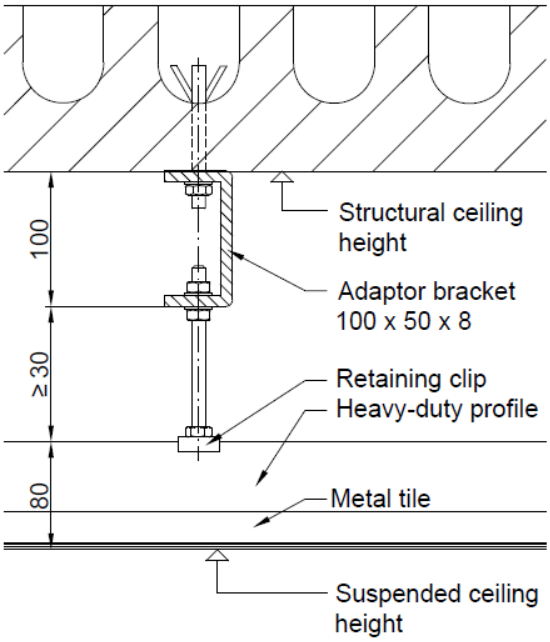




Solution 15

Suspension from directly fixed mounting profile

Layouts with the longitudinal axes of the heavy-duty profiles lying parallel to the cavities require the incorporation of a perpendicular supporting structure. In such cases, mounting profiles are fixed directly to the structural ceiling and perpendicular to the cavities using special cavity anchors. The hangers are then fitted to these profiles with adaptor brackets.



Solution 16

Suspension from adaptor bracket

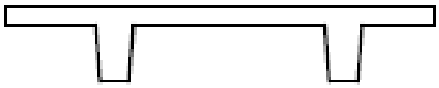
For layouts with the axes of the heavy-duty profiles lying perpendicular to those of the cavities, it is possible to dispense with an intermediate construction.

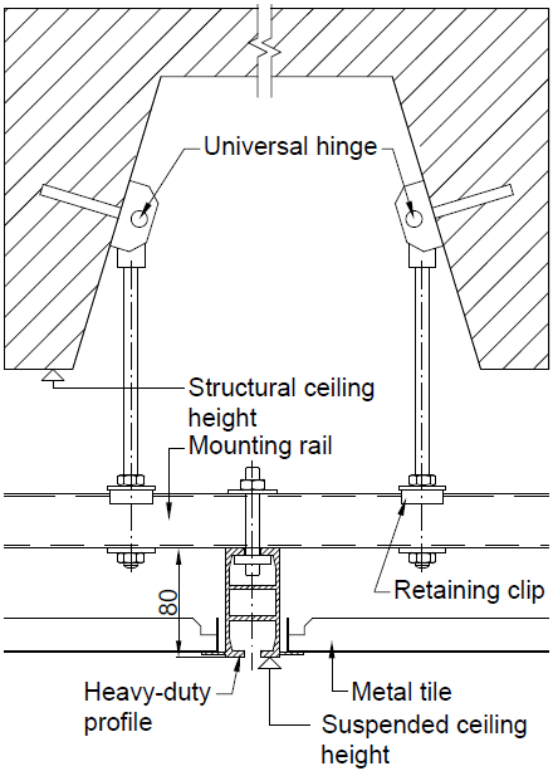
The standard solution then involves fixing the hangers with adaptor brackets and the special cavity anchors.

4 Mounting types

Mounting types for coffer/ribbed slabs

A similar variety of suspension and fixing options is available for these slab types as for hollow-core slabs. These are geared, among other things, to the relative direction of the ribs and heavy-duty profiles, and to the suspended ceiling height and structural ceiling height (height up to bottom face of ribs). The hangers are fitted to universal hinges fixed to the side of the ribs.





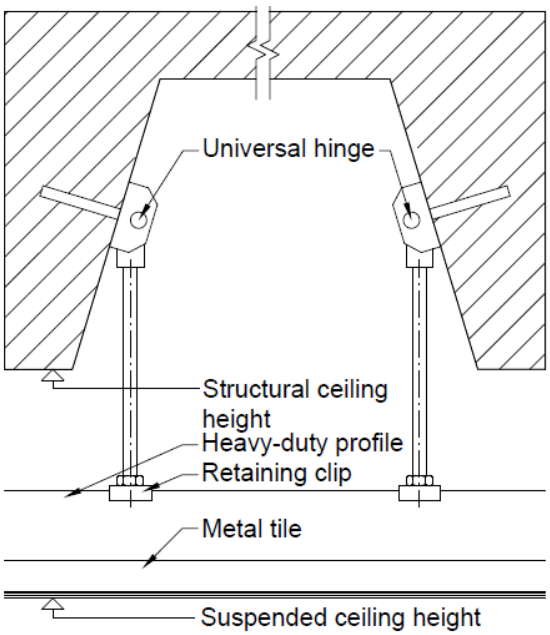
Solution 17

Fixing to suspended mounting rail

Layouts with the rib axes lying parallel to those of the heavy-duty profiles require an intermediate construction. The example shows the suspension of a mounting rail from universal hinges fixed to the side of the ribs. These hinges also allow height adjustment.

Caution! Only fixing to the side of the ribs is permissible.

4 Mounting types

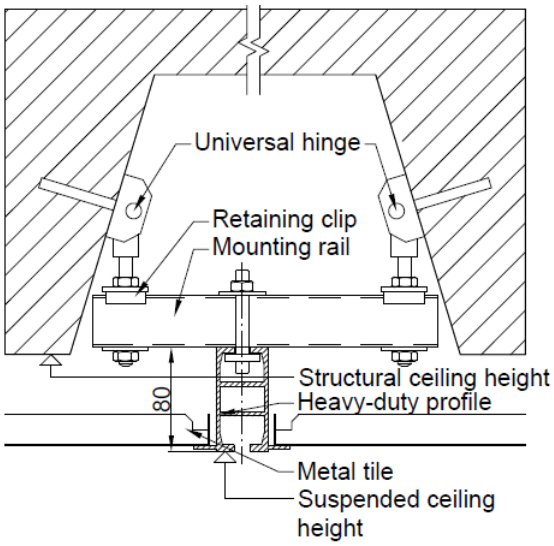


Solution 18

Fixing to universal hinge

For layouts with the rib axes lying perpendicular to those of the heavy-duty profiles, it is normally possible to dispense with an intermediate construction. The hangers, which are directly connected to the heavy-duty profile, are supported by universal hinges fixed to the side of the ribs. These hinges also allow height adjustment.

Caution! Only fixing to the side of the ribs is permissible.



Solution 19

Fixing to intermediate mounting rail

As in Solution 17, the rib axes are parallel to those of the heavy-duty profiles. Here, the mounting rail, supported by universal hinges, is suspended between the ribs. This allows a reduction in the distance between structural and suspended ceiling. Depending on the situation, this distance may be even smaller than 80 mm.

Caution! This solution is only practicable in cases where no heavy-duty profiles needs to be located below a rib. Only fixing to the side of the ribs is permissible.

5 Anchor systems

Heavy-duty anchors

High-performance anchor rod, including washer and nut, for fixing heavy-duty ceilings to cracked and uncracked concrete.

Item no.	DIB 038
Approval number	ETA-12/0006 of 04/04/2012
Type	HIT-Z
Material	steel
Finish	galvanised
Thread ∅	M8
Thread length	60 mm
Anchor length	100 mm
Max. useful length	28 mm
Drill bit diameter	10 mm
Effective anchorage depth	100 mm
Width across flats	13 mm
Anchor base	concrete ≥ C20/25 (B25)

Permissible load	
Cracked concrete	11.4 kN
Permissible shear load	6.9 kN
Uncracked concrete	11.4 kN
Permissible shear load	6.9 kN

Cracked and uncracked concrete	
Spacing $S_{cr,N}$	286 mm
edge distance $C_{cr,N}$	143 mm
minimum base material thickness h_{min}	143 mm
Pull-out torque T_{inst}	10 Nm

Weight	0.042 kg per unit
Packaging	40 pcs/box

The latest version of the assembly instructions and valid approvals must be observed!

Working life and cure times		
Base temperature	Working life t_{work}	Cure time t_{cure}
5 °C	25 min.	2 h
6 – 10 °C	15 min.	1 h
11 – 20 °C	7 min.	30 min.
21 – 30 °C	4 min.	30 min.
31 – 40 °C	3 min.	30 min.

Injection grout

For the heavy-duty anchor pictured above.
Storage temperature: -5 °C
Contents: 330 ml
Applied with HDM injection grout gun.

5 Anchor systems

Through anchor

Anchor, including washer and nut, for fixing horizontal bracing to cracked and uncracked concrete.

Item no.	DIB 039
Approval number	ETA-98/0001 of 18/08/2013
Type	HST
Material	steel
Finish	galvanised
Thread ∅	M 10
Thread length	30 mm
Anchor length	90 mm
Max. useful length	10 mm
Drill bit diameter	10 mm
Effective anchorage depth	60 mm
Width across flats	17 mm
Anchor base	concrete ≥ C20/25 (B25)

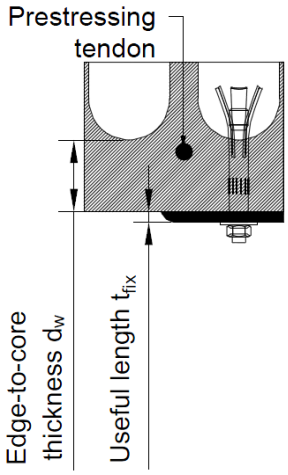
Permissible load	
Cracked concrete	4.3 kN
Permissible shear load	2.0 kN
Uncracked concrete	7.6 kN
Permissible shear load	2.0 kN

Cracked and uncracked concrete	
Spacing $S_{cr,N}$	70 mm
edge distance $C_{cr,N}$	90 mm
minimum base material thickness h_{min}	143 mm
Pull-out torque T_{inst}	45 Nm

Weight	0.063 kg per unit
Packaging	100 pcs/box

The latest version of the assembly instructions and valid approvals must be observed!

5 Anchor systems



Cavity anchor

Including washer and nut, for fixing heavy-duty ceilings to prestressed-concrete hollow-core slabs.

Item no.	DIB 038
Approval number	Z 21.1-701 of 17/02/2010
Type	KHD
Material	steel
Finish	galvanised
Thread ∅	M 10
Max. useful length	10 – 20 mm up to 50 mm possible
Drill bit diameter	14 mm
Edge-to-core thickness	≥ 25 - ≤ 40 mm type K 55 > 40 mm type K 65
Width across flats	17 mm
Anchor base	prestressed-concrete hollow-core slabs ≥ C45/55
Permissible load* for edge-to-core thickness	≥ 25 mm – 0.9 kN ≥ 30 mm – 1.2 kN > 40 mm – 3.0 kN
Weight	0.042 kg per unit
Packaging	50 pcs/box

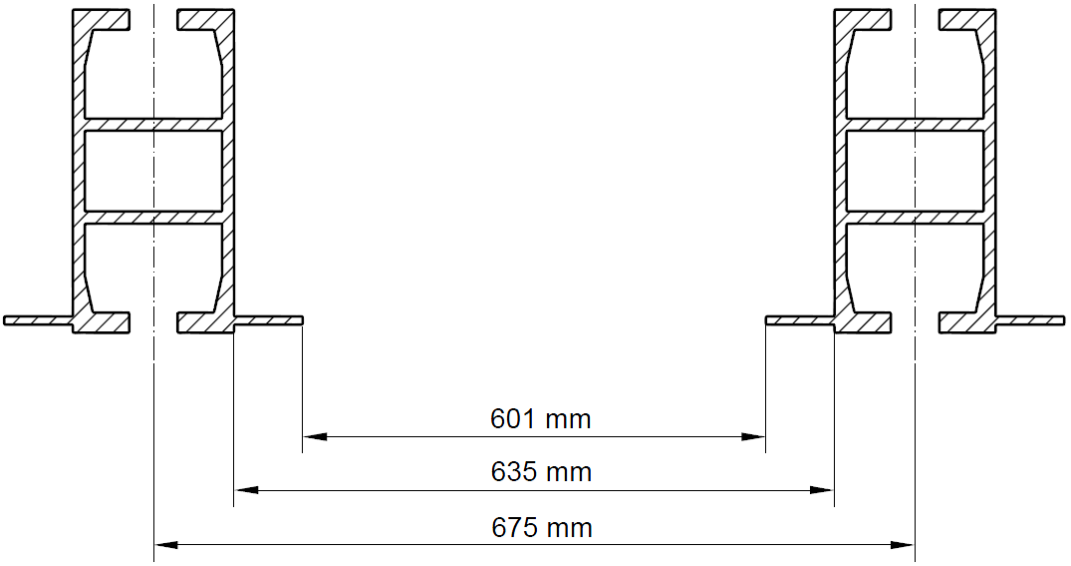
*All values apply for cold loads (= no fire exposure).

The latest version of the assembly instructions and valid approvals must be observed!

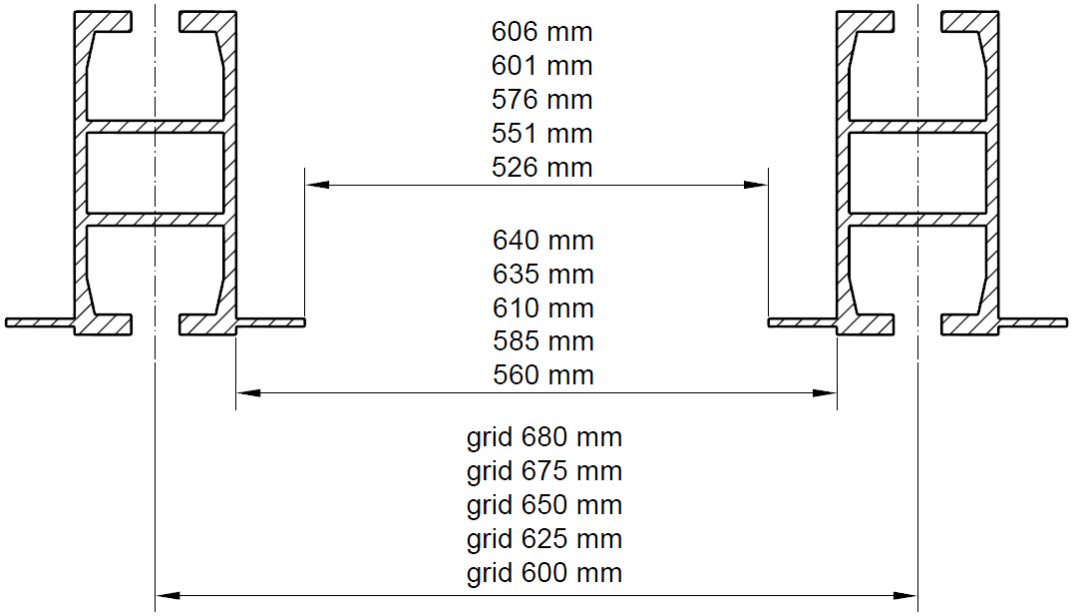
In case of uncertainty as to the concrete grade, an anchor pull-out test can be performed if required.

6 Grid sizes

Standard grid size 675 mm:

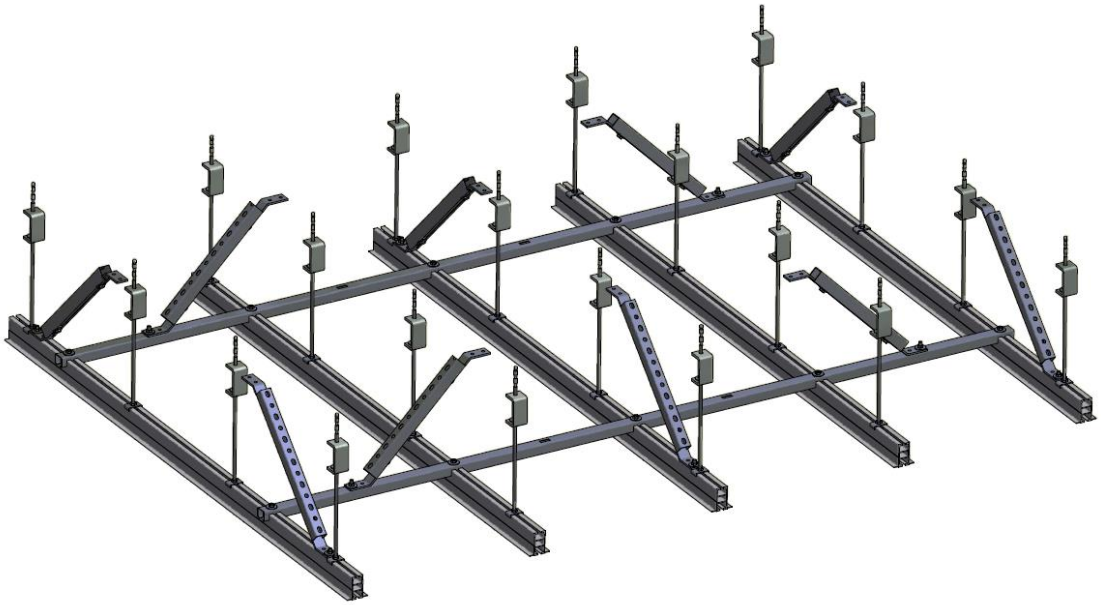


Other grid sizes are possible with varying suspension system layout:



7 Construction

To accommodate static and dynamic forces, the heavy-duty ceiling requires horizontal and vertical bracing. This is achieved by using threaded rod hangers and mounting profiles, which are diagonally connected to the structural ceiling in all four directions.



We design all heavy-duty ceilings and perform the associated calculations in-house. They are mounted in accordance with precise production and assembly detailing.

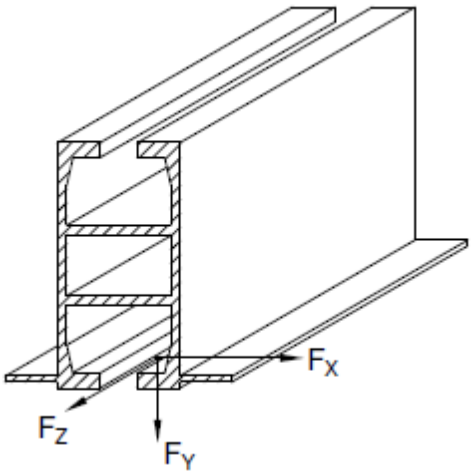
The lower face of the heavy-duty profiles must be set out horizontally (max. deflection ≤ 0.5 mm/m). The longitudinal and transverse loads must be accommodated without vibration and transmitted to the structural ceiling by braces.

Occurring forces that may act on both the equipment rails and the heavy-duty profiles:

F_X: Max. transverse forces acting on the heavy-duty profiles.

F_Y: Max. vertical ceiling loads. Dynamic loading occurs at individual fixing points as the loads constitute moving point loads.

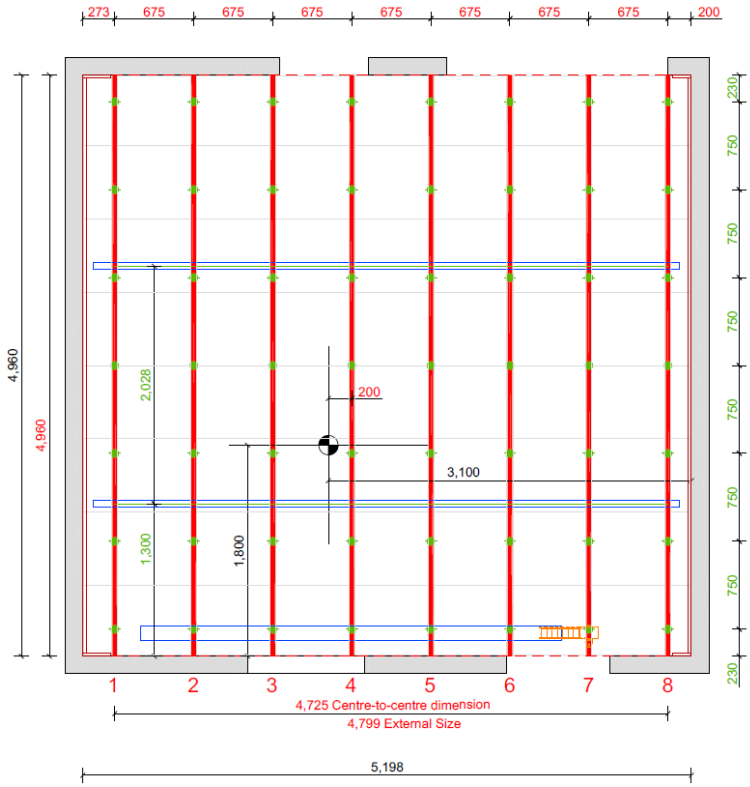
F_Z: Max. longitudinal forces acting on the heavy-duty profiles.



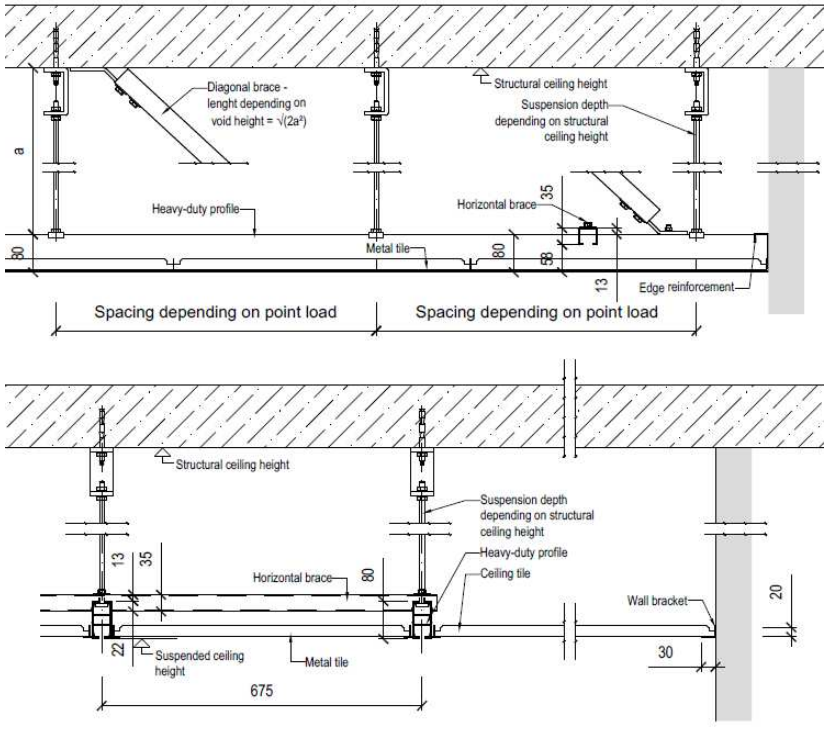
7 Construction

The following pages present some examples of our production and assembly detailing for the various ceiling types:

Concrete slab: Heavy-duty ceiling installed wall-to-wall.

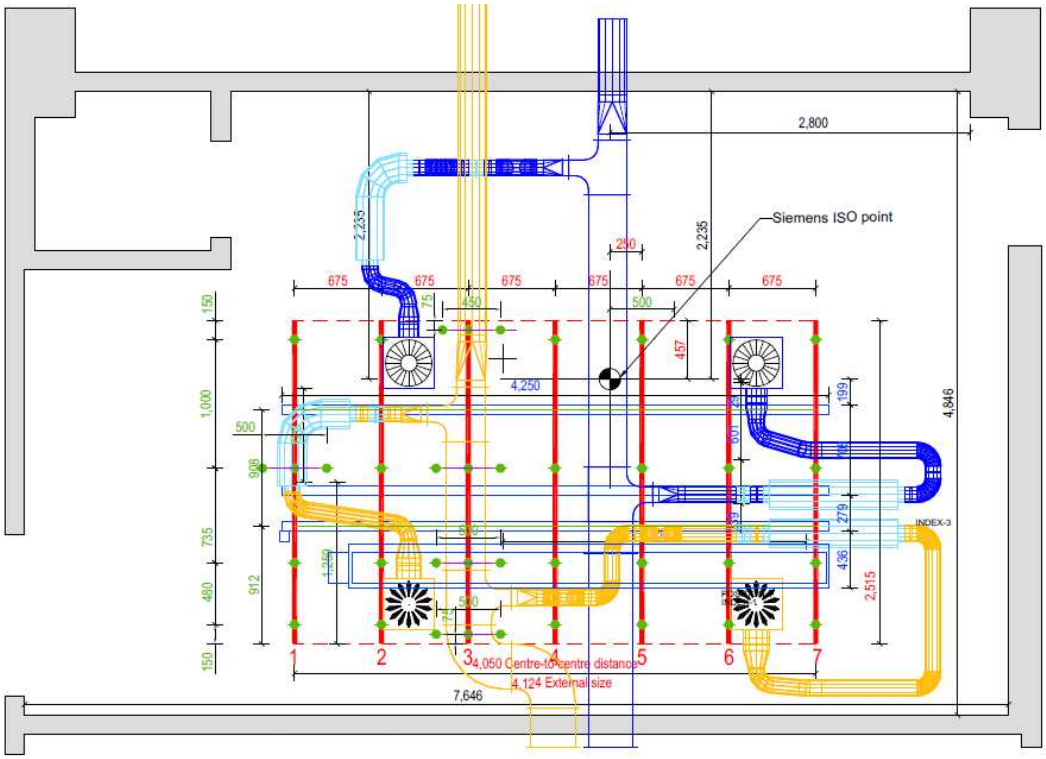


Other mounting types, such as those shown in Solutions 2-6 in Section 4 “Mounting types”, are possible! Solution 6 is depicted here.

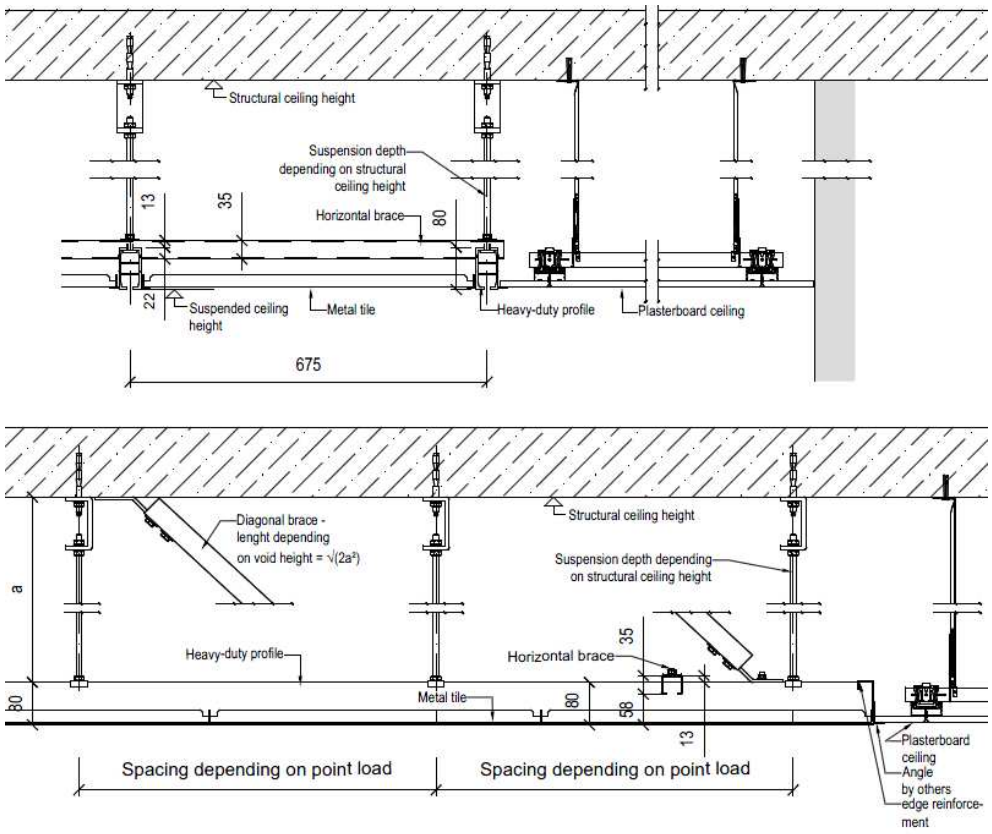


7 Construction

Concrete slab: Heavy-duty ceiling with gypsum border.

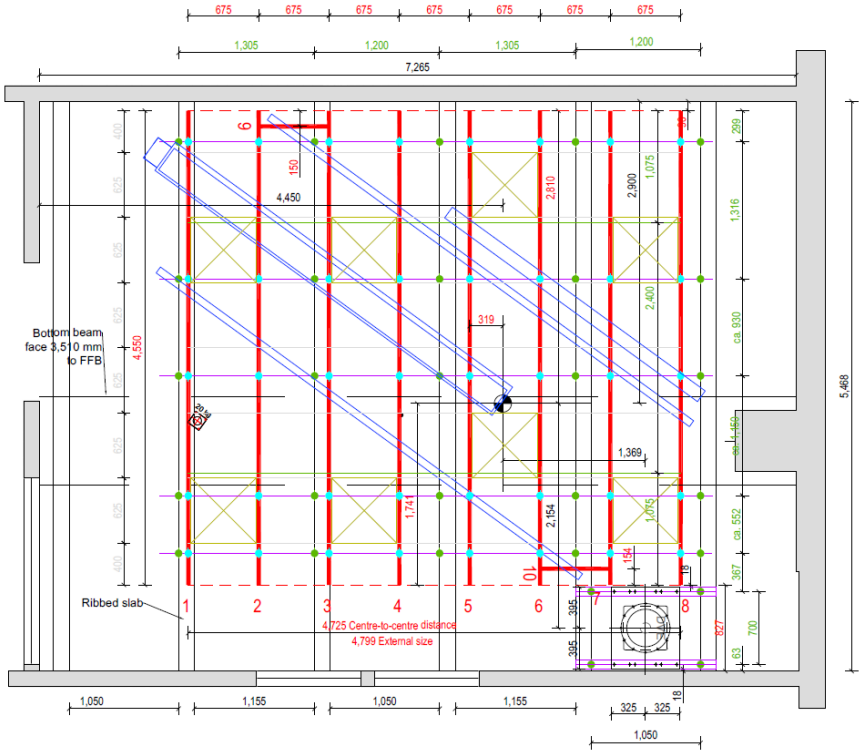


Mounting types, such as those shown in Solutions 2-6 in Section 4 “Mounting types”, are possible! Solution 6 is depicted here.

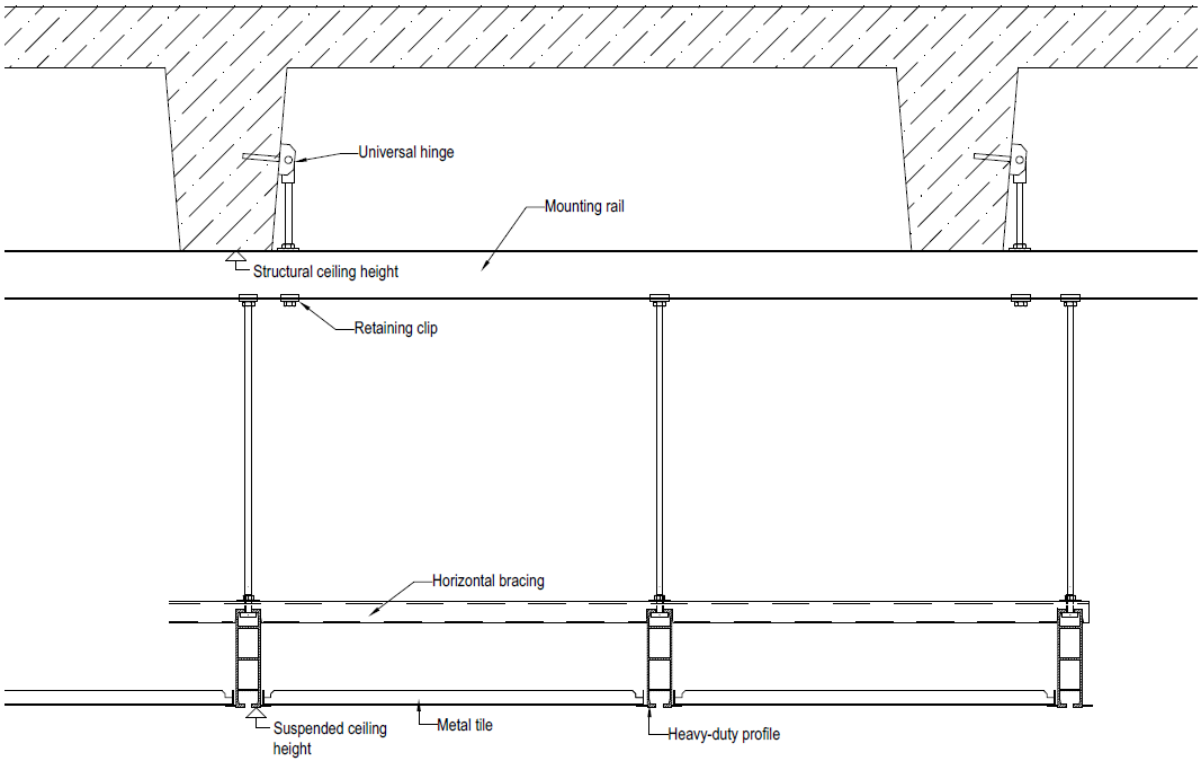


7 Construction

Ribbed slab: Heavy-duty ceiling with obliquely fitted equipment rails.

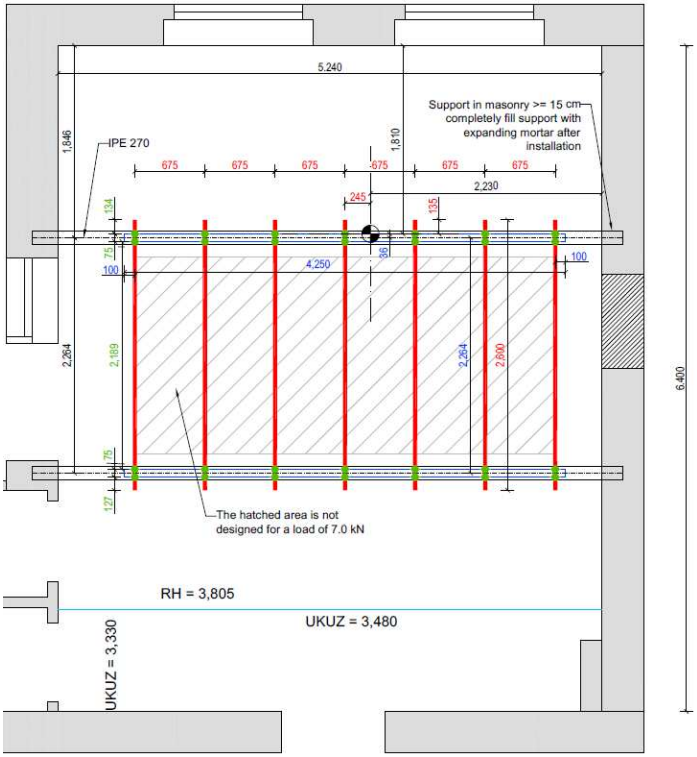


Here, the mounting type shown in Solution 17 (Section 4 “Mounting types”) is adopted.

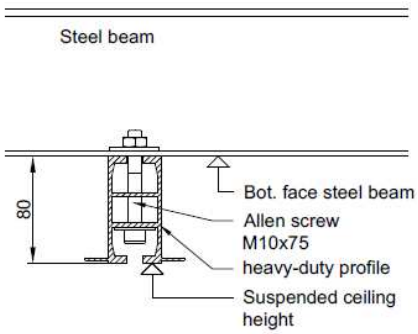


7 Construction

Steelwork: Heavy-duty ceiling fixed to steel beams.

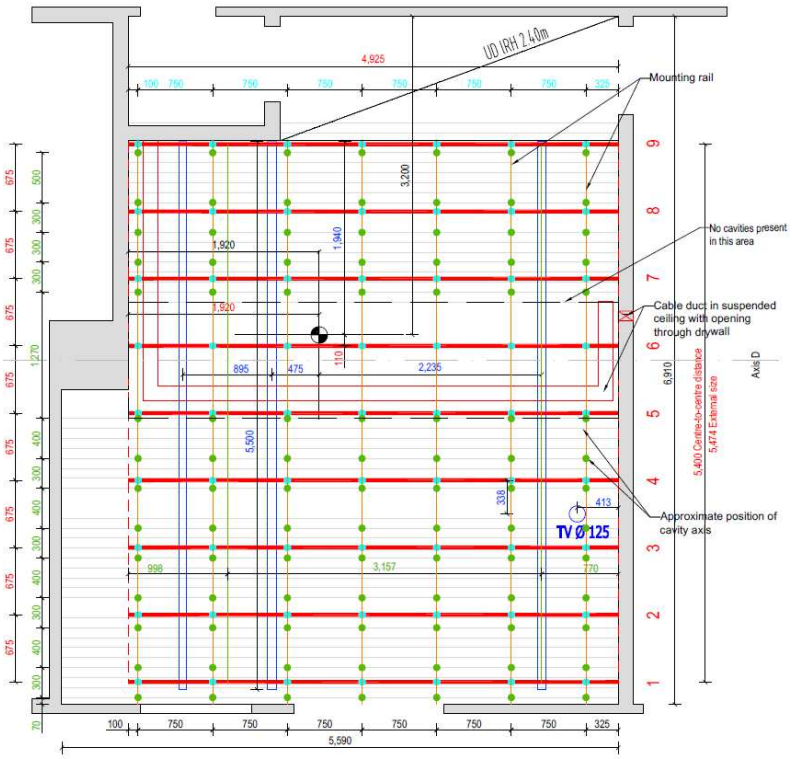


Mounting types, such as those shown in Solutions 7-11 in Section 4 “Mounting types”, are possible!

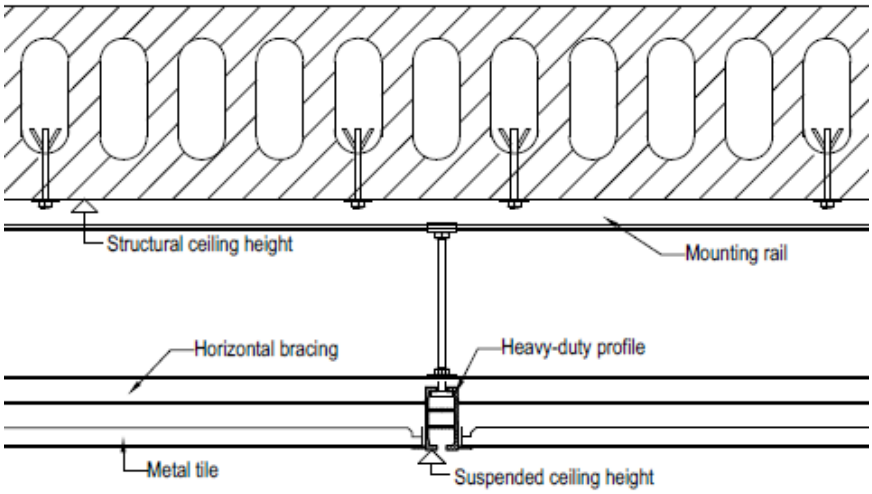


7 Construction

Hollow-core slab: Heavy-duty ceiling fixed to hollow-core slab, with load-spreading supporting structure arranged perpendicular to heavy-duty profiles.



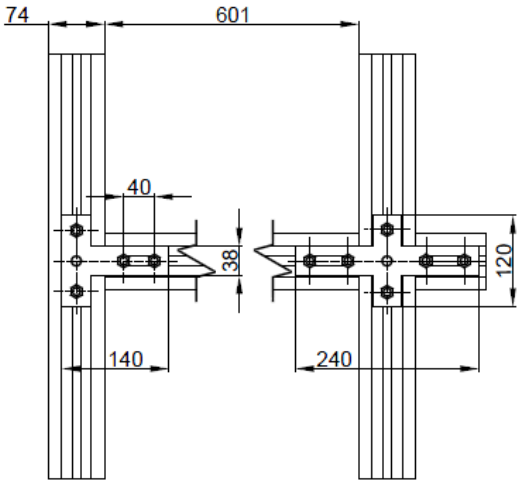
Here, the mounting type shown in Solution 15 (Section 4 “Mounting types”) is adopted.

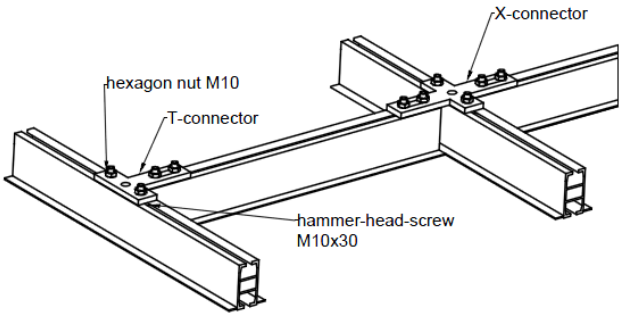


8 Cross mounting

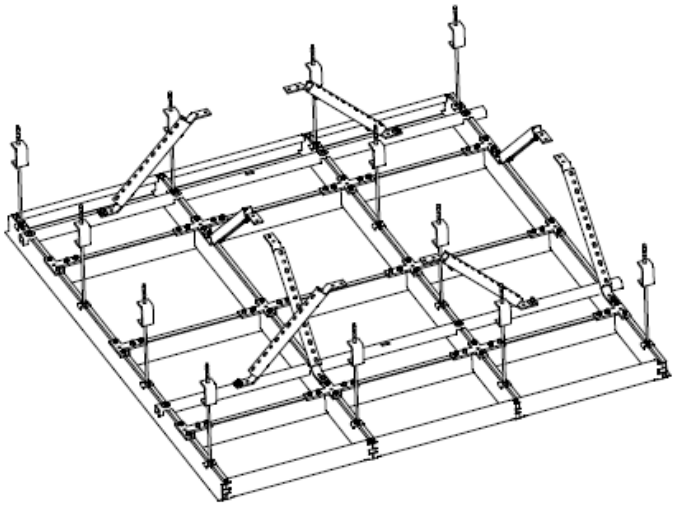
In some diagnostic rooms, equipment rails are required in both longitudinal and transverse direction. Such cases call for the installation of a cross grid for fixing the rails.

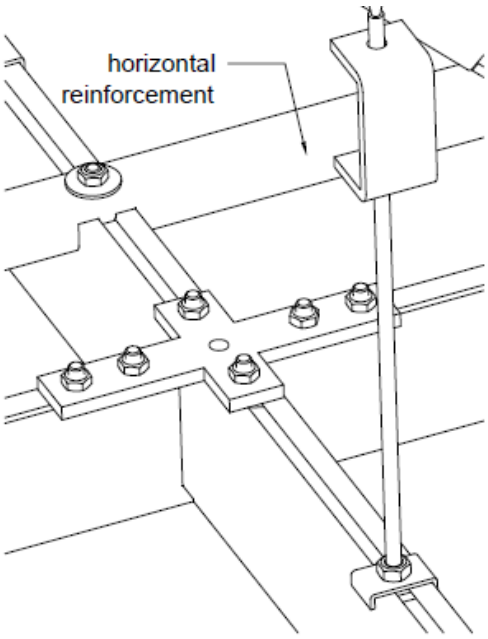
Suitable cross- and T-connectors were developed for this purpose.

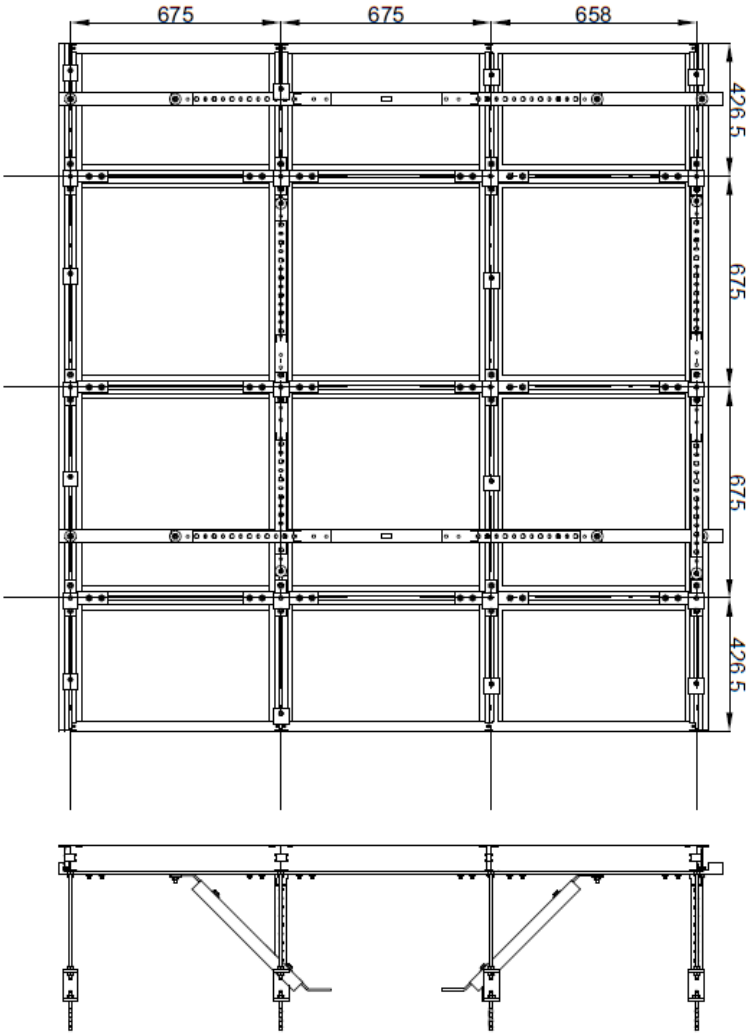




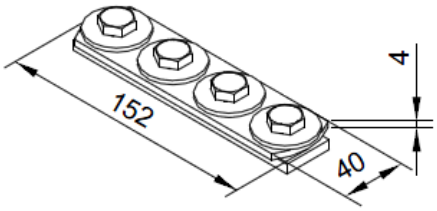
8 Cross mounting





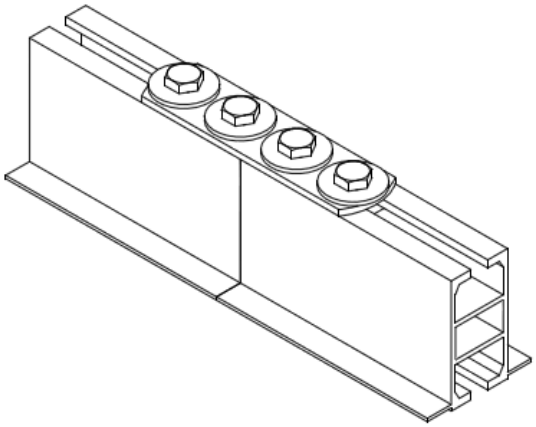


9 Longitudinal connector

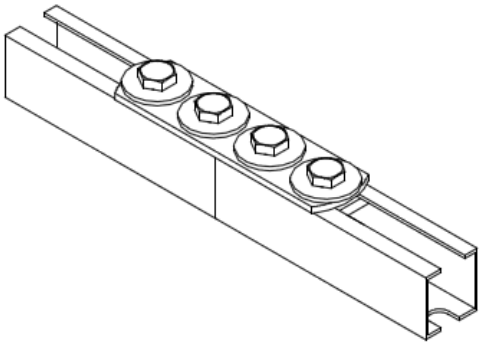


A longitudinal connector is required at end joints between profiles. This component is compatible with all heavy-duty and mounting profiles.

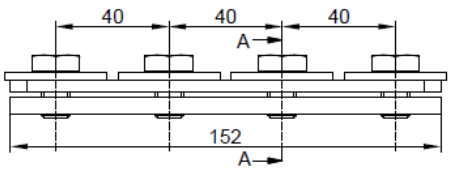
Wherever this type of connector is used (for heavy-duty profiles), an additional hanger must be fitted directly adjacent to it.

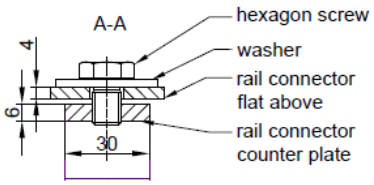


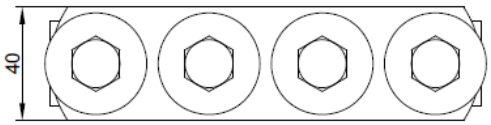
Longitudinal connection for heavy-duty profile.

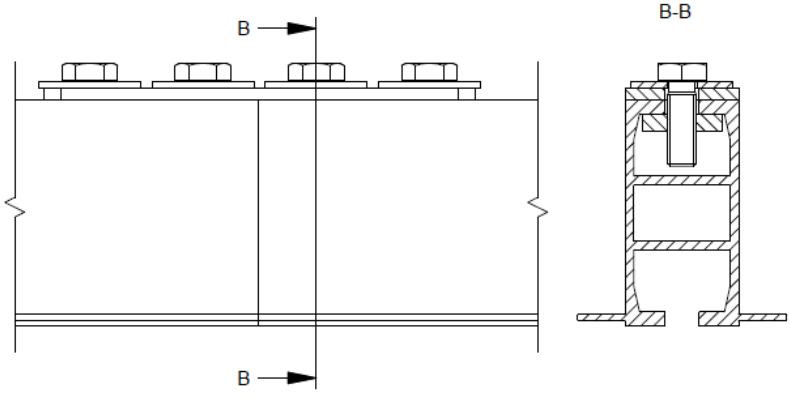


Longitudinal connection for horizontal brace.

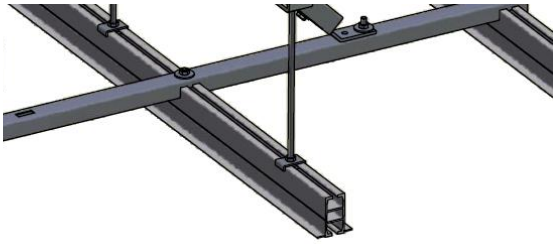


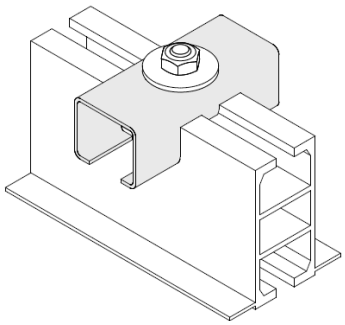




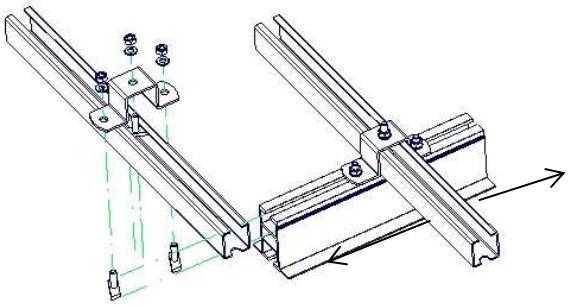


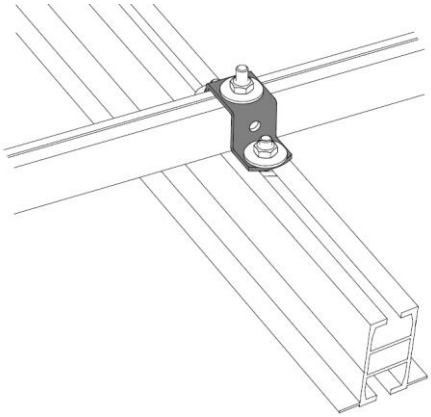
10 Bracing





Standard grid size 675 mm





Variable grid size

Horizontal bracing

To accommodate the dynamic loads from the diagnostics equipment, the individual heavy-duty supporting profiles are securely interconnected by means of perpendicular mounting profiles.

The horizontal bracing assembly is supplied complete with all nuts and bolts.

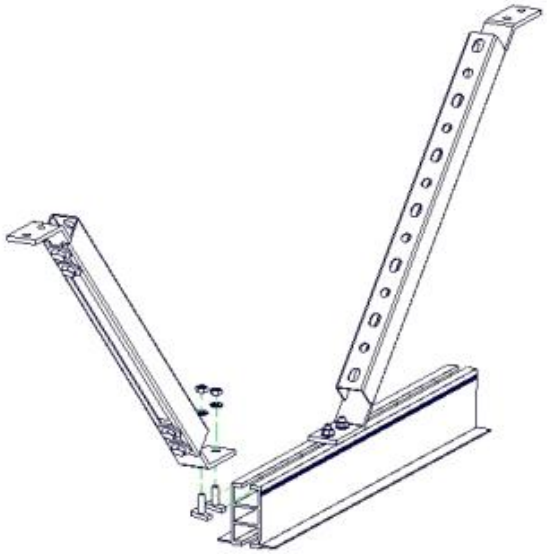
The horizontal bracing is generally installed above and parallel to the equipment rails to free up as much space as possible for the other ceiling fixtures.

The horizontal bracing is additionally stiffened by diagonal braces running to the structural ceiling.

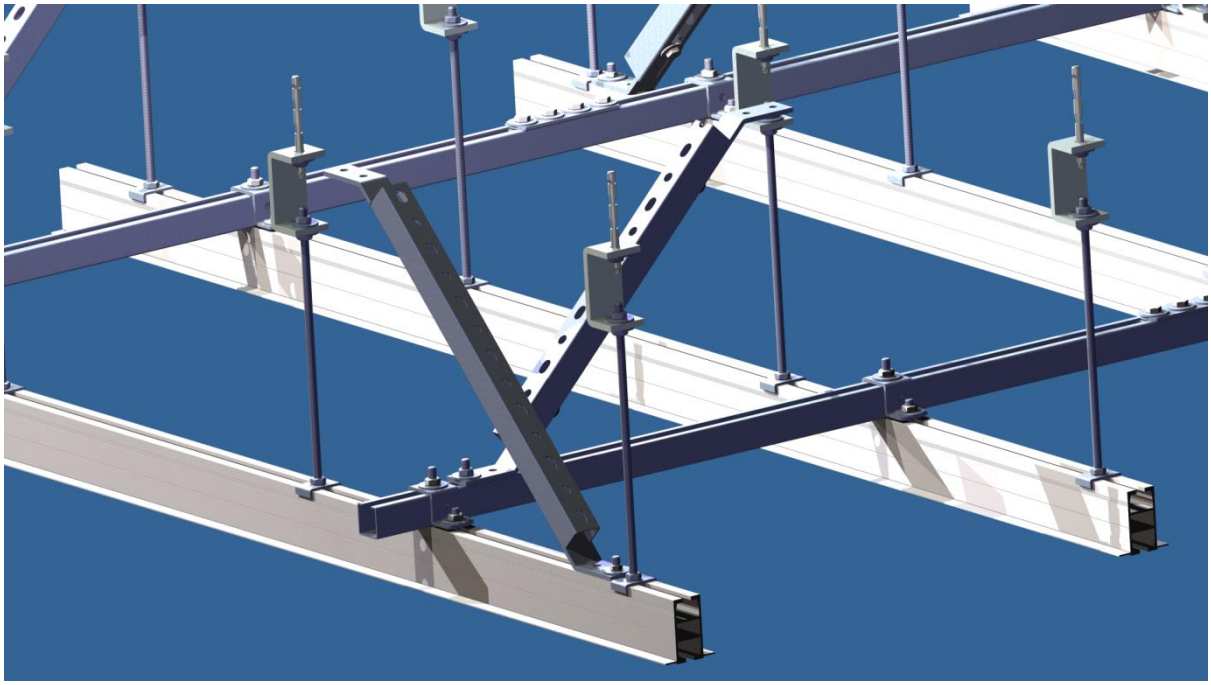
10 Bracing

Diagonal bracing

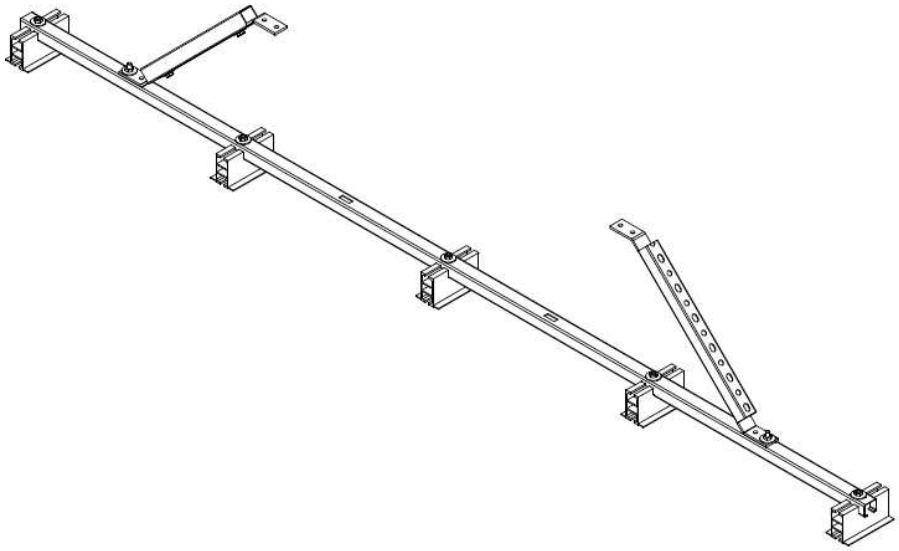
Diagonal braces are used to ensure the reliable transmission of horizontal forces to the structural ceiling.

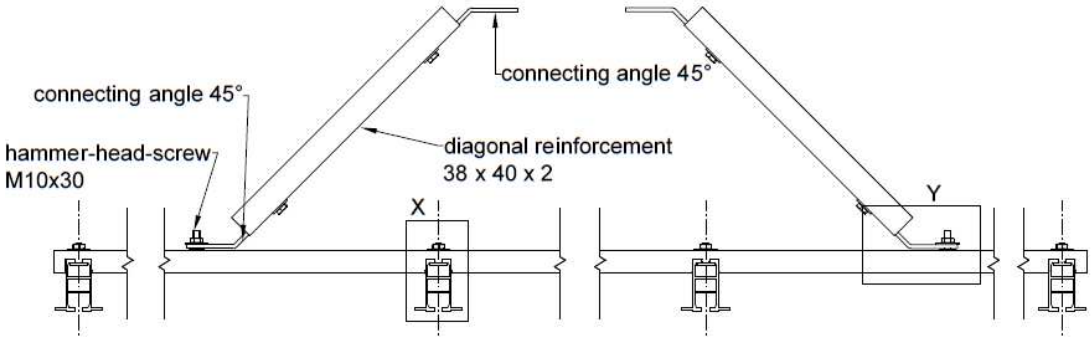


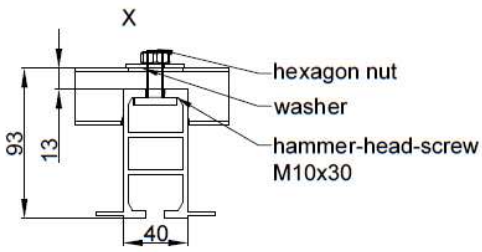
The diagonal bracing assembly is supplied complete with all bolts and anchors.

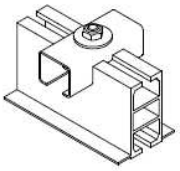


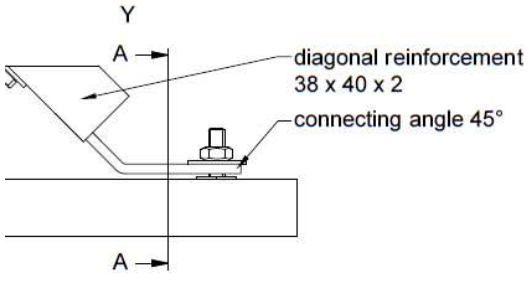
10 Bracing

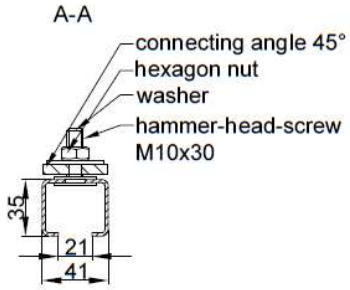


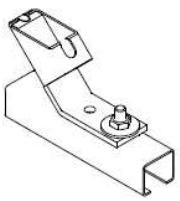

connecting angle 45°
connecting angle 45°
hammer-head-screw
M10x30
diagonal reinforcement
38 x 40 x 2
X
Y

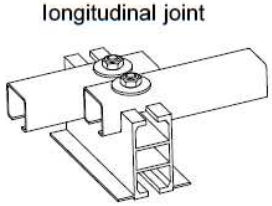

X
hexagon nut
washer
hammer-head-screw
M10x30
93
13
40



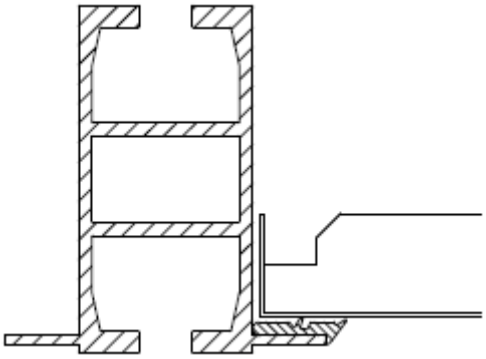

Y
A
diagonal reinforcement
38 x 40 x 2
connecting angle 45°
A

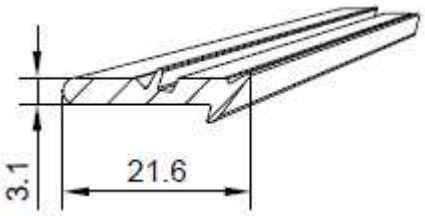

A-A
connecting angle 45°
hexagon nut
washer
hammer-head-screw
M10x30
35
21
41




longitudinal joint

11 Support profile





A self-adhesive plastics profile is available for spaces subject to stricter hygiene requirements, e.g. angio or cardiac catheterisation rooms, for bonding to the side support flange of the heavy-duty profile and to the perimeter angle.

The two lips formed in the support profiles provide a tight seal between the ceiling tiles and the heavy-duty profile.

Like all other fixtures of this system, the profiles are supplied in the colour RAL 9010.

The profiles can be cut to size with a utility knife.

Hygiene requirements call for regular cleaning of the ceiling surfaces. This is true for the exposed part of the support profiles as well. To prevent the support profiles from being damaged or becoming porous through use of the wrong cleaning agent, the following table provides details on suitable cleaning agents.

Resistance test for various cleaning agents			
	Fugaten©-Spray	Tana AZ70	Forol
Sealing profile	in permanent contact	in permanent contact	in permanent contact
Concentration	100%	100%	100%
Test period	14 days	14 days	14 days
Result	The cross-section was unchanged, no disintegration of material, no foam, no weight increase.		

11 Support profile

Report on fungistatic effect of sealing profiles

The test was performed on the basis of DIN EN ISO 846 “Plastics – Evaluation of the action of microorganisms” Methods A, B and B’.
Assessment is made by visual examination.
Method A (fungal growth test) is suitable for assessing the inherent resistance of plastics to fungal attack in the absence of other organic matter.

Methods B and B’ (determination of fungistatic effects) are used in case a surface contamination cannot be ruled out.

The incubation conditions are defined as follows:
24 +/- 1 °C for 4 weeks or more at a relative humidity ≥ 95%

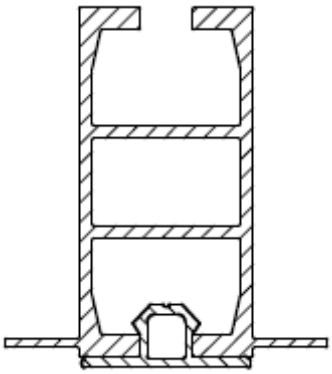
Test fungus:
Aspergillus niger van Tiegheim strain: ATCC 6275

Intensity of growth	Evaluation of fungal growth
0	No growth apparent under the microscope.
1	No growth visible to the naked eye, but clearly visible under the microscope.
2	Growth visible to the naked eye, covering up to 25% of the test surface.
3	Growth visible to the naked eye, covering up to 50% of the test surface.
4	Considerable growth, covering more than 50% of the test surface.
5	Heavy growth, covering the entire test surface.

11 Support profile

Interpretation of results		
Method	Intensity of growth	Assessment of sample
A	0	The material is not a nutritious medium for microorganisms; it is “inert” or “fungistatic”.
	1	The material contains nutritious substances or is contaminated to such a small degree that it permits only slight growth.
	2 to 5	The material is not resistant to fungal attack and contains nutritious substances suitable for the development of microorganisms.
B or B’	0	Strong fungistatic effect
	0 + zone of inhibition around the sample	Strong fungistatic effect around the sample by diffusion
	1	Partial fungistatic effect
	2 to 5	Decreasing to no fungistatic effect
Result		Intensity of growth to Table 2
		0 – no growth on sample
The tested sample does not serve as a nutritious medium for microorganisms and exhibits a strong fungistatic effect.		

12 Cover profile

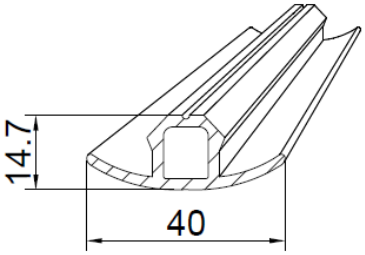


A plastics profile that can be clipped into the bottom slot of heavy-duty profiles is available for spaces subject to stricter hygiene requirements, e.g. angio or cardiac catheterisation rooms.

Like all other fixtures of this system, the profiles are supplied in the colour RAL 9010.

The bottom slot is closed off after installation of the equipment rails and other ceiling fixtures.

The profiles can be cut to size with a utility knife.



Hygiene requirements call for regular cleaning of the ceiling surfaces. This also includes the exposed part of the cover profile. To prevent the cover profiles from being damaged or becoming porous through use of the wrong cleaning agent, the following table provides details of suitable cleaning agents.

Resistance test for various cleaning agents			
	Fugaten©-Spray	Tana AZ70	Forol
Sealing profile	in permanent contact	in permanent contact	in permanent contact
Concentration	100%	100%	100%
Test period	14 days	14 days	14 days
Result	The cross-section was unchanged, no disintegration of material, no foam, no weight increase.		

12 Cover profile

Report on fungistatic effect of sealing profiles

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The incubation conditions are defined as follows:
24 +/- 1 °C for 4 weeks or more at a relative humidity ≥ 95%

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Intensity of growth	Evaluation of fungal growth
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1	No growth visible to the naked eye, but clearly visible under the microscope
2	Growth visible to the naked eye, covering up to 25% of the test surface
3	Growth visible to the naked eye, covering up to 50% of the test surface
4	Considerable growth, covering more than 50% of the test surface
5	Heavy growth, covering the entire test surface

12 Cover profile

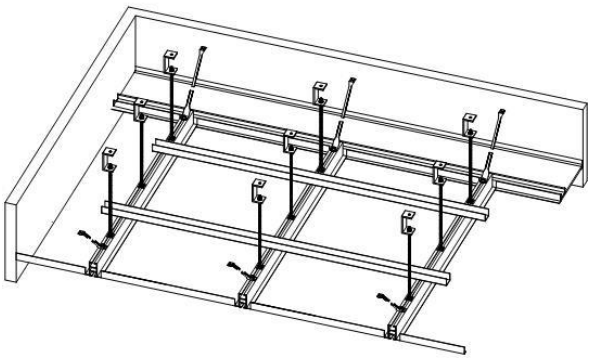
Interpretation of results		
Method	Intensity of growth	Assessment of sample
A	0	The material is not a nutritious medium for microorganisms; it is “inert” or “fungistatic”.
	1	The material contains nutritious substances or is contaminated to such a small degree that it permits only slight growth.
	2 to 5	The material is not resistant to fungal attack and contains nutritious substances suitable for the development of microorganisms.
B or B’	0	Strong fungistatic effect
	0 + zone of inhibition around the sample	Strong fungistatic effect around the sample by diffusion
	1	Partial fungistatic effect
	2 to 5	Decreasing to no fungistatic effect
Result		Intensity of growth to Table 2
		0 – no growth on sample
The tested sample does not serve as a nutritious medium for microorganisms and exhibits a strong fungistatic effect.		

13 Wall connection

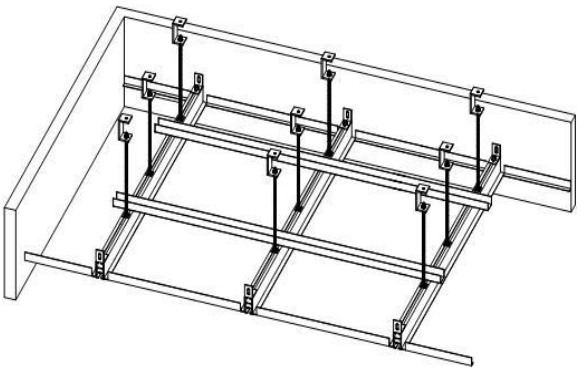
The heavy-duty ceilings can be mounted with or without a border. The inclusion of a border is particularly useful for installations where ventilation ducts, pipework, electrical wiring etc. are to be located at the room perimeter.

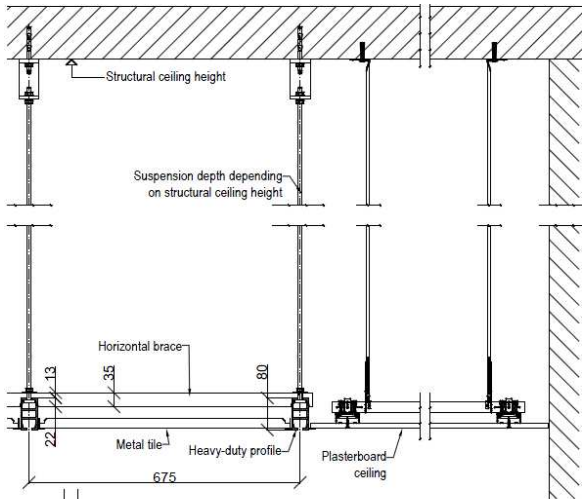
For both options, DIBATEC offers suitable perimeter profiles that are coated in the same colour as the other system components.

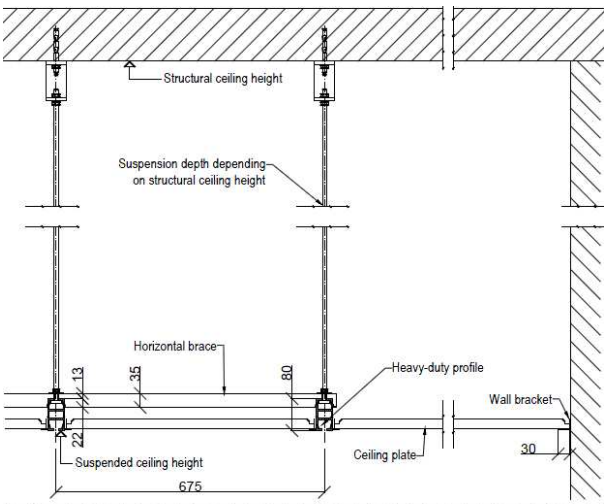
Construction with plasterboard border

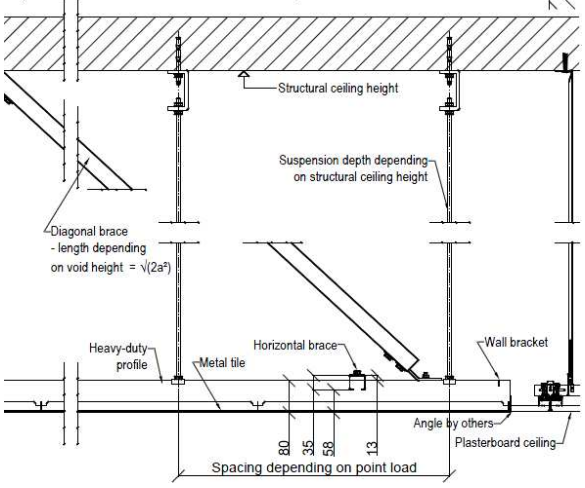


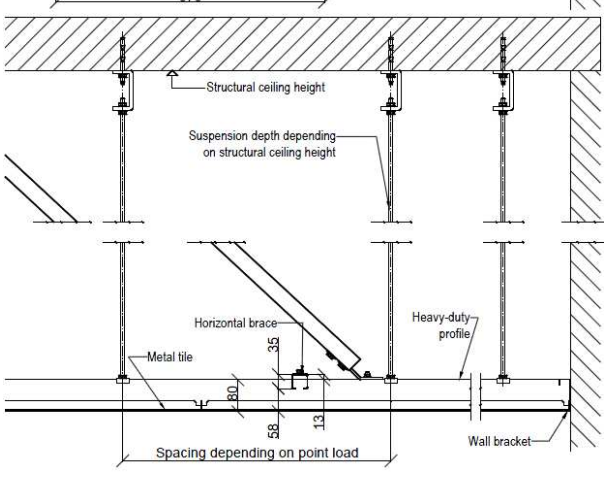
Construction with direct wall connection



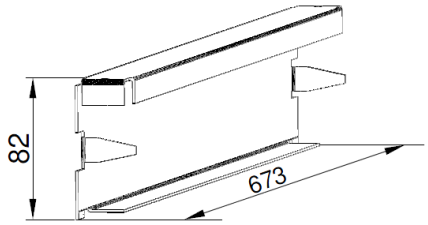






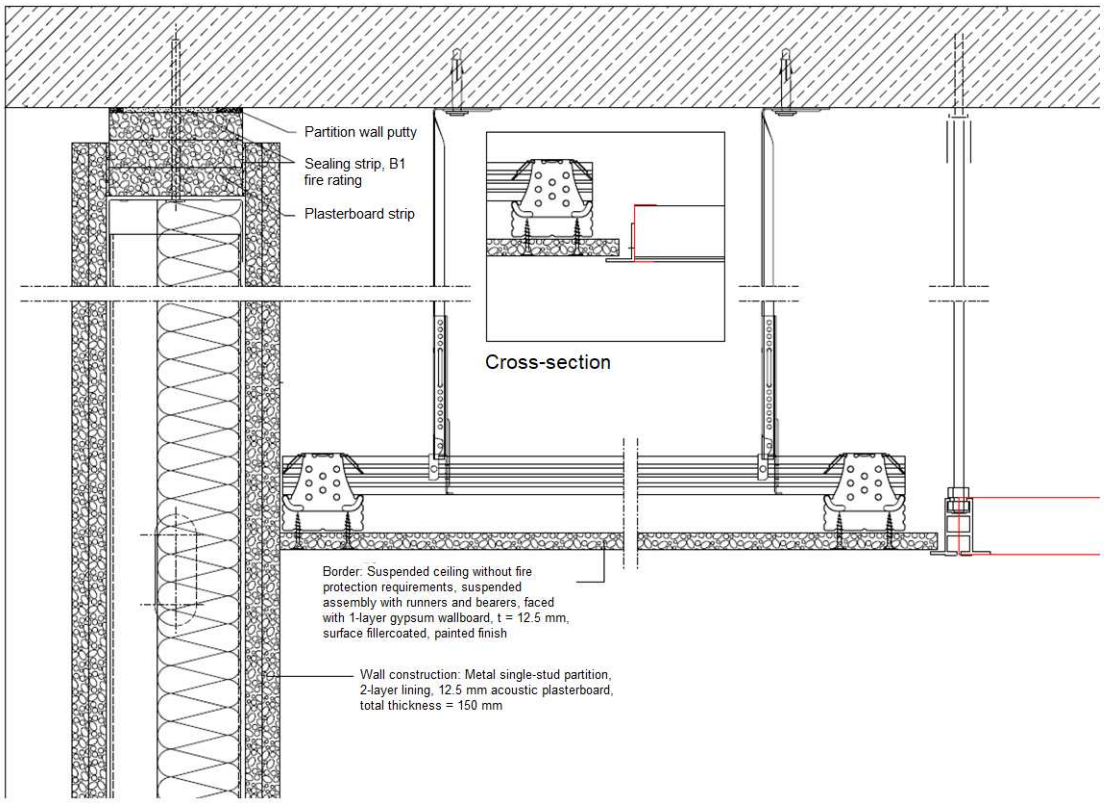


13 Wall connection

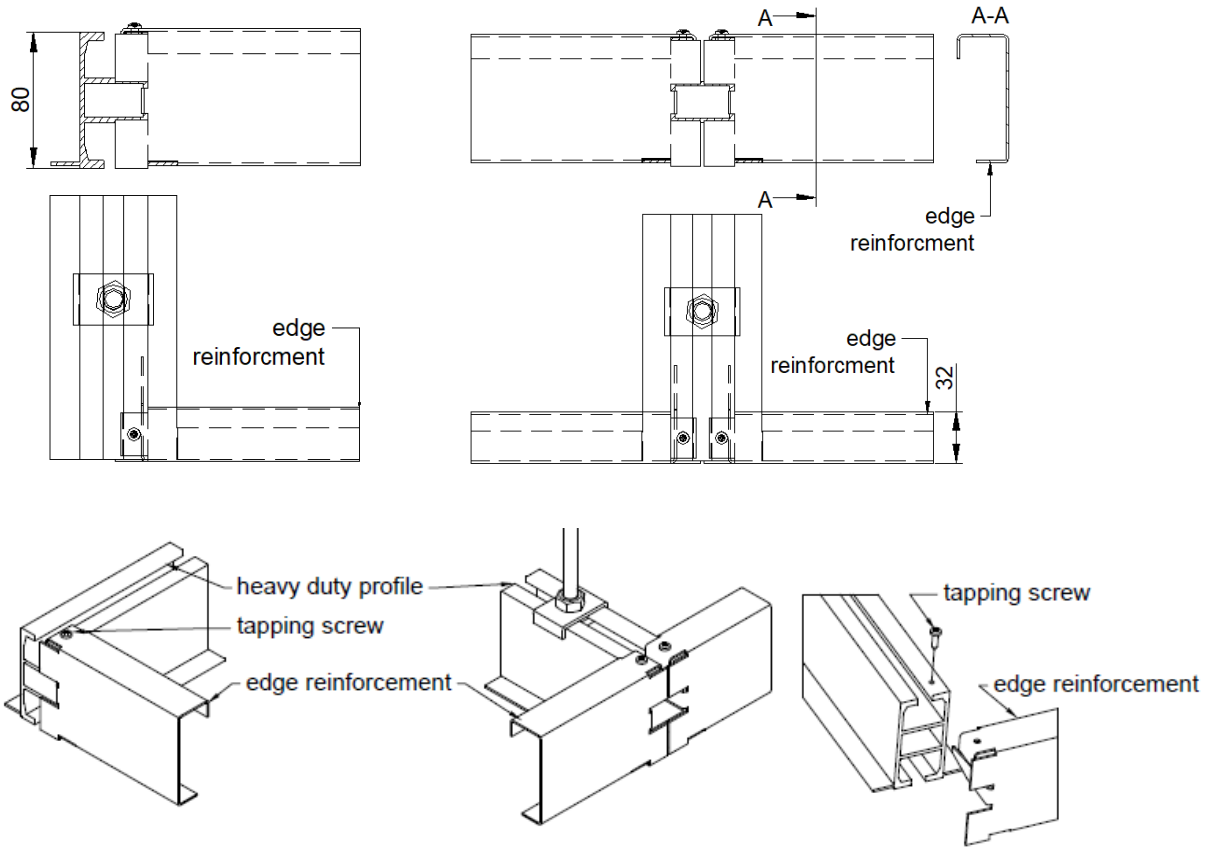


Edge reinforcement

Edge profile to receive ends of heavy-duty profiles, for supporting ceiling tiles on inner side and for fixing perimeter wall angle for ceiling border on outer side.



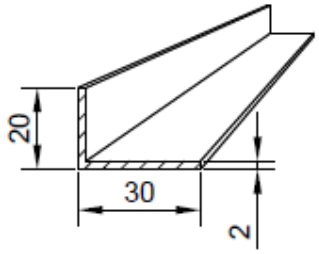
13 Wall connection



Construction with border

Construction with direct wall connection

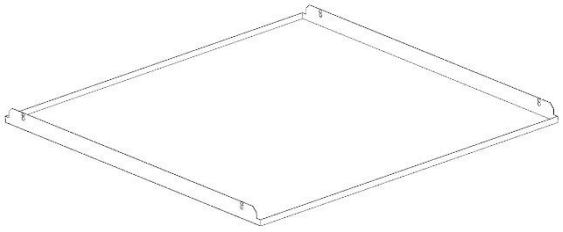
13 Wall connection

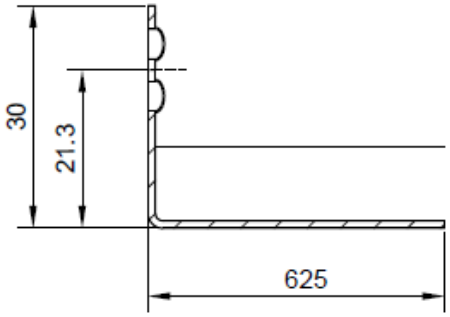


Aluminium wall angle

Perimeter wall profile for wall-to-wall mounting of heavy-duty ceiling constructions for supporting ceiling tiles or other fixtures.

14 Ceiling tiles





Metal tiles

Our metal tiles have snap-in projections on two sides. They are suitable for lay-in installations on the side legs of the heavy-duty profiles as well as for clip-in ceiling tile constructions.

Item no.	035	064
Material	steel sheet	
Finish	smooth, also perforated on request	
Edge detailing	without chamfer, square-edged on four sides	
Material thickness	0.6 mm	
Colour	white, similar to RAL 9010	
Size [mm]	625 × 625	625 × 312.5
Weight	5.23 kg/m²	
Packaging in box	14 pcs. = 5.47 m²	28 pcs. = 5.47 m²

The heavy-duty ceiling system can accommodate various ceiling tile types, the selection of which is based on a range of criteria. These include:

- architecture
- hygiene
- sound control
- fire protection
- ease of removal (for inspection purposes)

We will supply the correct system-compatible ceiling tile type to meet all requirements.

The heavy-duty profile system can also accommodate standard proprietary ceiling tiles for lay-in or clip-in installation. All tile types are removable for inspection access.
The tiles can be supplied in a variety of materials in line with requirements.

The sizes are geared to the relevant ceiling grid (centre-to-centre distance of heavy-duty profiles), e.g.:
ceiling grid = 675 mm for 625 x 625 mm ceiling tiles (external size)
ceiling grid = 655 mm for 600 x 600 mm ceiling tiles (external size)

Note: Standard proprietary ceiling tiles for lay-in installation cannot be used because they do not have an effective size of 625 mm. The actual size ranges between 615 and 619 mm. Moreover, the fact that the edges of these tiles are not coated may impair their visual impact. The transverse edges of the ceiling tiles remain exposed due to the parallel mounting arrangement of the heavy-duty ceilings.

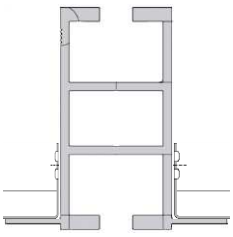
14 Ceiling tiles

The metal tiles are primarily supplied for lay-in or clip-in installation. Unperforated models are available from stock in the sizes specified above.

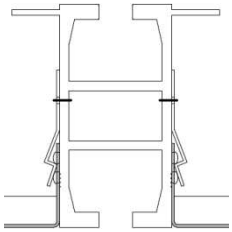
The lay-in installation method is normally adopted for the heavy-duty ceiling constructions. In exceptional cases, e.g. for small suspension depths, the ceiling tiles, luminaires and other fixtures can only be fitted from below due to the inadequate height of the ceiling void. Special detail solutions are required in such cases.

Schematic:

Lay-in installation

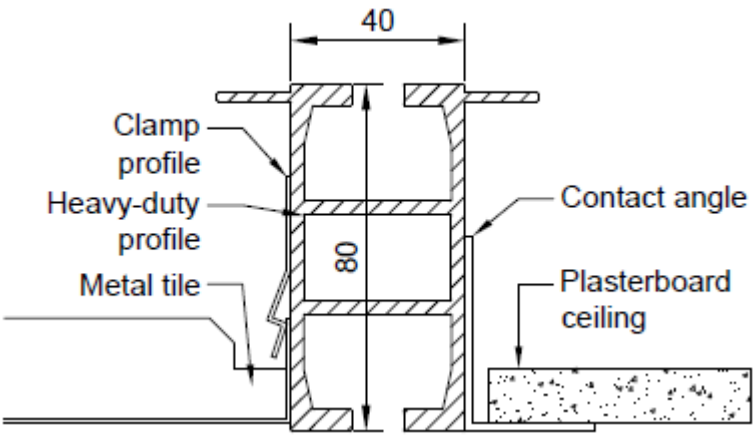


Clip-in installation

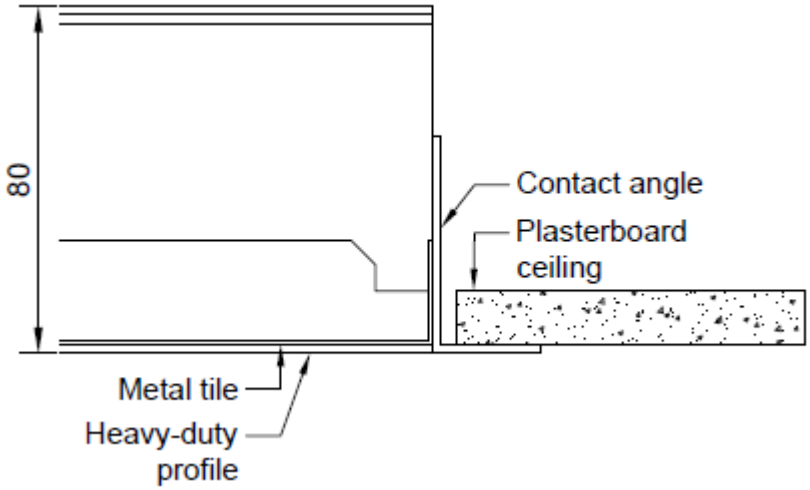


14 Ceiling tiles

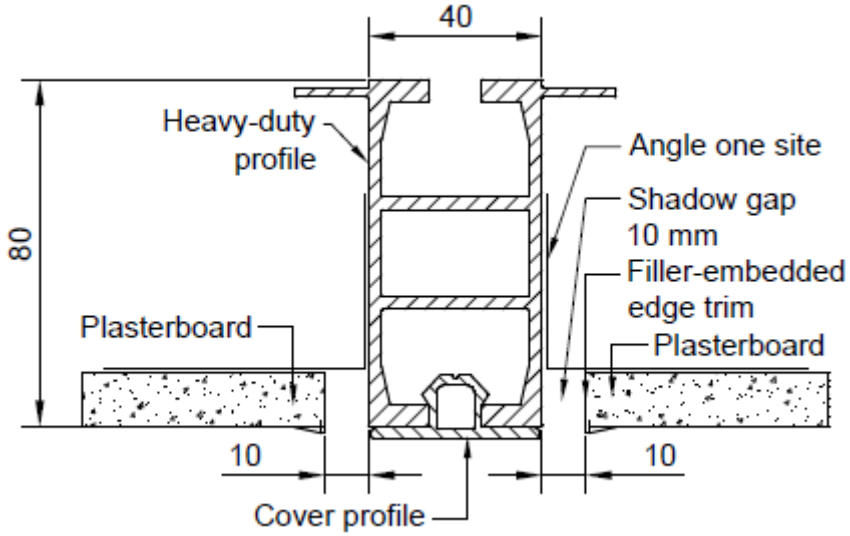
Assembly detail showing clip-in ceiling tile connected to plasterboard border:



Front connection of clip-in ceiling tile connected to plasterboard border:

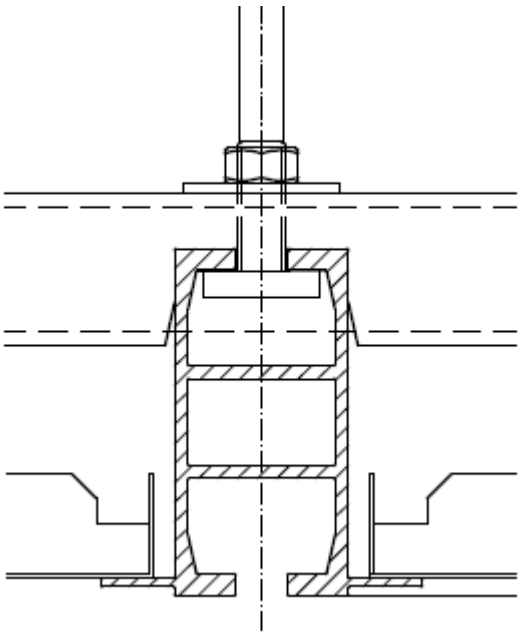


Assembly detail showing fixed gypsum plasterboard panel installation with shadow gap:

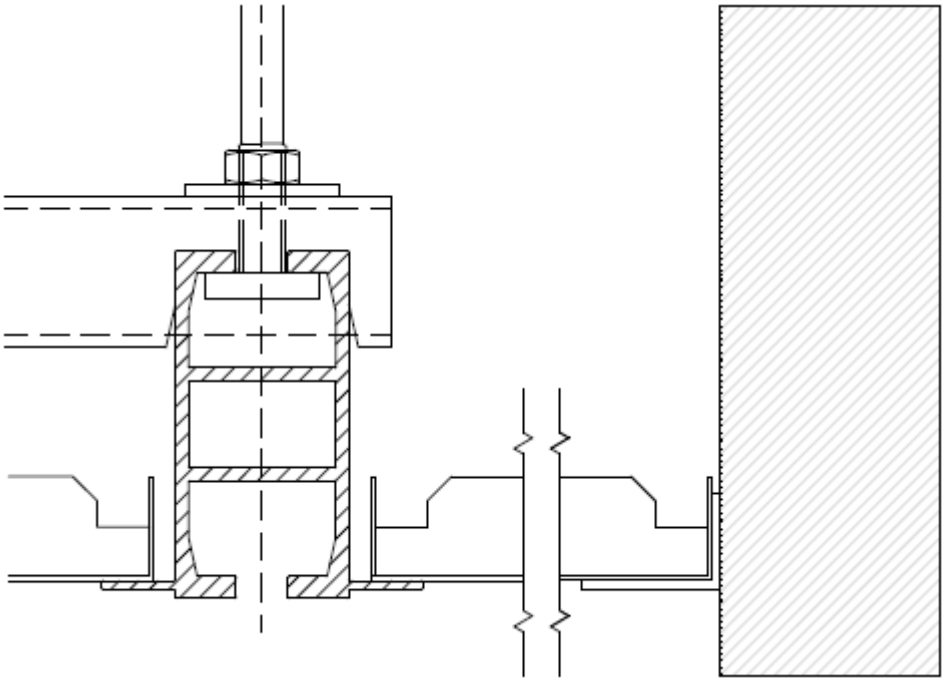


14 Ceiling tiles

Assembly detail showing heavy-duty profile with metal tiles on either side as lay-in installation:



Assembly detail showing heavy-duty profile with metal tiles on either side as lay-in installation and lateral metal tile border:



14 Ceiling tiles

Cleaning and care instructions for metal ceilings

Thanks to their smooth surface, metal ceilings require very little care or maintenance.

We recommend that the ceiling be cleaned at regular intervals. Cleaning should be geared to the degree of soiling and can be carried out in the installed condition.

The following cleaning methods are possible:

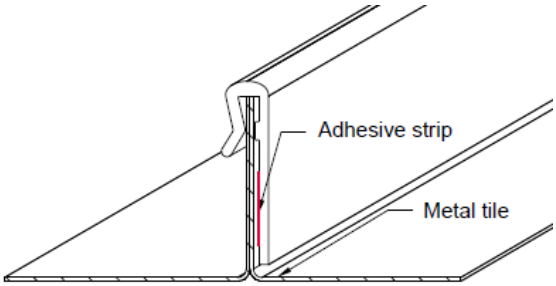
A. Dry cleaning:
- with a soft, dry cleaning rag (e.g. microfibre cloth)
- with a vacuum cleaner with soft brush attachment

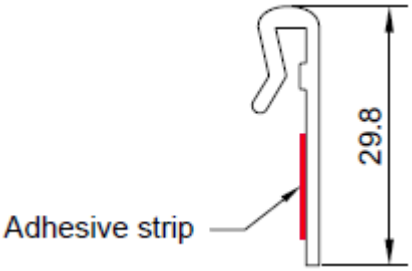
B. Wet cleaning:
- with clean water to which a non-abrasive, standard proprietary cleaning agent is added; the mixing ratio is geared to the degree of soiling on the ceiling.
- with all relevant glass cleaning agents
- with special cleaning agents in case of heavy, greasy soiling; in such cases, a self-evaporating, e.g. diluted spirit, should be selected.
- with a steam cleaner with up to 60 °C water temperature; this should likewise only be used in case of heavy soiling

Note: In case of heavy soiling, it is essential to hire a specialist company in advance to advise on and perform the cleaning works.

Practical tip: Perform a preliminary test with your preferred cleaning agent and method at an inconspicuous location. You will always be on the safe side this way.

15 Joint clip profile





A one-side self-adhesive plastics profile is available for spaces subject to stricter hygiene requirements, e.g. angio or cardiac catheterisation rooms, for lateral bonding to the internal side of the metal tile.

The joint clip profile provides a tight seal at the joints between adjacent ceiling tiles. It prevents the joints between tiles from opening.

Even ceiling tiles fitted with the joint clip profile can still be removed at any time and subsequently reinstalled in their original condition.
Like all other fixtures of this system, the profiles are supplied in the colour RAL 9010.

Profile length: 620 mm

Hygiene requirements call for regular cleaning of the ceiling surfaces. This is true for the exposed part of the support profiles as well. To prevent the support profiles from being damaged or becoming porous through use of the wrong cleaning agent, the following table provides details on suitable cleaning agents.

Resistance test for various cleaning agents			
	Fugaten©-Spray	Tana AZ70	Forol
Sealing profile	in permanent contact	in permanent contact	in permanent contact
Concentration	100%	100%	100%
Test period	14 days	14 days	14 days
Result	The cross-section was unchanged, no disintegration of material, no foam, no weight increase.		

15 Joint clip profile

Report on fungistatic effect of sealing profiles

The test was performed on the basis of DIN EN ISO 846 “Plastics – Evaluation of the action of microorganisms” Methods A, B and B’.
Assessment is made by visual examination.
Method A (fungal growth test) is suitable for assessing the inherent resistance of plastics to fungal attack in the absence of other organic matter.

Methods B and B’ (determination of fungistatic effects) are used in case a surface contamination cannot be ruled out.

The incubation conditions are defined as follows:
24 +/- 1 °C for 4 weeks or more at a relative humidity ≥ 95%

Test fungus:
Aspergillus niger van Tiegheim strain: ATCC 6275

Intensity of growth	Evaluation of fungal growth
0	No growth apparent under the microscope
1	No growth visible to the naked eye, but clearly visible under the microscope
2	Growth visible to the naked eye, covering up to 25% of the test surface
3	Growth visible to the naked eye, covering up to 50% of the test surface
4	Considerable growth, covering more than 50% of the test surface
5	Heavy growth, covering the entire test surface

15 Joint clip profile

Interpretation of results		
Method	Intensity of growth	Assessment of sample
A	0	The material is not a nutritious medium for microorganisms; it is “inert” or “fungistatic”.
	1	The material contains nutritious substances or is contaminated to such a small degree that it permits only slight growth.
	2 to 5	The material is not resistant to fungal attack and contains nutritious substances suitable for the development of microorganisms.
B or B’	0	Strong fungistatic effect
	0 + zone of inhibition around the sample	Strong fungistatic effect around the sample by diffusion
	1	Partial fungistatic effect
	2 to 5	Decreasing to no fungistatic effect
Result		Intensity of growth to Table 2
		0 – no growth on sample
The tested sample does not serve as a nutritious medium for microorganisms and exhibits a strong fungistatic effect.		

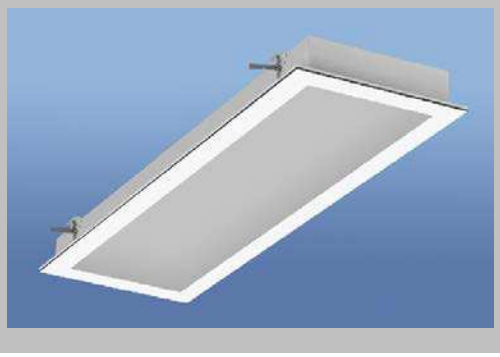
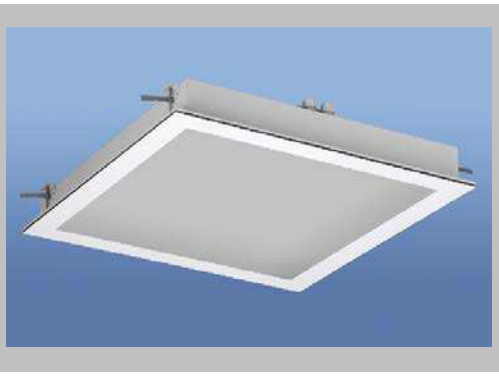
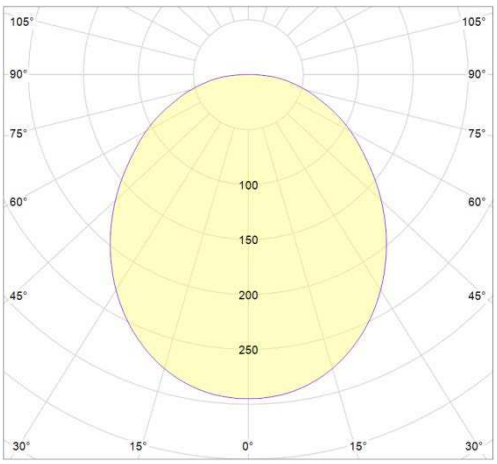
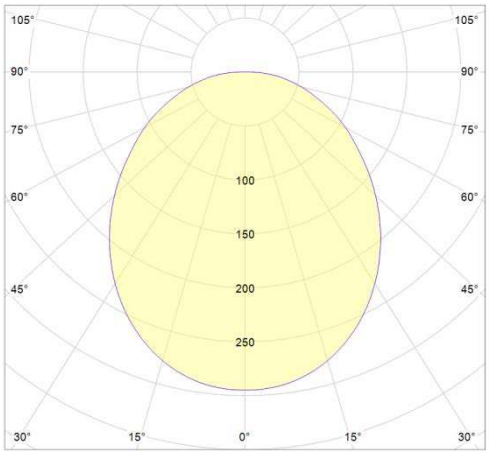
16 Luminaires

Hygiene luminaire

The DIBATEC hygiene luminaires perfectly complement our heavy-duty ceilings. They meet all standards and requirements for IP 54 or IP 65 and are very easy to fit: The luminaires are simply laid in the standard 675 mm ceiling grid. They can also be readily installed in plasterboard ceilings. The associated installation kit is supplied with the product.

Benefits:

- wired ready for connection
- suitable for heavy-duty ceilings
- same colour as profiles and metal ceiling tiles
- cover swings down, even in installed condition
- no downwardly projecting components
- same height as heavy-duty profile, with no parts projecting into ceiling void
- LEDs with colour rendering CRI (Ra) > 90 are factory-fitted
- light colour 4,000 K

Classic R or Plus R hygiene luminaire	Classic or Plus hygiene luminaire
With light distribution curve	
	
	
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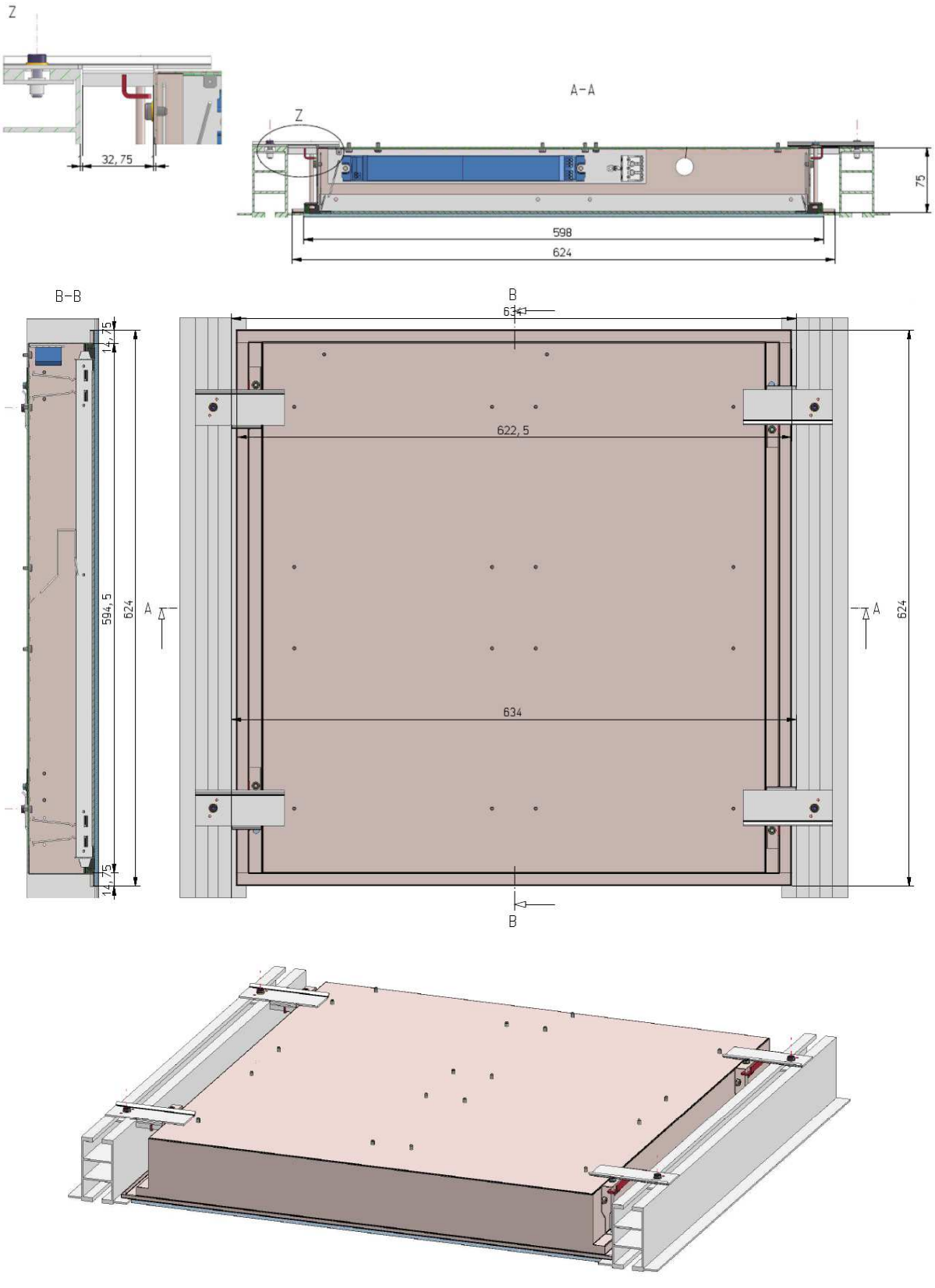
16 Luminaires

Technical data for hygiene luminaires				
Properties	Classic	Classic R	Plus	Plus R
Item no.				
Protection type	IP 54	IP 54	IP 65	IP 65
Size				
Luminaire body [mm]	624 x 624	624 x 312	624 x 624	624 x 312
Glass cover for heavy-duty ceiling [mm]	598 x 624	598 x 312	598 x 624	598 x 312
Glass cover for plasterboard ceiling [mm]	624 x 624	624 x 312	624 x 624	624 x 312
Cut-out in plasterboard ceiling [mm]	609 x 609	609 x 297	609 x 609	609 x 297
Installation height [mm]	75			
Unit weight [kg]	12.0	6.0	12.0	6.0
Housing material	white steel sheet, RAL 9016			
Cover material	Satinance acrylic plate with high translucency (82%), maximum plate homogeneity and special glare-reducing surface, wide-angle light distribution, bottom luminaire surface comprising 4 mm toughened glass pane with perimeter screen printing			
Electronic control gear	DALI dimmable, multi-watt electronic balanced unit			
Electric plug	Wieland GST 18/5 5-pole, snap-in connector terminal			
Wiring	halogen-free			
Light source	LED			
Luminous colour [K]	4,000			
Colour rendering	Ra ≥ 90			
Luminaire luminous flux [lm]	4,900	2,450	4,900	2,450
Connection power [W]	45.8	22.9	45.8	22.9
Life span	L80B10 = 72,000 h			
Energy efficiency class	A++			
Test mark	CE, F			
Cleaning	The surface can be cleaned with standard cleaning and disinfection agents. However, a preliminary cleaning test should still be performed at an inconspicuous location prior to use.			

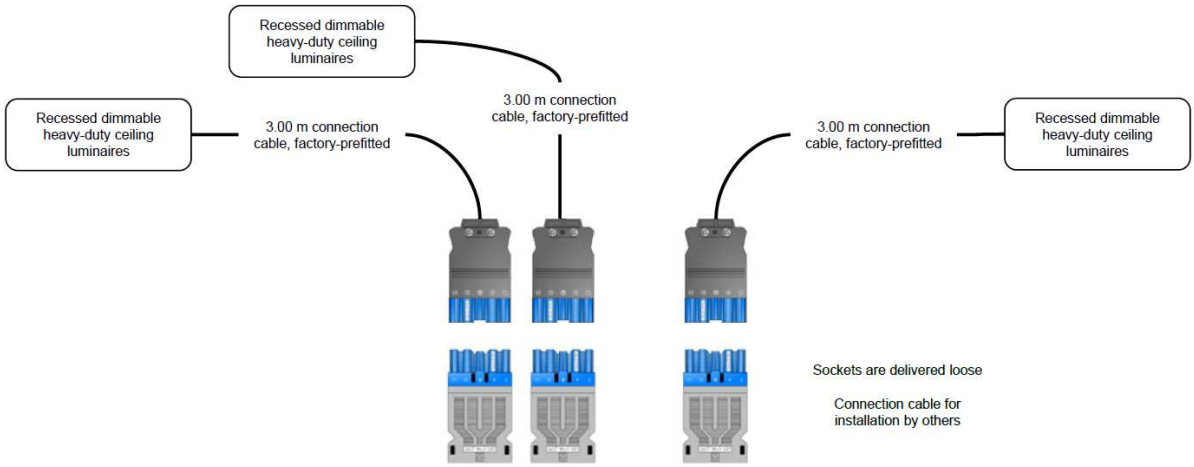
16 Luminaires

Dimensioned drawing for Classic or Plus hygiene luminaire

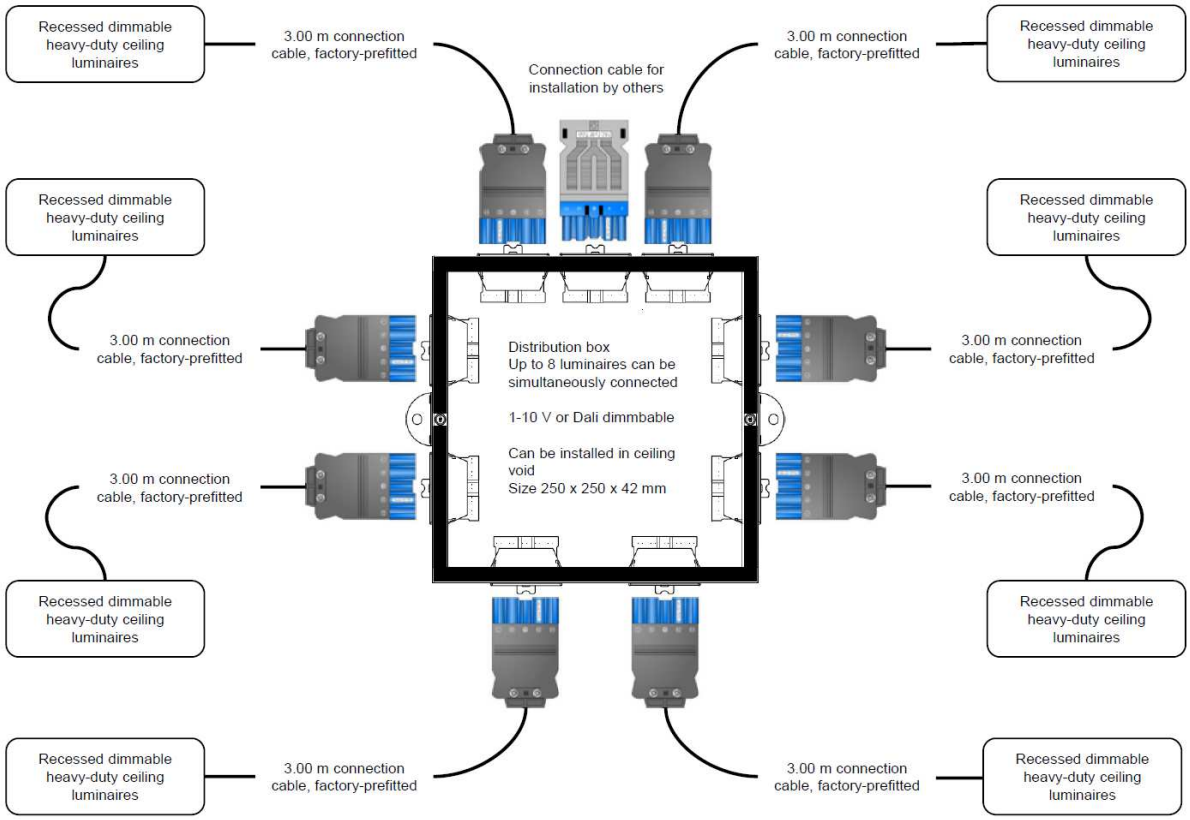


16 Luminaires

Single recessed luminaire connection

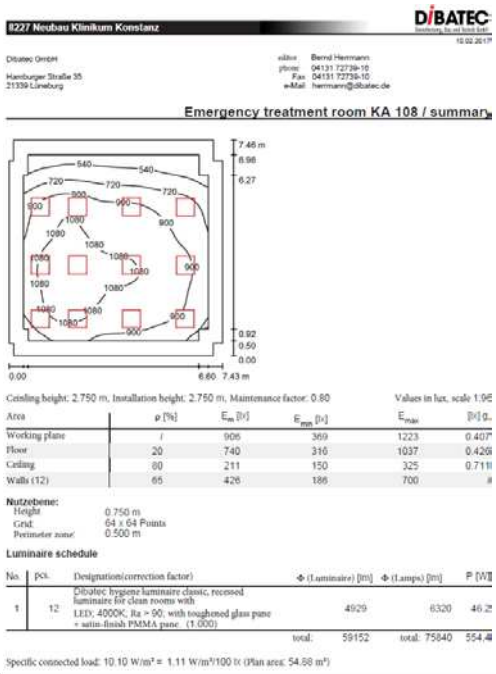


Multiple recessed luminaire connection



17 Luminaire planning

All luminaire planning concepts prepared at our company comply with the relevant standards and regulations. We verify the cost-effectiveness and technical feasibility of their application in examination rooms while giving due consideration to aesthetic criteria.
In addition, our proposals allow for the incorporation of various equipment rails.



8227 Neubau Klinikum Konstanz

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phone: 04131 72739-10
Fax: 04131 72739-10
e-Mail: herrmann@dibatec.de

Emergency treatment room KA 108 / summary

Ceiling height: 2.750 m, Installation height: 2.750 m, Maintenance factor: 0.80 — Values in lux, scale 1:96

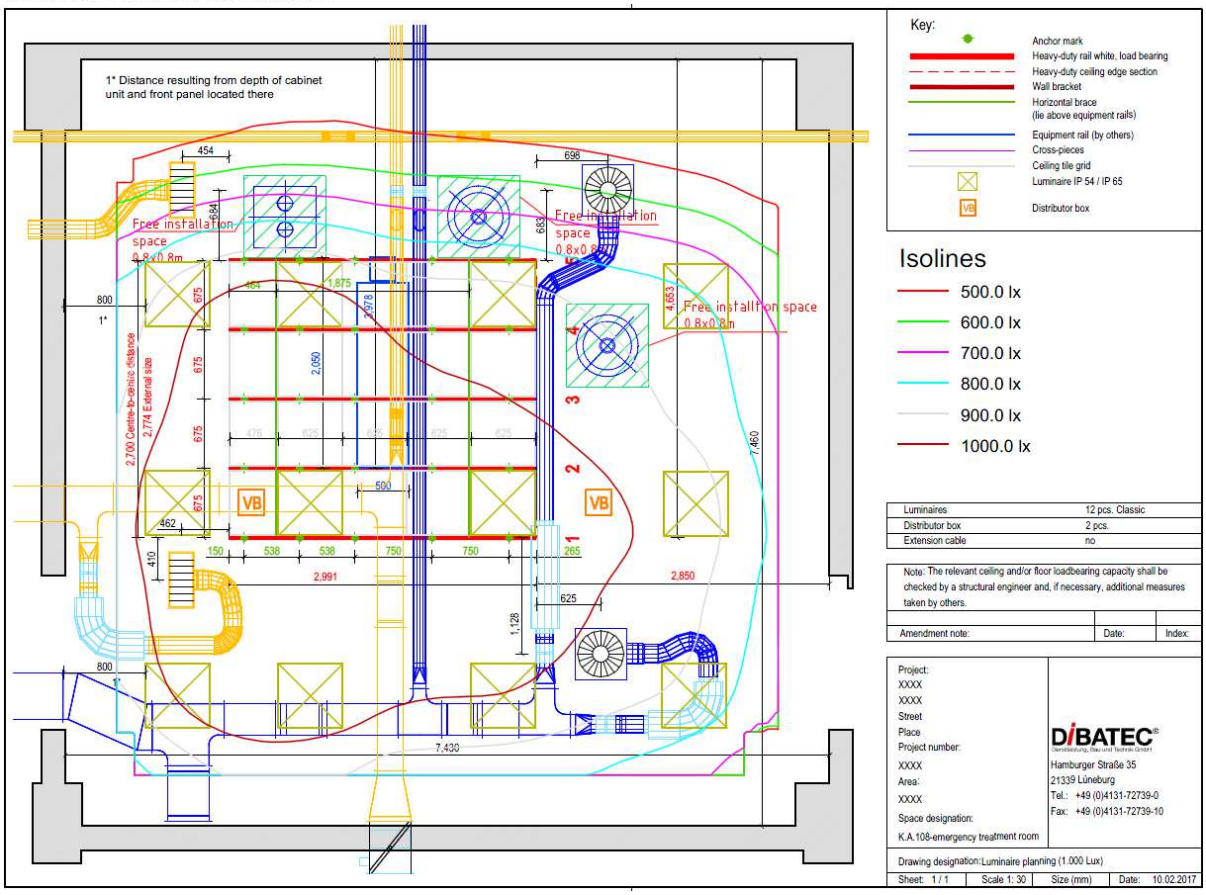
Area	ρ [%]	E_m [lx]	E_{min} [lx]	E_{max} [lx]	[lx] g..
Working plane	/	906	369	1223	0.407
Floor	20	740	316	1037	0.426
Ceiling	80	211	150	325	0.711
Walls (12)	66	426	186	700	/

Nutzebene:
Height: 0.750 m
Grid: 64 x 64 Points
Perimeter zone: 0.500 m

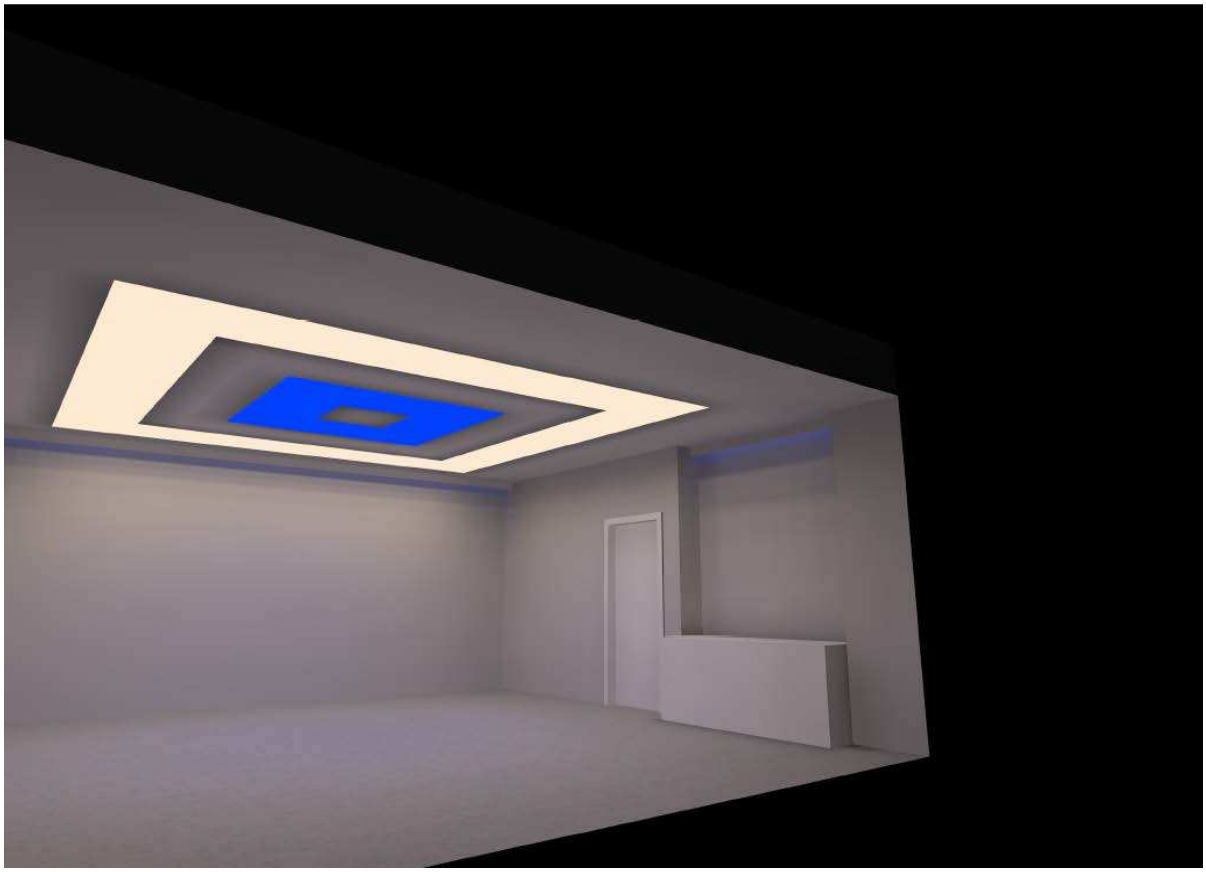
Luminaire schedule

No.	pcs.	Designation(correction factor)	Φ (Luminaire) [lm]	Φ (Lamps) [lm]	P [W]
1	12	Dibatec hygiene luminaire classic, recessed luminaire for clean rooms with LED; 4000K, Ra > 90; with toughened glass pane + satin-finish PMMA pane (1.000)	4929	6320	46.2
		total:	59152	total: 75840	554.4

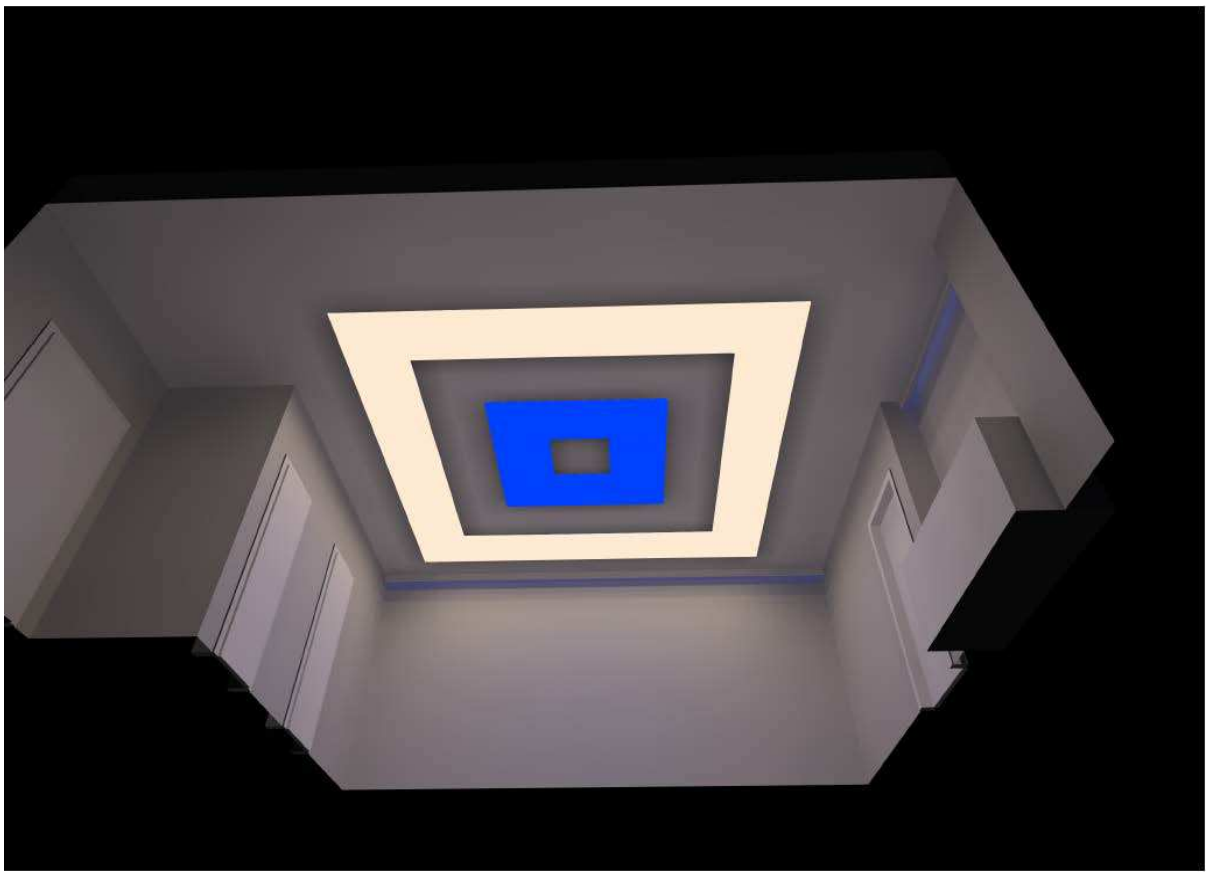
Specific connected load: 10.10 W/m² = 1.11 W/m²/100 lx (Plan area: 54.88 m²)

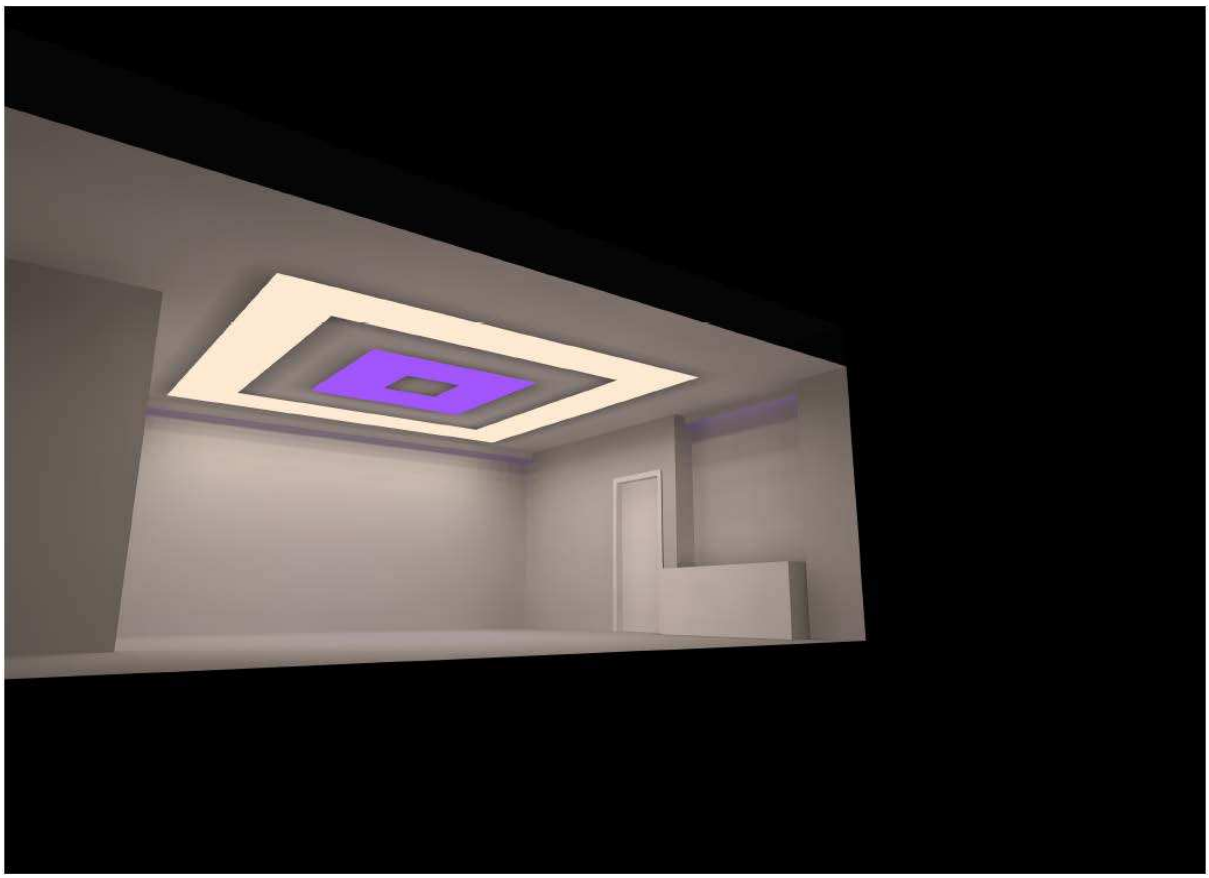


17 Luminaire planning

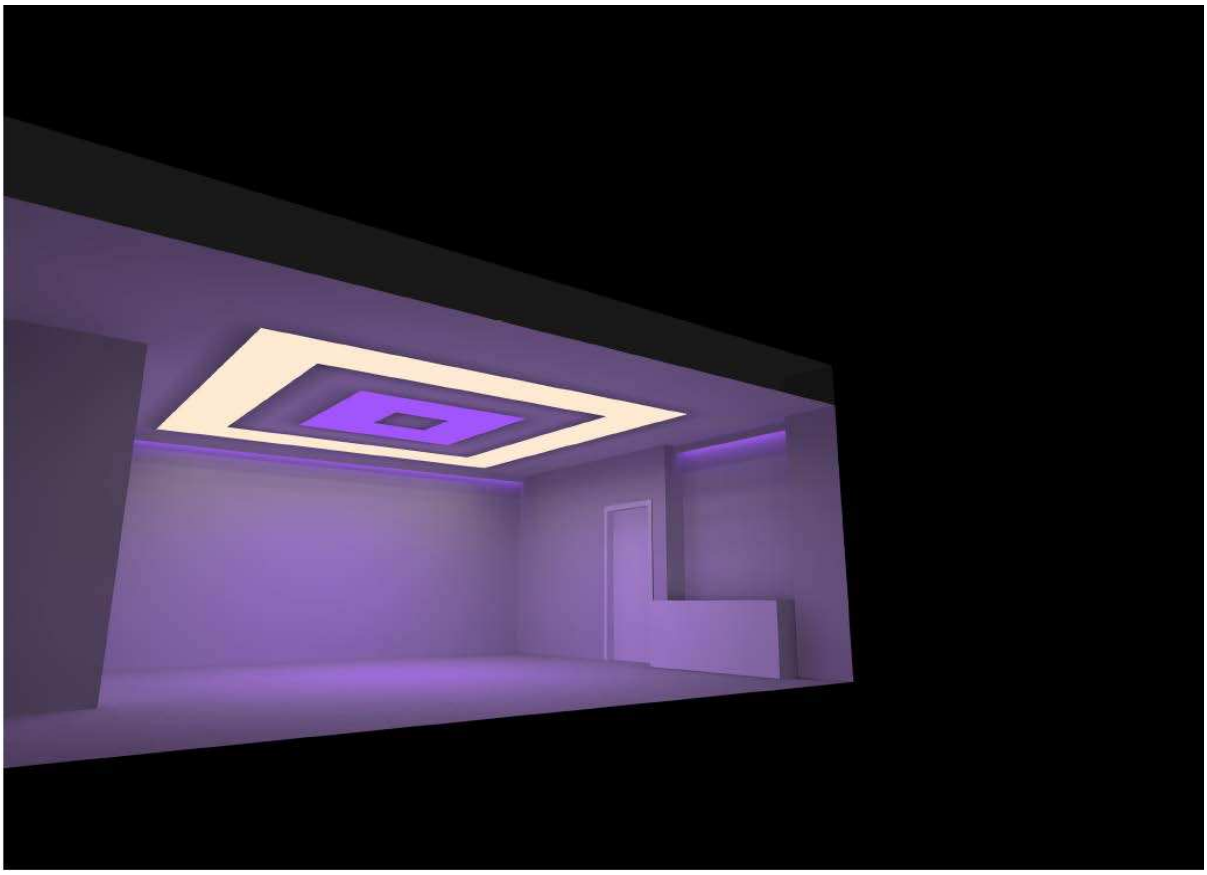


17 Luminaire planning



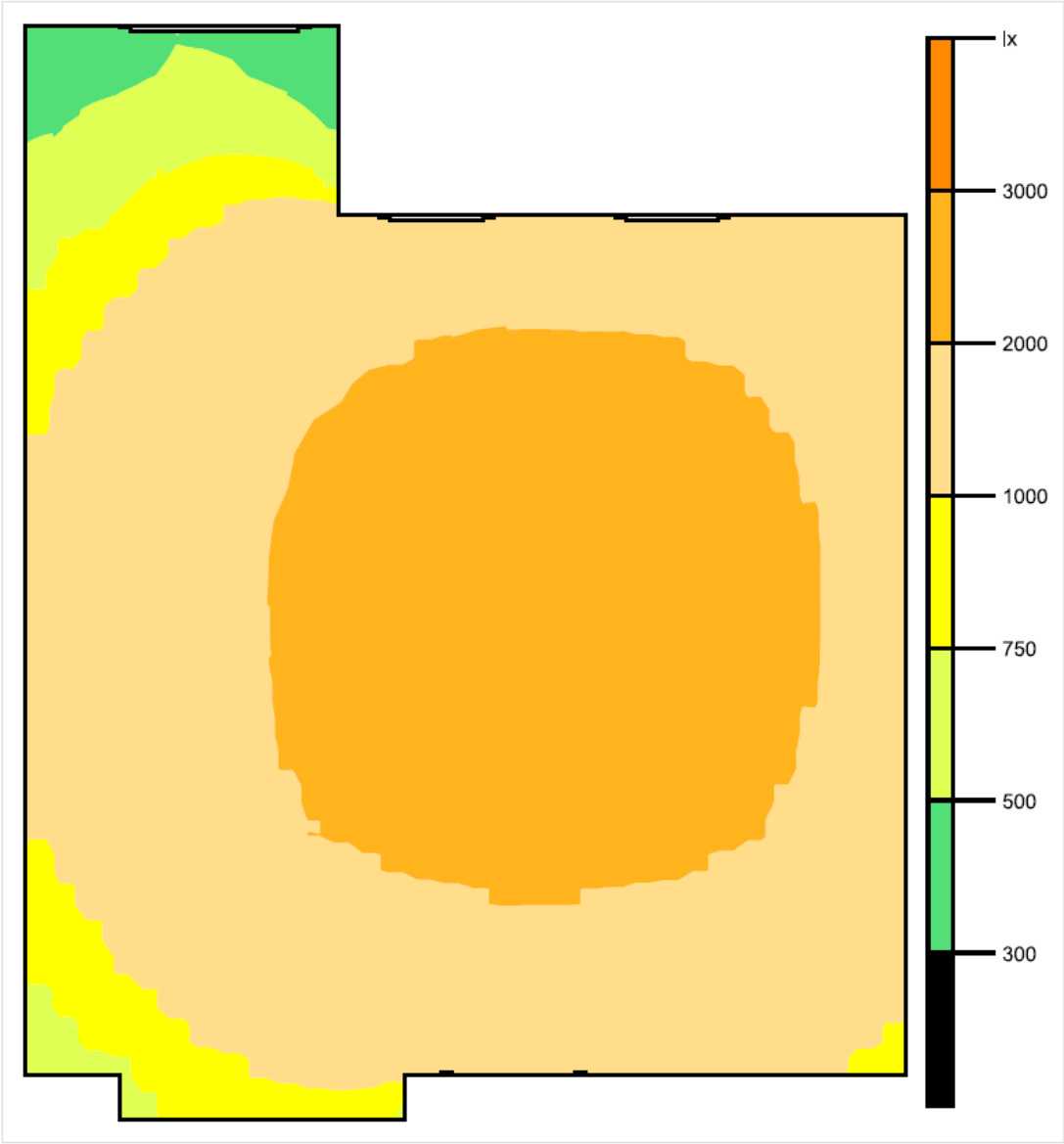


17 Luminaire planning



17 Luminaire planning

Working plane 1 / false colours / lighting scene 2 with RGB / perpendicular illuminance (adaptive)

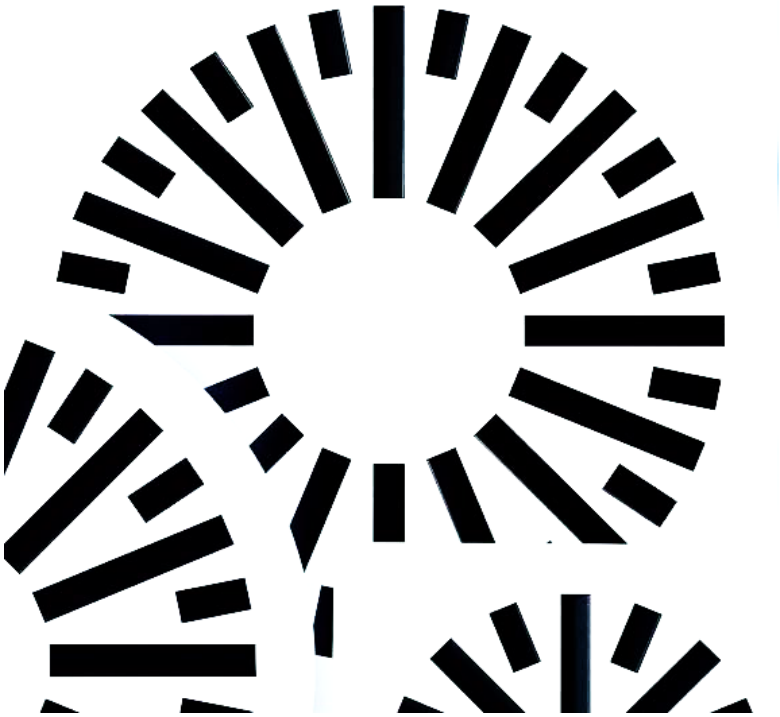


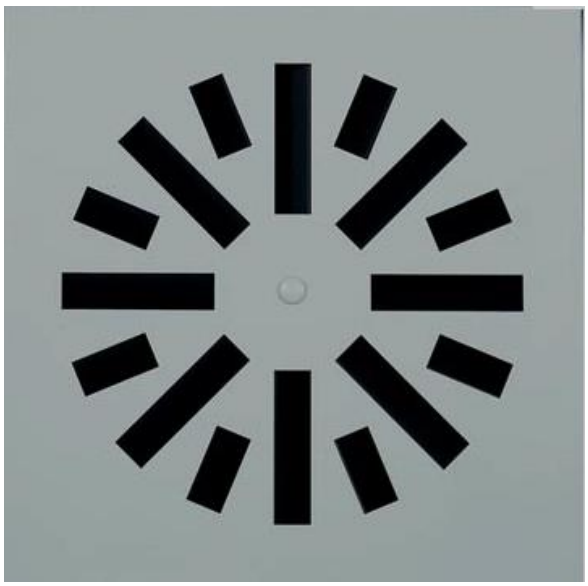
18 Ventilation outlets

Our ventilation outlet range for heavy-duty ceiling systems is currently being revised and redesigned.

We would be glad to provide information on request.

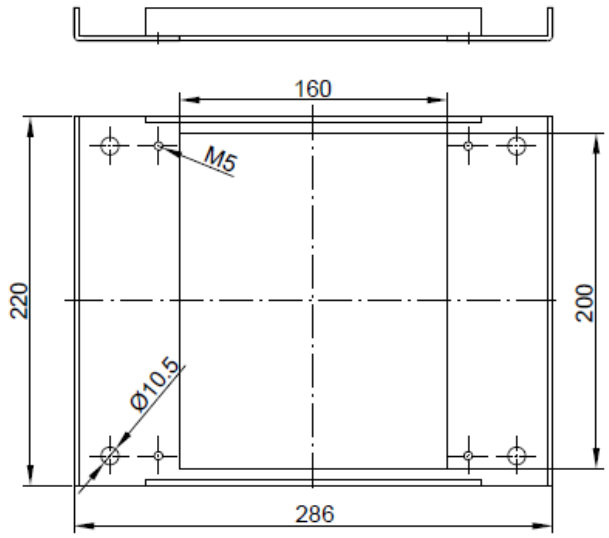
Please feel free to contact us.





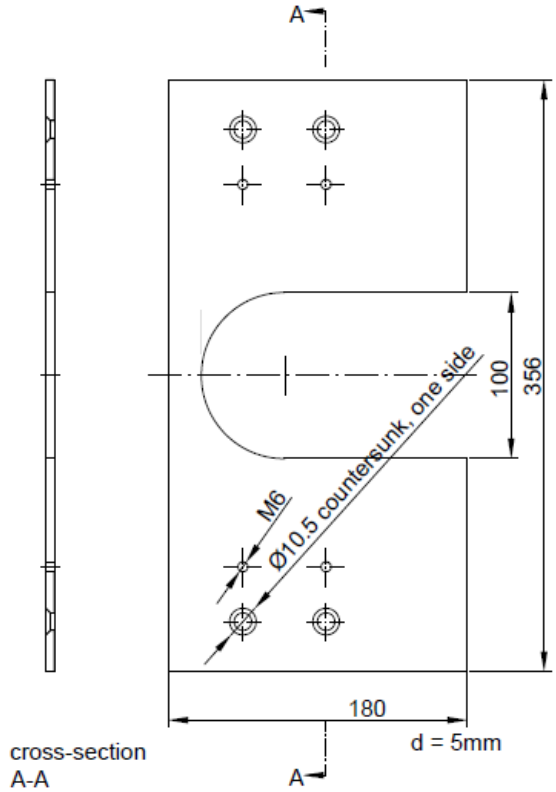
19 Cable outlets

DIBATEC provides suitable cable outlet support assemblies for various equipment manufacturers. These can be installed in conjunction with the heavy-duty ceilings and adjusted in height and position to suit the ceiling tile type.



Philips cable outlet, type 1

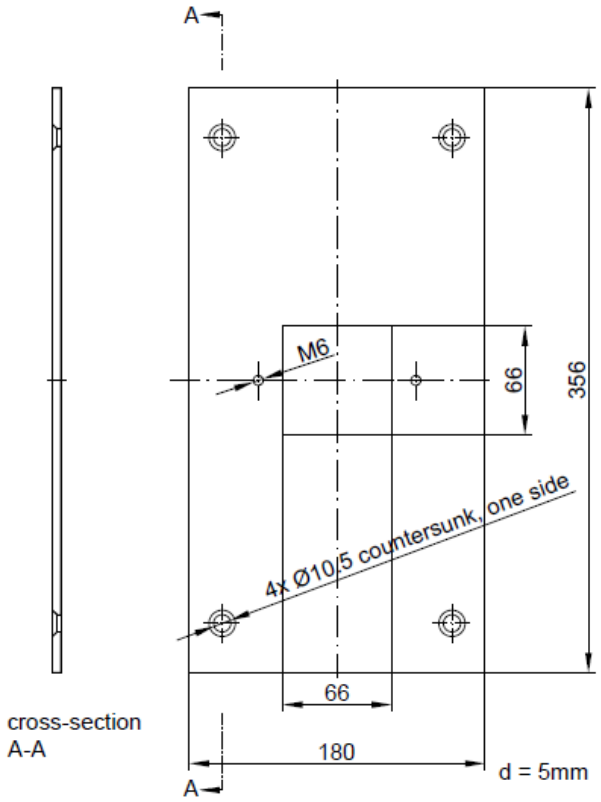
steel plate d = 3mm, folded
on four sites



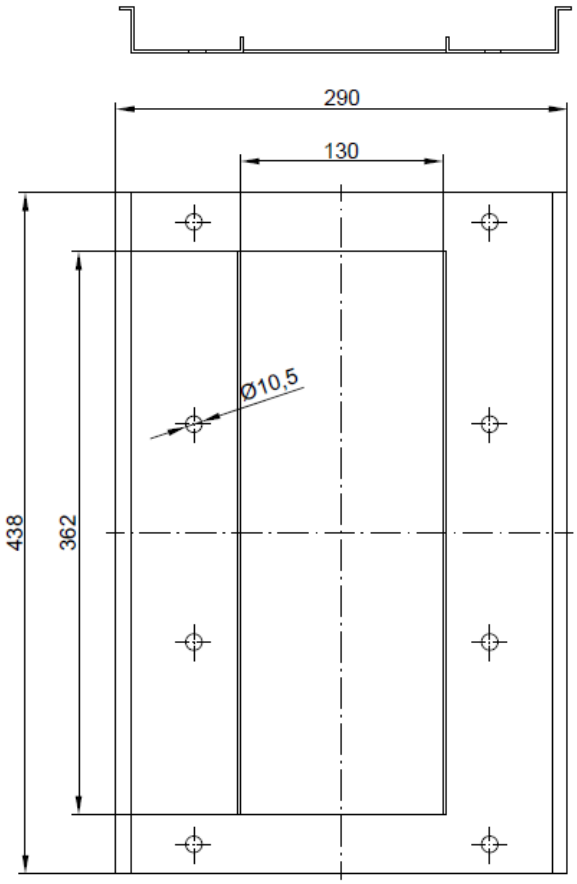
Philips cable outlet, type 2

cross-section
A-A

19 Cable outlets

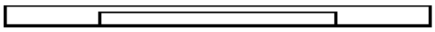


Philips cable outlet, type 3

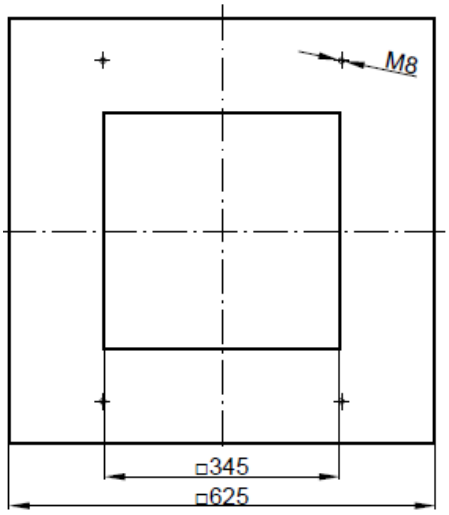


Siemens cable outlet

19 Cable outlets

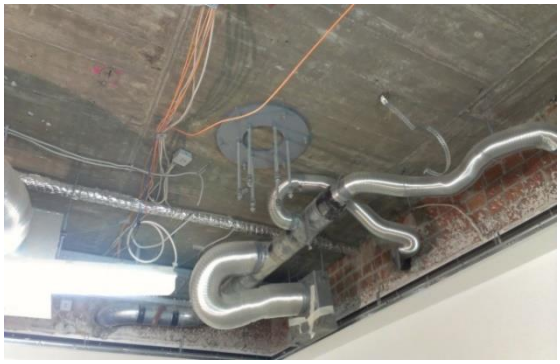


Canon cable outlet



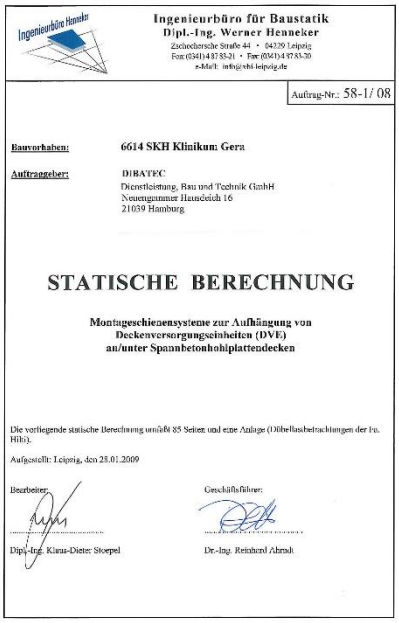
steel plate d=2mm
folded on four sides

20 Ceiling supply units



More often than not, ceiling supply units cannot be directly fixed to the structural ceiling. This may be due to obstructing ventilation ducts, for example. In other cases, e.g. with hollow-core slabs, it may not be possible for the structural ceiling to accommodate the loads. Such situations call for the installation of an additional load-spreading supporting structure.

In all these cases, DIBATEC offers customised solutions that are precisely tailored to the specific requirements.
Upon request, we will also prepare the associated structural calculations.



Ingenieurbüro für Baustatik
Dipl.-Ing. Werner Henneker
Zschochersche Straße 44 • 04229 Leipzig
Fon (0341) 4 97 85-21 • Fax (0341) 4 97 83-20
e-Mail: info@sbh-leipzig.de

Auftrag-Nr.: 58-1/ 08

Bauvorhaben: 6614 SKH Klinikum Gera

Auftraggeber: DIBATEC
Dienstleistung, Bau und Technik GmbH
Neuengammer Hausdeich 16
21039 Hamburg

STATISCHE BERECHNUNG

Montageschienensysteme zur Aufhängung von Deckenversorgungseinheiten (DVE) an/unter Spannbetonhohlplattendecken

Die vorliegende statische Berechnung umfaßt 85 Seiten und eine Anlage (Möbellastbetrachtungen der Fa. Hill).

Aufgestellt: Leipzig, den 28.01.2009

Bearbeiter: Dipl.-Ing. Klaus-Dieter Stoepel

Geschäftsführer: Dr.-Ing. Reinhard Abradi

20 Ceiling supply units

Practical examples:

Supporting structure for a Dräger ceiling supply unit

This ceiling supply unit had to be installed below a hollow-core slab that could only carry a load of 3.0 kN per anchor point. A load-spreading supporting structure was thus required for this project.

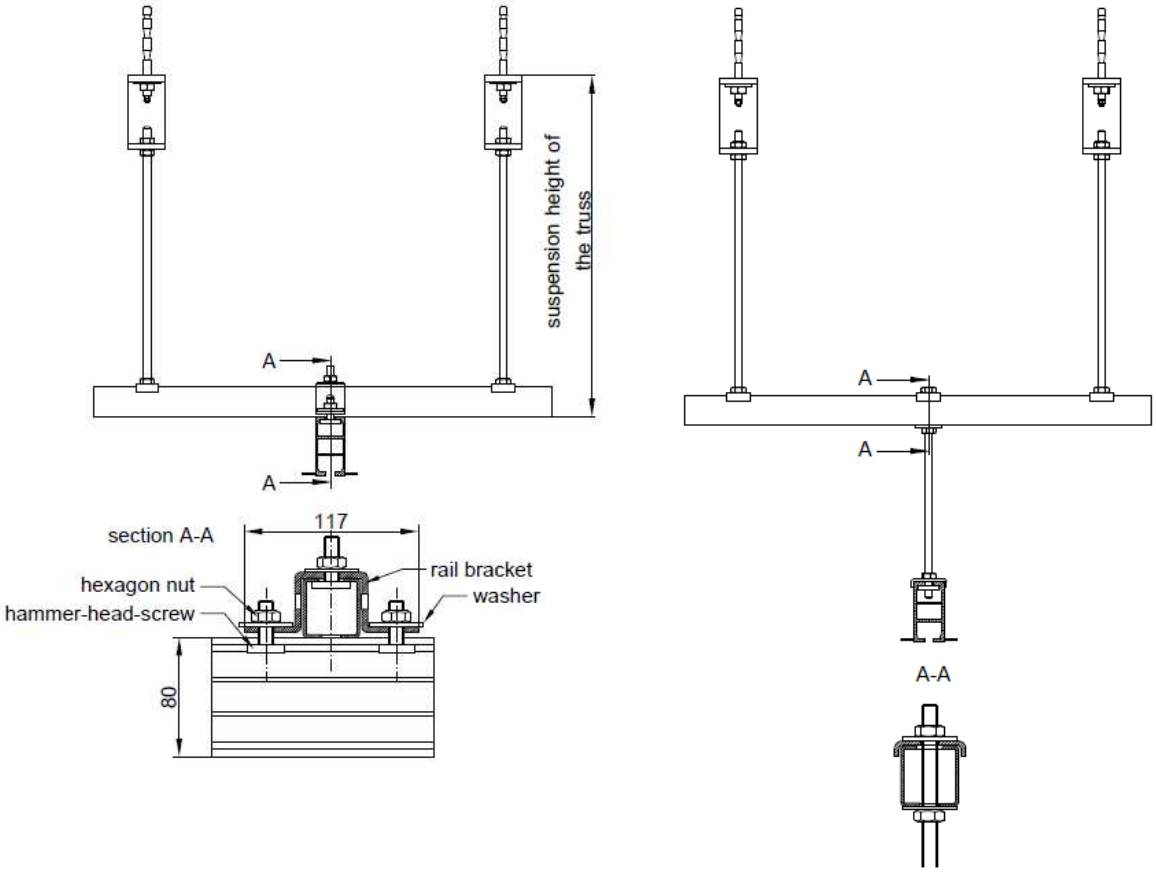
Supporting structure for a Dräger ceiling supply unit complete with operating luminaire

Here, the same situation was encountered as above. This project, however, required the additional integration of a supporting structure for the operating luminaire.

Supporting structure for a Dräger-Ponta unit

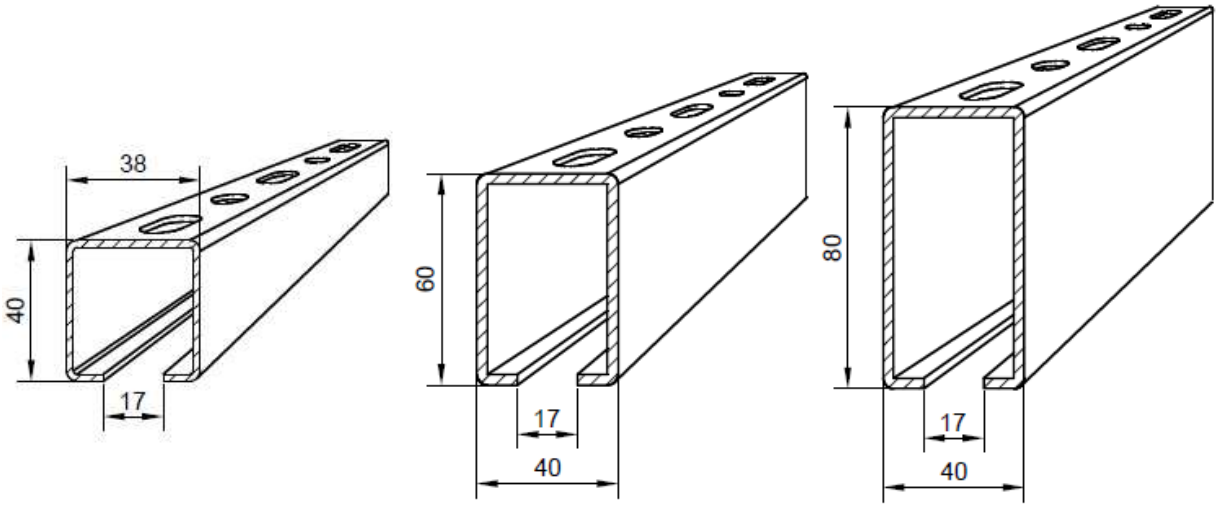
On this project too, it was not possible to fix the supporting structure to the structural ceiling. Our special solution provides a stable assembly.

21 Truss

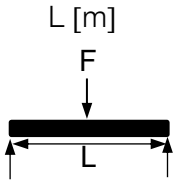


The presence of ceiling fixtures may sometimes prevent the heavy-duty ceiling system from being fixed to the structural ceiling. In such cases, additional trusses thus need to be installed to ensure safe transmission of the structural loads to the structural ceiling. Various profiles are used to meet the specific requirements. On request, we will gladly perform the associated structural checks.

21 Truss



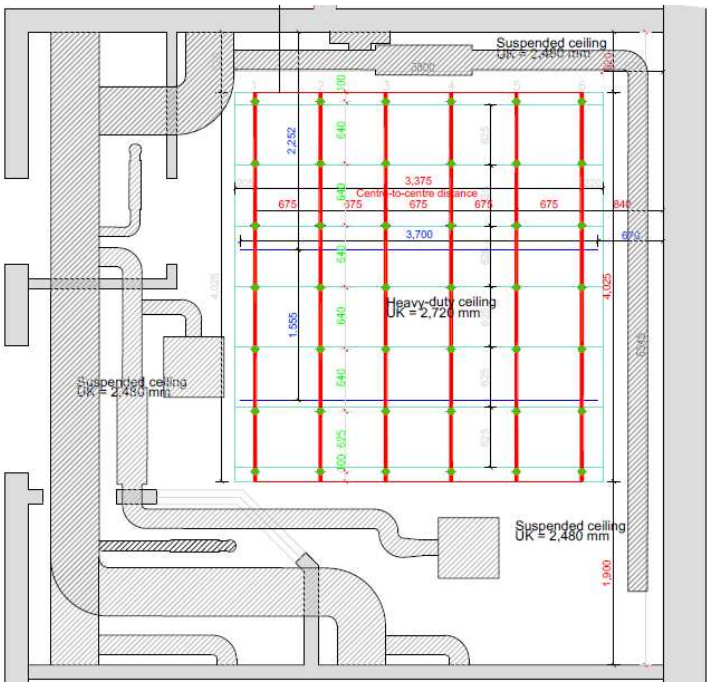
Profile type	Load-carrying capacity [kN]					



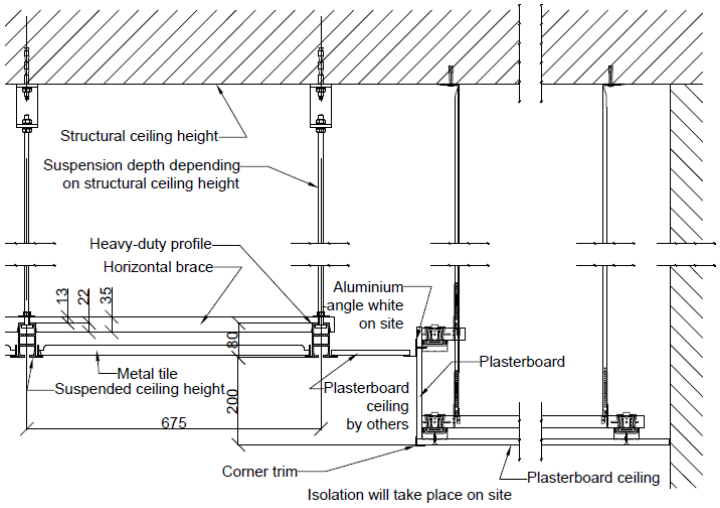
	0.5 m	1.0 m	1.5 m	2.0 m	4.0 m	6.0 m
38/40	2.939	1.463	0.967	0.718	-	-
40/60	8.131	4.051	2.685	1.997	0.720	0.230
40/80	13.021	6.494	4.310	3.212	1.520	0.590

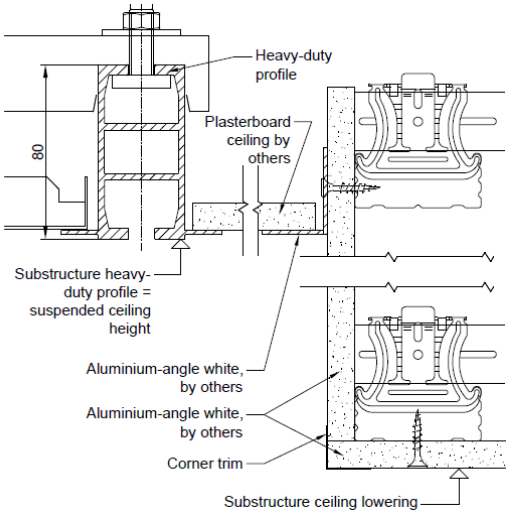
Various profile heights are adopted in line with the particular requirements. We also specify other profiles in specific cases involving particularly high loads.

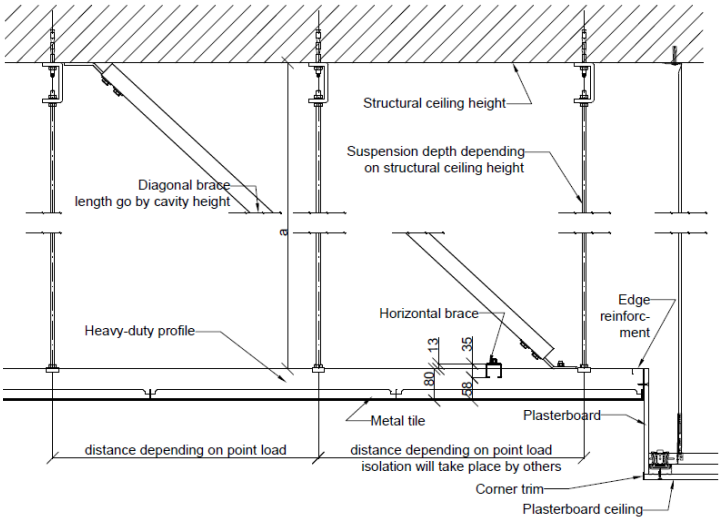
22 Change in ceiling height

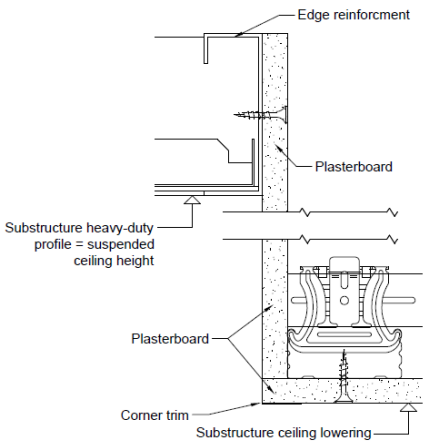


To allow incorporation of all necessary fixtures, the ceilings are often designed with the entire ventilation system located in the perimeter border area. In such cases, the border must be installed at a lower level than the actual heavy-duty ceiling so that it can accommodate the ductwork cross-sections. Various solutions are available to achieve a change in ceiling height.

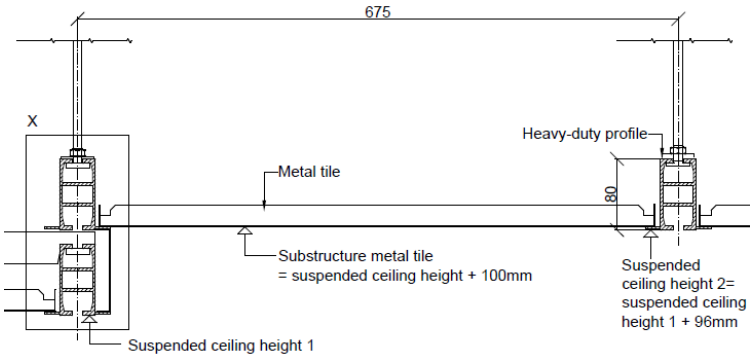


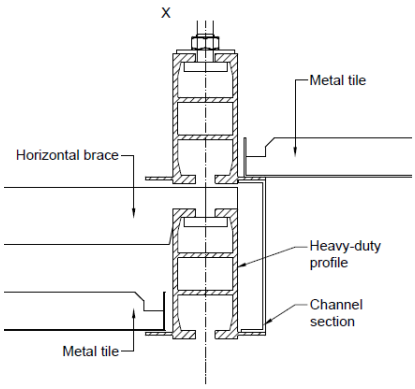




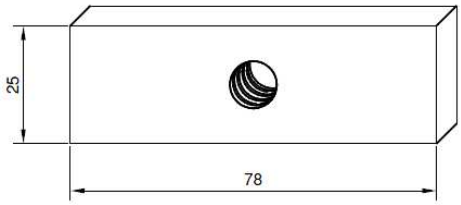


22 Change in ceiling height





23 Sliders

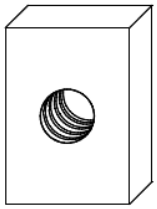


Nut

Slide block for the lower profile slot in the heavy-duty profile to fix it with the equipment rail.

Material	steel
Finish	galvanised
Packaging	25 pcs./box
Billing unit	1 pcs.

Item no.	Material thickness [mm]	Colour	Thread	Weight [kg/unit]
	8	silver	M6	0.120
	8	yellow	M8	0.122
DIB 012	10	silver	M10	0.144
DIB 023	10	yellow	M12	0.146



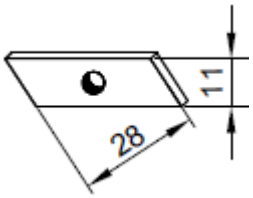
Slide Nut

Sliding blocks for the upper profile groove in the heavy-duty profile for fixing with the equipment rail.

Material	steel
Material thickness	6 mm
Finish	galvanised
Packaging	100 pcs.
Billing unit	1 pcs.

Item no.	Dimension [mm]	Thread	Weight [kg/100 pcs.]
DIB 054	32.8 x 23	M6	2.5
DIB 055	32.8 x 23	M8	3.3
DIB 013	28.0 x 25	M10	3.0
DIB 003	32.8 x 23	M12	2.9

23 Nuts

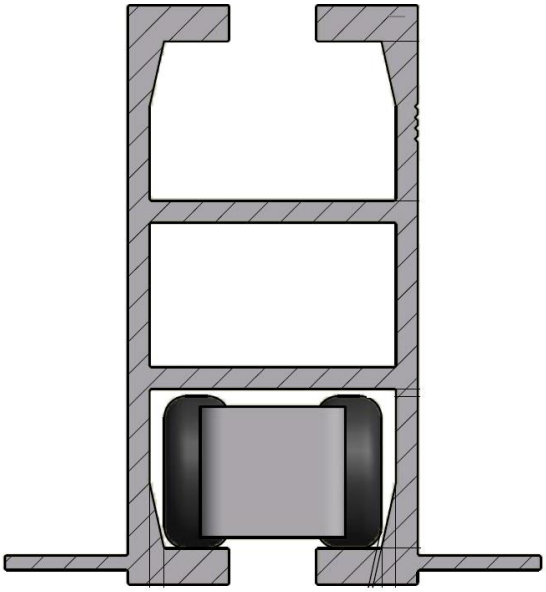


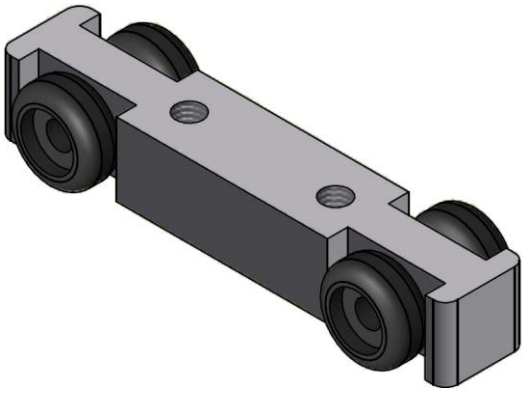
Threaded plate

Threaded plates are used to attach structural elements to heavy-duty ceiling profiles.

Item no.	DIB 081
Material	steel
Material thickness	4 mm
Finish	galvanised
Thread	M5
Grade	D 9-1
Weight	0.1 kg/100 pcs.
Packaging	100 pcs./box
Billing unit	1 pcs.

24 Carriage





Robust, smooth-running carriage to receive, for example, corrugated hoses or other pendant equipment.

An additional opening is required for insertion of the carriage into the slot at the bottom of the heavy-duty ceiling profile. This can be subsequently closed off with our cover profile.

Product specification

- smooth-running carriage
- maintenance-free bearings
- two M8 threads
- for manual operation

Two stoppers to limit carriage travel as specified are included in the delivery.

25 Special constructions

The adoption of standard ceiling installation procedures is not feasible in many cases.

Such situations require special solutions, e.g.:

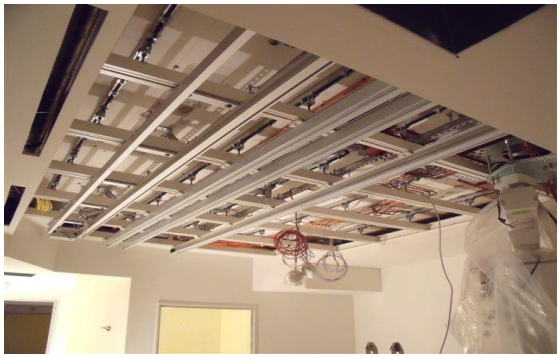
Installation in coffer slab constructions

Installation of steel supporting structures

Installation of load-spreading steel assemblies

25 Special constructions

Installation of load-spreading steel assemblies

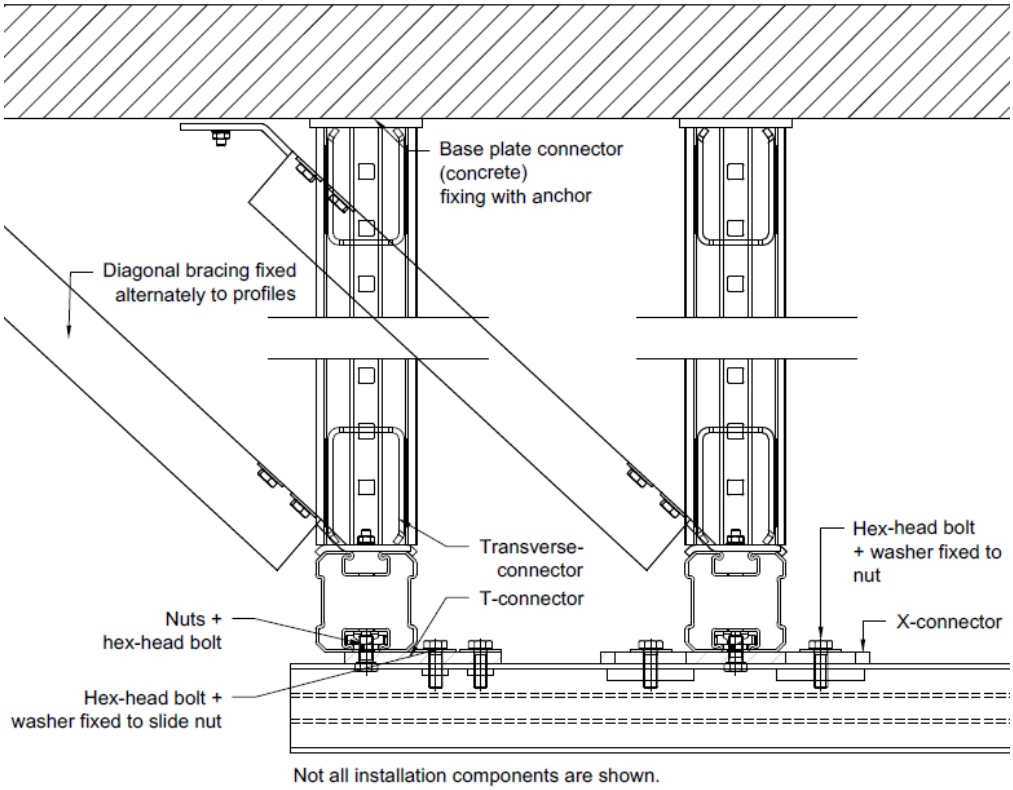


Heavy-duty ceiling with clip-in assembly, including installation frame for luminaire

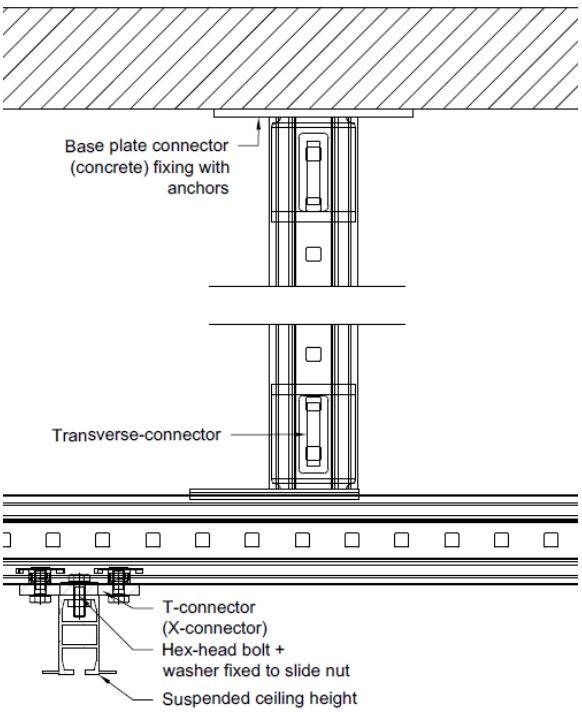
Special solution for variable grid

25 Special constructions

Heavy-duty ceiling with enhanced point load:



Not all installation components are shown.



Heavy-duty ceiling with enhanced point loads up to 18.0 kN.

The assembly meets the requirements of the pendant equipment manufacturer through the use of reinforced profiles, anchor systems designed for M12 and ancillary mounts.

25.1 Equipment cabinet fronts

Working in tandem with our partner companies, we offer complex metalwork solutions.

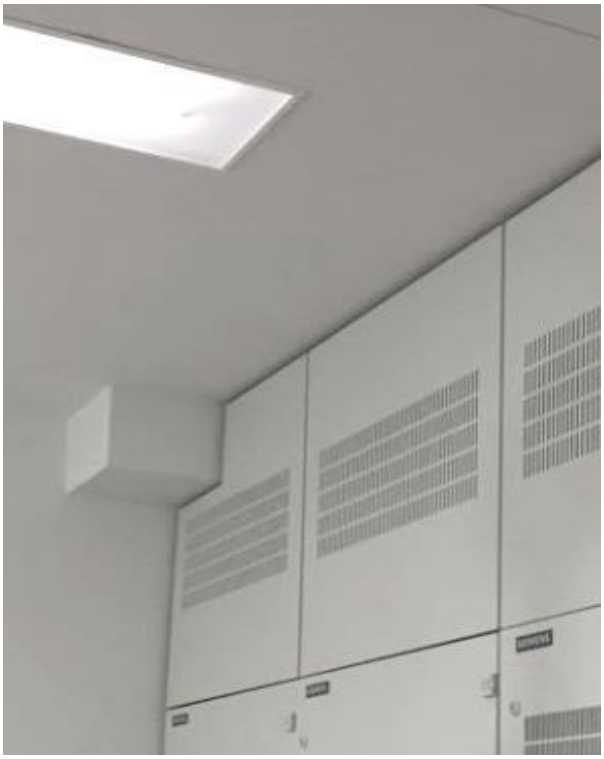
All materials are available, including steel, stainless steel and aluminium.
These can be perforated, folded, drilled, milled or can undergo other surface treatments.

Suitable surface finishes, such as powder coating, anodising, enamelling or film lamination, are also possible.

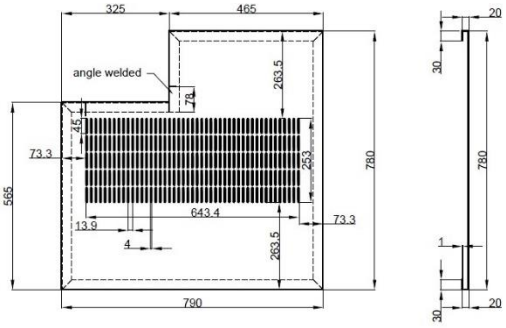
Among other things, we produce special equipment cabinet fronts with slotted/perforated patterns to match the equipment manufacturer's colour.

Top fronts for equipment cabinets:

25.1 Equipment cabinet fronts



Top front with corner cut-out



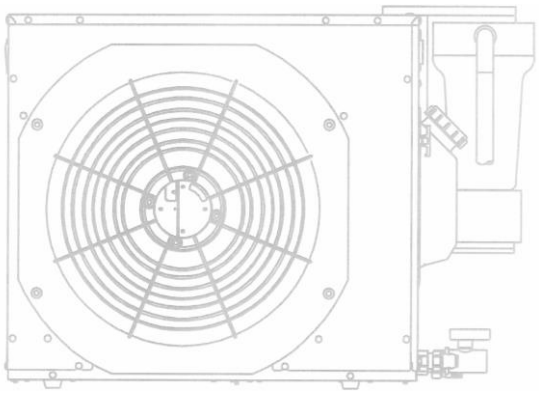
Drawing detail

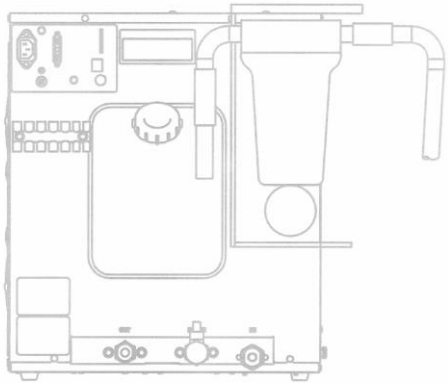
With variable suspension systems, all metal tiles at all positions are subsequently removable.

25.2 Wall bracket with condensate tray

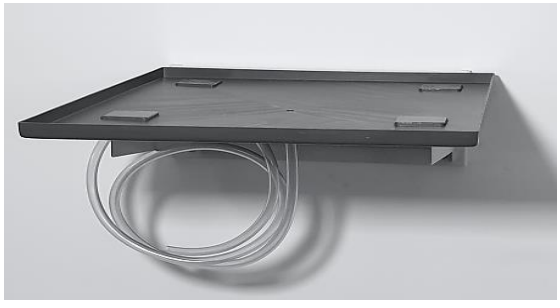
We have developed a wall bracket with condensate tray for the Siemens SMC one4all chiller unit.

The tray can be installed in lengthwise or crosswise direction. The condensation immediately drains off via the hose supplied with the product.





Item no.	
Dimension	658 x 508 mm
Tray material	PVC
Tray colour	grey
Wall bracket material	steel
Wall bracket colour	white, like RAL 9010
Packaging	loose



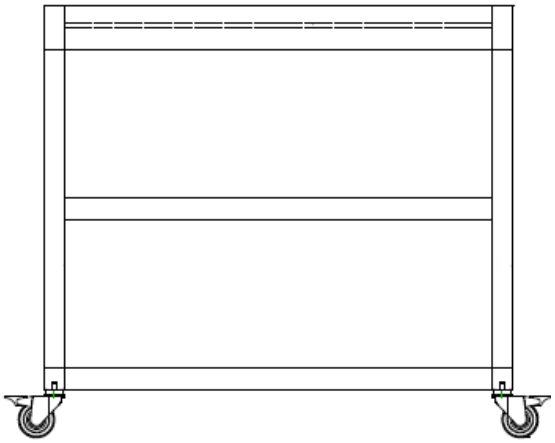
Individual items can be ordered directly from us. Installation instruction and accessories (anchors, screws, hose clamps etc.) are included in the delivery.

25.3 Monitor trolley

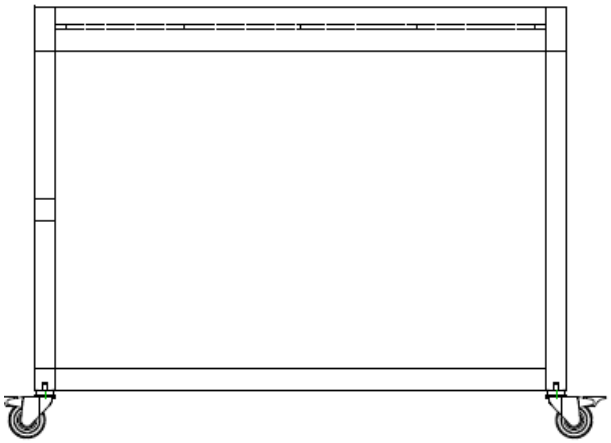
The trolley is designed to stow an image system and a large display container. The castors can be rotated 360° and can be fixed with two parking brakes.
The product is assembled at the factory and shipped on a pallet. If desired, it can alternatively be delivered disassembled.

Item no.	
Dimension	on demand
Profile material	aluminium
Profile finish	anodised
Weight	39 kg – as shown above
Packaging	1 pcs./pallet

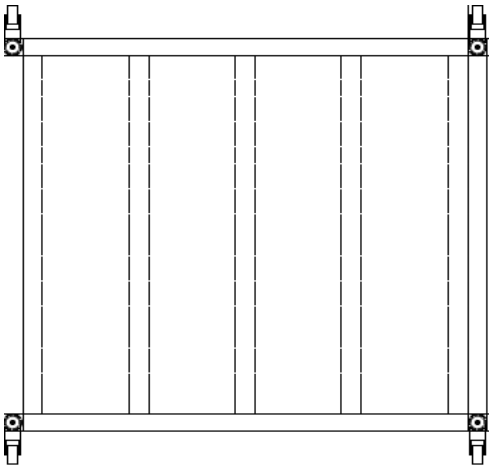
Front view:



Side view:



Top view:



We will prepare an appropriately dimensioned drawing for your trolley.

25.4 Wall bracket for anti-scatter grids

A wall bracket is used to store anti-scatter grid panels. It consists of three plastic panes made of acrylic glass, which are fixed at a desired distance by aluminum tubes. The floor tubes are also covered with plastic hoses. The edges and cutouts of the glossy white discs are lasered.

The product is assembled at the factory and shipped in a box. A mounting template is also included in the scope of delivery.

Item no.	
Dimension	475 x 570 x 110 mm
Material	acrylic glass
Colour	white
Weight	3.00 kg/unit
Packaging	1 pcs./box

25.5 Baby-sleeve bracket

A baby-sleeve bracket has been designed to keep infants and young children fixed in the desired position during X-rays. The baby-sleeve can be attached to the hook.

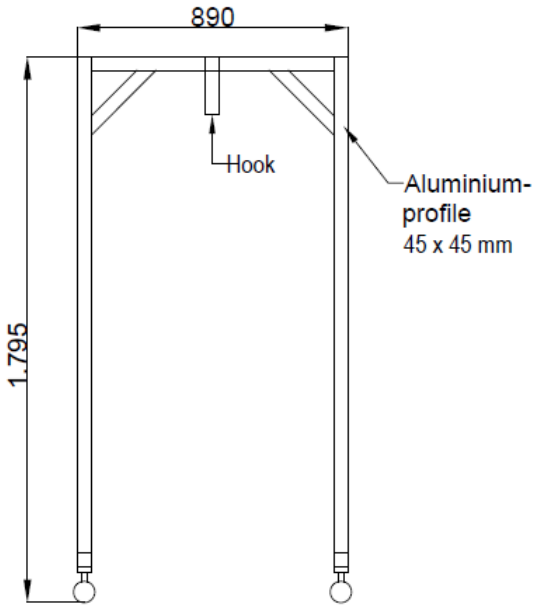
The castors can be rotated 360° and can be fixed with four parking brakes.

The product is assembled at the factory and shipped on a pallet. If desired, it can alternatively be delivered disassembled.

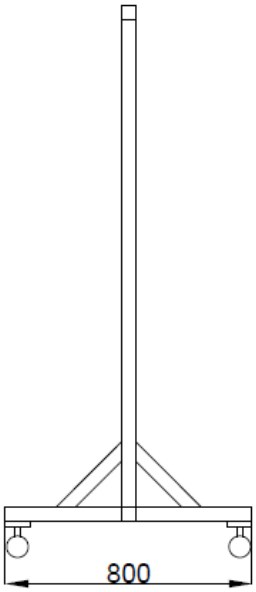
Item no.	
Dimension	on demand
Profile material	aluminium
Profile finish	anodised
Packaging	loose

25.5 Baby-sleeve bracket

Front view:



Side view:



The dimensions correspond to the pictures on the previous page.
We will prepare an appropriately dimensioned drawing for your baby-sleeve bracket.

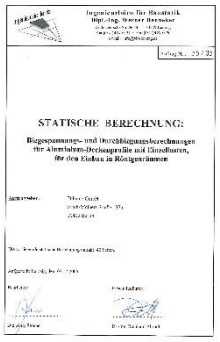
26 Test certificates

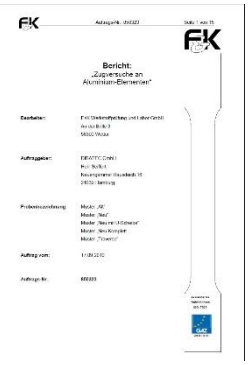
All fixtures are produced by DIBATEC or contractually bound manufacturers.
All individual components are catalogued and undergo regular in-house tests.

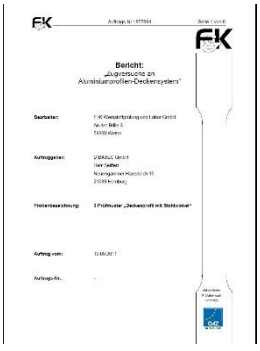
As the heavy-duty ceilings do not constitute standardised systems, no approvals or CE markings are available.

However, all fixtures are still tested and additionally verified by structural calculations. The relevant approvals are available for all anchor systems.


Statische Berechnung:
Biegespannungs- und Durchbiegungsberechnungen für Aluminium-Deckenprofile für den Einbau in Röntgenräumen (mit Einzellasten)


STATISCHE BERECHNUNG:
Biegespannungs- und Durchbiegungsberechnungen für Aluminium-Deckenprofile mit Einzellasten, für den Einbau in Röntgenräumen


Bericht:
„Zugversuche an Aluminium-Elementen"


Bericht:
„Zugversuche an Aluminiumprofilen-Deckensystem"


DIBt
Allgemeine bauaufsichtliche Zulassung
Deutsches Institut für Bautechnik


DIBt
Europäische Technische Zulassung ETA-12/0006


Deutsches Institut für Bautechnik
DIBt
Europäische Technische Zulassung ETA-98/0001

27 Specification

Item	Specification	UP	TP
1.	Heavy-duty ceiling system to receive X-ray machines Room type Assembly comprising strong, screwed aluminium profiles, including tested suspension system with structural verification Supply and installation DIBATEC GmbH Hamburger Str. 35 21339 Lüneburg, Germany Phone: +49 4131 72739-0, Fax: +49 4131 72739-10 Tendered make/type..... to be completed by tenderer Installation may only be performed by duly licensed specialist contractors that can provide proof of appropriate certification by the manufacturer. The suspension system must include all necessary horizontal bracing, diagonal bracing and hangers. It must be vibration-free on all sides and height-adjustable, and must be levelled in by laser. The horizontal braces must be provided with a pattern of punch holes to guarantee exact compliance with the 675 mm grid. The bracing must be able to accommodate compression and tension. Technical data Size of heavy-duty ceiling area (L x W) approx. ... mm x … mm Equipment rail direction Structural ceiling height Suspended ceiling height Structural ceiling type Load Ceiling grid Colour The heavy-duty ceiling system must be fixed to a concrete slab by means of approved heavy-duty anchors. The wall connection must be formed with a full-perimeter border. Quantity: …. m²	€/m²	€/total

27 Specification

Item	Specification	UP	TP
2.	Heavy-duty ceiling system for X-ray rooms with cross mounting, supplementary to Item 1 Max. point load Size of heavy-duty ceiling area Heavy-duty profiles Heavy-duty profile length Colour Centre-to-centre distance Quantity: …. m²	_____	_____
3.	Metal tiles Special white, to match heavy-duty profiles, smooth, square-edged – without chamfer, suitable for lay-in and/or clip-in installation Size 625 x 625 mm Material thickness 0.6 mm With tightly butted joints, including holes for cable penetrations and precise cutting to size at edges Supply and installation Quantity: …. m²	_____	_____
4.	Cover profile for open bottom slot of heavy-duty ceiling profile (for stricter hygiene requirements) Colour: white, made from ageing-resistant, ozone-resistant, lightfast and weatherproof plastics Following installation of the equipment rails, the bottom slot of the heavy-duty profiles must be closed off with the tight-fitting cover profile. Supply and installation Quantity: …. m	_____	_____
5.	Supporting profile between supporting leg of heavy-duty profile/edge reinforcement and metal tile to form airtight seal (for stricter hygiene requirements) Colour: white, made from ageing-resistant, ozone-resistant, lightfast and weatherproof plastics Supply and installation Quantity: …. m	_____	_____

27 Specification

Item	Specification	UP	TP
6.	Edge reinforcement at profile ends A plasterboard border must be installed around the full perimeter. To create a neat junction between the heavy-duty profiles and the border, an edge reinforcement profile must be installed to allow fixing of the wall angle. This must be fixed so that it is structurally continuous with the heavy-duty profiles and serves, on the inner side in the heavy-duty ceiling area, as a bearing for the ceiling tiles or fixtures. Outside the heavy-duty ceiling area, a wall angle can be screwed to this edge reinforcement profile. At the same time, this maintains an exact distance between the heavy-duty profiles at the edge of the heavy-duty ceiling area, with compressive and tensile forces properly accommodated. Supply and installation Quantity: …….m	_____	_____
7.	Truss for bridging ventilation ducts, pipework etc. Based on structural requirements for heavy-duty ceilings described above Length not exceeding 1.50 m Quantity: …. pcs	_____	_____
8.	Cable outlet support assembly as specified by equipment manufacturer in accordance with drawing Supply and installation Quantity: …. pcs	_____	_____
9.	Nuts for above-mentioned heavy-duty ceilings Suitable for receiving equipment rails Size 25 x 78 x 10 mm with M10 thread Quantity: …….. pcs	_____	_____

27 Specification

Item	Specification	UP	TP
10.	Hygiene luminaire with LED technology To fit heavy-duty ceilings with 675 mm grid Data: Protection type: IP 54 Classic/IP 65 plus Installation height: 75 mm Size: 624 x 624 x 75 mm With 4 LED modules, each with 10.8 W and 1,750 lm and Ra > 90, System capacity: 46.0 W/7,000 lm for 350 mA With special acrylic plate for maximum homogeneity and glare reduction, and clear 4 mm toughened glass pane with screen printing around perimeter With electronic converter, 1–10 V or DALI With 2 PG 13.5 plastic glands and halogen-free connection cable, length: 3 m, 5 x 1.5 mm^2 with 5-pole Wieland plug, GST18i, colour: white/black Incl. fixing kit for heavy-duty profiles and fixing kit for plasterboard ceilings Type: Hygiene luminaire plus DIB – 32 LED Supply and installation Connection to existing electrical installation by others	_____	_____

28 References

In recent years, our heavy-duty ceiling system has been successfully incorporated in a variety of facilities. A list of references is presented below.

- Klinikum St. Marien Amberg
- Krankenhaus Angermünde Medizinisch-Soz.-Zentrum Uckermark Angermünde
- Marienhospital Ankum
- Klinikum Ansbach Ansbach
- Marienhospital Arnsberg
- Helios Klinik Attendorn
- St. Barbara Klinik Attendorn
- Josefinum Augsburg
- Klinikum Eltern-Kind-Zentrum Augsburg
- Ubbo-Emmius-Klinik Aurich
- Schön Klinik Bad Aibling
- Hufeland-Klinik Bad Ems
- Klinikum am Plattenwald Bad Friedrichshall
- SLK Kliniken Heilbronn Bad Friedrichshall
- Klinikum Bad Hersfeld
- Praxis für Radiologie Dr. Flicker Bad Hersfeld
- Uniklinikum Bad Homburg
- Salzkammergut-Klinikum Bad Ischl-Gmünden-Vöcklabruck (Österreich)
- Karl-Hansen-Klinik Bad Lippspringe
- Deister Süntel Klinik Bad Münder
- Neurologische Klinik Bad Neustadt / Saale
- HDZ Bad Oeynhausen Bad Oeynhausen
- Asklepios Klinik Bad Oldesloe
- Helios Klinik Bad Saarow
- Vinzenz Krankenhaus Bad Salzuflen
- Psychiatrie am Klinikum Bad Salzungen
- Neurologische Klinik Westend Bad Wildungen
- Werner Wicker Klinik Bad Wildungen
- Zollernalb Klinikum Balingen
- Klinikum am Bruderwald Bamberg
- Klinikum Bayreuth
- Kliniken Beelitz
- Heilig Geist Hospital Bensheim
- Radiologie Dr. Plümer Bergen
- DRK Kliniken Berlin Westend
- DRV Berlin
- Vivantes Humboldt Klinikum Berlin Reinickendorf
- St Joseph Krankenhaus Berlin
- Unfallkrankenhaus Berlin Biesdorf
- Virchow-Klinikum Charité Berlin Wedding
- MCT-Diagnostik & Co. Röntgenanlagen Berlin Charlottenburg
- Martin Luther KH Berlin Wilmersdorf
- Dr. med. String Berlin Erkner
- DTZ – Diagnostik & Therapierzentrum Berlin Friedrichshain
- Vivantes Klinikum Berlin Friedrichshain
- Diagnostikzentrum Berlin Köpenick
- Vivantes Urbanklinik Berlin Kreuzberg
- Sana Klinikum Berlin Lichtenberg
- Dr. Löwe Tierklinik Berlin Marzahn
- Alexianer St. Hedwig Kliniken Berlin Mitte
- Bundeswehr Krankenhaus Berlin Mitte
- Charité Berlin Mitte
- DHZ Deutsches Herzzentrum Berlin Mitte
- Gemeinschaftspraxis im Jüdischen Krankenhaus Berlin Mitte
- Diagnostikzentrum AEPG Berlin Pankow
- Maria Heimsuchung Caritas-Klinik Berlin Pankow
- JVA – Krankenhaus Berlin Plötzensee
- Radiologie Medical Park Humboldtmühle Berlin Reinickendorf
- Ev. Johannesstift Wichern Krankenhaus Berlin Spandau
- Campus Benjamin Franklin Berlin Steglitz
- Franziskus Hospital Berlin Tiergarten
- KH Hedwigshöhe Berlin Treptow-Köpenick
- Immanuel Diakonie Berlin Wannsee
- Ev.-Freikirchliches KH und Herzzentrum Brandenburg Bernau
- Radiologische Praxis Biberach
- Sana Kliniken Biberach
- Klinikum Bielefeld
- Evangelisches Krankenhaus Bielefeld
- Klinikum Ludwigsburg
- Asklepios Klinik Birkenwerder
- Radiologie Ehingen / Blaubeuren Gemeinschaftspraxis Blaubeuren
- Berufsgenossenschaft. Uniklinikum Bergmannsheil Bochum
- Uni-Klinik Bochum
- Radiologische Praxis Rüsenacker Bochum Wiemelhausen
- Asklepios Klinik Brandenburg / Havel
- Klinikum Braunschweig
- Städtisches Klinikum Braunschweig
- DRK Krankenhaus Bremen
- Klinikum Links der Weser Bremen
- Medizinisches Versorgungszentrum Bremen
- Zentral Krankenhaus Bremen
- OsteMed Klinik Bremervörde
- Radiologie Rechbergklinik Bretten
- Ärztezentrum Brilon
- Krankenhaus Buchholz und Winsen Buchholz

28 References

- Capio Mathilden-Hospital Büdingen
- Max Grundig Klinik Bühlerhöhe Bühl
- Helios Klinik Jerichower Land Burg
- Steigerwaldklinik Burgebrach
- Radiologische Gemeinschaftspraxis im Krankenhaus Burghausen
- AWO Krankenhaus Calbe
- Landesklinik Nordschwarzwald Calw / Hirsau
- Allgemeines Krankenhaus Celle
- Sana Kliniken Cham
- Onkologisches Zentrum Chemnitz
- St. Josefs Hospital Cloppenburg
- Klinikum Coburg Regiomed-Kliniken Coburg
- MediClin Herzzentrum Coswig
- CTK Carl Thiem Klinikum Cottbus
- Sana Herzzentrum Cottbus
- Klinikum Crailsheim
- Krankenhaus DAD Dachau
- Elbe-Jeetzel-Klinik Dannenberg
- Klinikum Dessau
- Radiologisches Zentrum Dietzenbach
- Klinikum Dortmund
- Klinikum Westfalen Dortmund
- DINZ Universitätsklinikum Dresden
- Dr. Amler Dresden
- Krankenhaus Dresden
- Uniklinik Carl Gustav Carus Dresden
- Uniklinik Dinz Dresden
- Sana Kliniken Duisburg
- St. Anna Krankenhaus Duisburg
- St. Johannes Hospital Duisburg
- Dominikus Krankenhaus Düsseldorf Heerdt
- Rottal-Inn Kliniken Eggenfelden
- Schön Klinik Eilbeck
- St. Georg Klinikum Eisenach
- Elbe-Elster-Klinikum Elsterwerda
- Klinikum Emden Hans-Susomihl-Krankenhaus Emden
- Klinikum Landkreis Erding
- Radiologie im Zentrum Erding
- Hermann-Josef Krankenhaus Erkelenz
- NOZ Universitätsklinikum Erlangen
- St. Josef Krankenhaus Essen Werden
- Elbe-Elster-Klinikum Finsterwalde
- Lausitz Klinik Forst GmbH Forst Lausitz
- Klinikum d. J.W. Goethe Universität Frankfurt am Main
- Kantonsspital Thurgau Frauenfeld (Schweiz)
- Krankenhaus Freudenstadt
- Klinikum Friedrichshafen
- Kleintierpraxis Friedrichstadt
- FMI Spital Frutigen (Schweiz)
- KRH Klinikum Robert Koch Gehrden
- Main-Kinzig-Kliniken Gelnhausen
- Universitätsklinik Genf (Hôpitaux Universitaires de Genève Genf (Schweiz)
- IMC Klinikum St. Georg Georgsmarienhütte
- SRH Waldklinikum Gera
- MediClin Reha Gernsbach
- Ev. KH Mittelhessen Gießen
- Neubau Kleintier- und Vogelklinik Gießen
- Uniklinikum Gießen
- Kreis KH Rudolf Virchow Glauchau
- Alp-Fils-Kliniken, Klinik am Eichert Göppingen
- Christophsbad Göppingen
- Krankenhaus Neu-Mariahilf Göttingen
- Veterinärmedizinisches Forschungsherz-katheterlabor Göttingen
- Evangelisches Krankenhaus Göttingen Weende
- Kliniken Am Goldenen Steig Grafenau
- Oberhavel Klinik Gransee
- Ernst-Moritz-Arndt-Universität (EMA) Greifswald
- St. Antonius Gronau
- Klinikum Region Großburgwedel
- Median Klinik Grünheide
- Klinikum Altmühlfranken Gunzenhausen
- KMG Klinik Güstrow
- St. Elisabeth Hospital Gütersloh
- Landeskrankenhaus Hainburg (Österreich)
- Martin-Luther-Uniklinik Halle
- MVZ Strahlentherapiezentrum Halle
- Radiologische Praxis Halle
- Krankenhaus Martha-Maria Halle Dölau
- Strahlenzentrum Gem.-Praxis Prof. Carl und Dr. Fehlauer Hamburg
- Asklepios Klinik Hamburg Altona
- Asklepios Klinik Hamburg Barmbek
- Schön-Klinik Hamburg Eilbeck
- UKE – Universitätsklinikum Hamburg Eppendorf
- Asklepios Klinik Hamburg Harburg
- Marien Krankenhaus Hamburg Hohenfelde
- Tierklinik Hamburg Lokstedt
- Asklepios Klinik Hamburg Rissen
- Albertinen Krankenhaus Hamburg Schnelsen
- Krankenhaus St. Georg Hamburg St. Georg
- Amalie Sieveking Krankenhaus Hamburg Volksdorf
- Asklepios Klinik Hamburg Wandsbek
- Regio Kliniken Hamburg Wedel
- KH Groß Sand Hamburg Wilhelmsburg
- Kinderklinik auf der Bult Hannover
- KRH Klinikum Siloah Hannover
- MHH – Medizinische Hochschule Hannover

28 References

- Vinzenzkrankenhaus Hannover
- St. Vinzenz Krankenhaus Haselünne
- Kurpfalz Krankenhaus Heidelberg
- Uniklinik Kinderklinik Heidelberg
- Ärztehaus Heidenheim
- Klinikum am Plattenwald Heilbronn
- Helios Klinik Helmstedt
- Paracelsus-Kliniken Hemer
- MRT Berlin Brandenburg Hennigsdorf
- Oberhavel Kliniken Hennigsdorf
- Gemeinschaftskrankenhaus Herdecke
- Klinikum Herford
- Klinikum für Nuklearmedizin Herford
- Praxis Dres. Rein, Klöpper, Spindler Herford
- Evangelisches. Krankenhaus Herne
- Elbe-Elster Klinikum Herzberg
- Helios Klinik Herzberg Osterode / Herzberg
- Helios Kliniken Herzberg / Osterode
- BDH Klinik - Bundesverband Rehabilitation Hessisch Oldendorf
- Sana Klinikum Hof
- Klinik Homburg Saar Homburg
- Universitätsklinikum des Saarlandes Homburg Saar
- Klinikum Nordfriesland Husum
- Gemeinschaftspraxis für Radiologie Idar-Oberstein
- Klinik Immenstadt
- Universitätsklinikum Jena
- Westpfalz-Klinikum Kaiserslautern
- SRH Klinikum Karlsbad Langensteinbach
- Klinikgruppe Dr. Guth Karlsburg
- Städtisches Klinikum Karlsruhe
- Diakonie-Klinikum Kassel
- DRK-Kliniken Nordhessen Kassel
- Klinikum Kempten
- Klinikum Kitzingen
- Bundeswehr Zentralkrankenhaus Koblenz
- Achenbach Krankenhaus Königswusterhausen
- Herzzentrum Bodensee Konstanz
- Vincentius Krankenhaus Konstanz
- Helios Klinik Krefeld
- St. Josephhospital Krefeld
- Ortenau Klinikum Lahr Ettenheim
- Lakumed-Kliniken - Krankenhaus Landshut Achdorf
- Medizinisches Versorgungszentrum RNR Langenfeld
- Golden Gate Leipzig
- OKL Leipzig
- Uni Angio Leipzig
- Klinik und Reha-Zentrum Lippoldsberg
- Radiologische Gemeinschaftspraxis am Evangelischen Krankenhaus Lippstadt
- Kliniken des Landkreises Lörrach Lörrach
- Mühlenkreisklinikum A.d.ö.R. Krankenhaus Lübbecke
- Spreewaldklinik Lübben
- Curavid Lübeck
- Evangelisches Krankenhaus Luckau
- Praxis Lüdenscheid Radiologie Sauerland Lüdenscheid
- Klinikum Ludwigsburg
- Städtisches Klinikum Lüneburg
- St. Marienhospital Lünen
- Paul Gerhardt Diakonie Lutherstadt Wittenburg
- Städtisches Klinikum Magdeburg
- Universitätsklinikum Magdeburg A.ö.R. Magdeburg
- KH Mainburg Ilmtal Kliniken Mainburg
- Klinikum der Johannes Gutenberg Universität Mainz
- MVZ Marburg
- Klinikum Fichtelgebirge Marktredwitz
- Hirslanden Klinik Meggen (Schweiz)
- Glantal Klinik Meisenheim
- Carl-von-Basedow Klinikum Merseburg
- Klinikum Hochsauerland Marienhospital Meschede / Arnsberg
- Radiologische Praxis im Helios Krankenhaus Mühlheim / Baden
- Klinikum Hochfranken Münchberg
- Städt. Klinikum München Bogenhausen
- Klinikum der Universität OPZ München Großhadern
- Isar-Amper-Klinikum München Haar
- Städt. Klinikum München Harlaching
- DHZ Deutsches Herzzentrum München Neuhausen Nymphenburg
- Sana Gesundheitscampus München Sendling
- Albklinik Münsingen
- Clemenshospital Münster
- Herz-Jesu-Krankenhaus Hiltrup Münster
- Radiologische Gemeinschaftspraxis Münster
- Raphaelsklinik Münster
- Stauferklinik Mutlangen
- St. Johannes-Hospital Neheim
- Ärztehaus Neresheim
- Diakonie Klinikum Dietrich Bonhoeffer Neubrandenburg
- Hôpital de Neuchâtel Neuchâtel (Schweiz)
- Enzkreis Kliniken Neuenbürg
- Klinikum Neumarkt i.d.OPf.
- Gesundheitszentrum Ruppiner Kliniken

28 References

Neuruppin
- Schön Kliniken Neustadt
- Klinikum Neustadt am Rübenberge
- Diakonie Krankenhaus Neustadt / Harz
- St. Elisabeth Neuwied
- Klinikum Niederlausitz Senftenberg
- Föderales Zentrum für Neurochirurgie Novosibirsk (Russland)
- EKO Oberhausen
- Radiologisches Institut (RIO) Oberhausen
- Klinikum Schaumburger Land Obernkirchen / Vehlen
- Marienhospital Oelde
- Radiologisches Zentrum Offenbach
- Sana Klinikum Offenbach
- Evangelisches Krankenhaus Oldenburg
- Klinikum Osnabrück
- Marienhospital Osnabrück
- Marienhospital Niels-Stensen-Kliniken Osnabrück
- Kreiskrankenhaus Osterholz-Scharmbeck
- Asklepios Klinik Parchim
- Asklepios Klinik Pasewalk
- Radiologie Zentrum Peine
- Rottal-Inn Kliniken Pfarrkirchen
- Klinikum Pforzheim
- Siloah St. Trudpert Klinik Pforzheim
- Helios Klinikum Pirna
- Helios Voigtland Klinikum Plauen
- Ernst v. Bergmann Klinik Potsdam
- Oberlinklinik Potsdam
- St. Josef Krankenhaus Potsdam
- KMG Klinikum Pritzwalk
- Harzklinikum Dorothea Christiane Erxleben Quedlinburg
- KH St. Elisabeth Ravensburg
- Radiol. Praxisgemeinschaft im Gänsbühl Ravensburg
- Caritas - Krankenhaus St. Josef Regensburg
- Krankenhaus der Barmherzigen Brüder Regensburg
- Klinik St Hedwig Regensburg
- Universitätsklinikum Regensburg
- Imland Klinik Rendsburg
- Klinikum Rheine
- Elblandklinikum Riesa
- MVZ RadCom Dr. med. Klengel Riesa
- Klinikum Schaumburg Rinteln
- Landkreis Mittweida Krankenhaus Mittweida
- Klinikum Obergöltzsch Rodewisch
- Radiologie Evershagen Rostock
- Uniklinik Rostock Altbau Chirurgie Rostock
- Agaplesion Diakonieklinikum Rotenburg / Wümme
- Kreisklinik Roth
- St. Josef Krankenhaus Rüdesheim
- Paracelsus Krankenhaus Gesundheitszentrum Ruit
- Xcare-Gruppe Strahlentherapie Saarlouis
- LVP Diagnosezentrum Salzburg (Österreich)
- Kompetenzzentrum Schöningen
- Rems-Murr-Klinik (RMK) Schorndorf
- Asklepios Klinik Schwalmstadt
- St. Barbara Krankenhaus Schwandorf
- Helios Klinik Schwelm
- Röntgenpraxis Des. Med. Dahlmann, Strohbach & Wittkat Schwerin
- Schwülper Kleintierklinik Astelion Schwülper
- Schildau Klinik Seesen
- Hôpitaux du Valais - Hôpital de Sierre Sierre (Schweiz)
- GRN-Klinik Sinsheim
- Heidekreis Krankenhaus Soltau
- LHK-Labor Heidekreis Klinikum Soltau
- DRK Krankenhaus Sömmerda
- Elbe Kliniken Stade-Buxtehude Stade
- Klinikum Schaumburg Stadthagen
- Asklepios Klinik Stadtroda
- Gem.schaftspraxis Radiologie und Nuklearmedizin Strausberg
- Diakonie Klinikum Stuttgart
- Karl-Olga-Krankenhaus Stuttgart
- Katharinenhospital Stuttgart
- Klinikum Suhl
- DRK Krankenhaus Teterow
- Uniklinik Crona Tübingen
- Asklepios Klinik Uckermark-Schwedt
- Dr. Larsen CA Radiologie Uelzen
- St. Josephhospital Uerdingen
- Donau Klinik Ulm
- Rehabilitationsklinikum (RKU) Ulm
- Universitätsklinikum Ulm
- Schwarzwald-Baar-Klinikum Villingen-Schwenningen
- Schönklinik Vogtareuth
- SHG Kliniken Saarland Heilstätten Völklingen
- Spital Waldshut Waldshut-Tiengen
- Heidekreis Klinikum Walsrode
- Sankt-Petri-Hospital Warburg
- Ärztezentrum Wertheim – Gemeinschaftspraxis Wertheim
- Ammerland Klinik Westerstede
- Wilhelmspital Wien (Österreich)

28 References

- Landesklinikum Wiener Neustadt (Österreich)
- St. Josefs-Hospital Wiesbaden
- Gesundheitszentrum Dr. Kogan Wildau
- Klinikum Wilhelmshaven
- Rems-Murr-Kliniken Winnenden / Waiblingen
- Krankenhaus Winsen
- Ruhrradiologie Witten
- Städtisches Klinikum Wolfenbüttel
- Kreisklinik Wörth a. d. Donau
- Helios Klinik Wuppertal
- Radprax im Petrus Krankenhaus Wuppertal
- Frauenklinik Würzburg
- Missioklinik Würzburg
- Juliusspital Würzburg
- Diakonie Krankenhaus Zschadraß
- Klinikum Mittleres Erzgebirge Zschopau
- Stadtspital Triemli Zürich (Schweiz)
- Universitätsklinikum Balgrist Zürich (Schweiz)
- Heinrich-Braun-Klinikum Zwickau
- Paracelsus Krankenhaus Gesundheitszentrum Zwickau

Please feel free to contact us for further information and fuller technical details.

29 General Terms and Conditions

All deliveries and services are performed on the basis of our following General Terms and Conditions, even if we do not specifically refer to them. Their validity may only be completely or partly ruled out through explicit agreement when an individual business transaction is concluded.
General Contractual Terms and Conditions, particularly purchasing conditions of the customer, shall not apply to our deliveries and services.
If the customer does not reject the order confirmation within a working week after receiving the order confirmation, our Terms and Conditions shall be regarded as having been completely and unrestrictedly accepted.
Acceptance of our deliveries and services in any case includes recognition of our Terms and Conditions without any reservations and relinquishment of any of the conditions of the customer stipulated in its standard forms.
The same applies to making the advance payment and the first payment by the customer.
In particular the following applies:

1. Application

Our deliveries and services, including consultations and other ancillary services, are only performed in accordance with these conditions. Deviating conditions are rejected.
If nothing to the contrary is agreed, all offers are non-binding. With regard to the type and scope of the service, orders only become binding through our order confirmation. The obligation to deliver only becomes effective after proper written confirmation of the order.
Documents belonging to the offer, such as samples, images, drawings and weight specifications, are only approximately decisive. We reserve the right to make changes, particularly regarding design and material insofar as the subject matter of the contract and its serviceability are not substantially altered.
No warranty or liability is accepted for material lists.
We reserve our absolute ownership right and absolute copyright to offers, cost estimates, drawings and other documents.
These documents and also excerpts thereof are not allowed to be passed on to third parties. We are not responsible for failure to comply with statutory or regulatory regulations and requirements which were not yet known at the time when the order was placed.

2. Pricing

Pricing applies from 21339 Lüneburg or one of our distribution warehouses, excluding freight and packaging in EURO, plus the applicable statutory value-added tax. Our prices are in any case non-binding, unless our confirmation includes the note “fixed price”. In the event of wage increases in accordance with collective bargaining agreements and increases in raw material prices and other acquisition costs, we must reserve a right to change prices and discounts.

3. Payment conditions

Our invoices are immediately due for payment without any deduction immediately after the invoice date.
Advance payment is agreed for new customers. If, following conclusion of the contract, circumstances should occur which make the security of the receivables due from the customer appear doubtful, we may demand advance payment from the client.

If the customer is in arrears for payment of an invoice, this means that all invoices that are still not yet paid shall be due for payment. The customer bears the cost of changes to orders. Agreed prices are not binding for follow-up orders. If there should be difficulties in transferring the invoice amount to us for any reason, the customer must compensate us for any ensuing disadvantages.
The customer is not entitled to withhold payments because of notice of defects, unless the withheld payment is appropriate in relationship to the claimed defects. If the customer does not make a payment when it is due, we are entitled to charge interest amounting to the respective applicable discount rate of the German Federal Bank plus 5%.

29 General Terms and Conditions

4. Delivery conditions

1. Terms of delivery begin on the date of the order confirmation, but not before clarification of all individual details, particularly only after the customer's approval of the checked and authorised working drawings. Terms of delivery are accordingly rescheduled.

2. Terms of delivery and delivery deadlines refer to the time when goods are ready for dispatch.

3. Changes to orders also accordingly reschedule delivery times.

4. We cannot accept any liability for goods not arriving punctually at the customer.

5. Force majeure – which amongst other things includes traffic interruptions, defects in goods, vehicles and raw material, failure of energy supply, war, strike, bans on imports and exports, all types of operating problems and other hindrances we are not responsible for which make delivery impossible or more difficult – extend the delivery time accordingly.

6. We are entitled to make partial deliveries.

5. Warranty

1. The buyer must carefully check the goods immediately after accepting their receipt. The buyer must immediately notify us in writing regarding recognisable defects and regarding non-recognisable defects immediately after they are discovered, stating the type and scope of the defects.

2. In the case of justified notification of defects, we may choose whether to subsequently improve the goods or provide replacements within an appropriate deadline.

3. If the goods are damaged or destroyed through incorrect handling or storage following transfer of risk, we are not obliged to subsequently improve them or replace or change them or reduce the price.

6. Retention of title

1. All goods which we supply remain our property until complete payment of the respective receivables, even after they are sold to third parties. Reselling of the goods supplied under retention of title is allowed in proper business transactions. The receivables arising from reselling are deemed as assigned to us.

2. In the event of composition or bankruptcy proceedings, the customer is obliged to designate the goods as our property through labelling them as such or in another way before passing them on to third parties. As long as a claim on our part exists, we are entitled to request that the customer notifies us at any time regarding which goods supplied to the customer under retention of title are still in the customer's possession and where they are located, and we are entitled to inspect them and fetch them back.

3. The customer bears the risk for the goods we supplied and is obliged to carefully safekeep and insure them adequately against loss (theft, fire, etc.); the customer hereby assigns to us in advance the claim vis-à-vis the insurance in the event of damage – namely a first-ranking partial sum amounting to the purchase price of the goods we supplied under retention of title.

This shall also apply if the insurance does not fully cover the entire damage, so that we are not just assigned a proportionate compensation sum in such a case.

29 General Terms and Conditions

4. If the supplied goods are combined with another object in such a way that they become a fundamental part of this object, the customer already assigns joint ownership of this object to us, in proportion to the value of the objects combined with each other which the customer insofar safekeeps on behalf of us. In the event of combination of the supplied object with a plot of land, the seller must, upon request by us, otherwise order appropriate security for our receivables/claims existing at this point in time as well as future receivables/claims within the framework of the business relationship. The customer is obliged to notify us in the quickest possible way regarding seizures by third parties, particular attachments, etc.

5. The attachment or assignment as security of our goods is ruled out. The receivable/claim of the customer on the basis of passing on the goods is hereby already assigned to us together with all ancillary rights, namely regardless of whether the goods subject to retention of title are supplied without treatment and processing or after treatment and processing or whether they are supplied alone or together with other objects. In the latter case, the receivable/claim is to be assigned to us according to the proportion of the value of our goods. In the event of reselling, the customer is obliged to state the name and address of the purchaser at any time upon request. The receivables/claims from the customer on account of payment or payment instead of accepted bills of exchange are now already assigned to us. The transfer of the bill of exchange is replaced through the customer safekeeping the accepted bill of exchange on behalf of us. The receivables/claims assigned to us provide security for all our receivables/claims, including those which arise in the future.

7. Supplementary agreements

All assurances and agreements – including those made by telephone, fax or written agreements – which contradict one of the above-mentioned conditions or which go beyond them as well as all types of amendments, particularly to payment conditions, explicitly require our written confirmation. This particularly applies to all verbal supplementary agreements and supplementary agreements of our sales representatives. This also applies to amendments to or exclusion of our General Terms and Conditions. Any possible purchasing conditions are not significant for us insofar as they contradict our General Terms and Conditions, which in case of doubt have priority. One-sided amendments to these General Terms and Conditions, particularly changes to payments conditions by the customer, are not allowed and are non-binding for us. For the commercial processing of our deliveries or services, we store and process the customer's personal data and use these within the framework of the intended purpose of the concluded business transaction.

8. Third-party benefit, non-assignment ban

The contract does not establish any third-party rights. An assignment of rights, receivables and claims on the basis of this contract by the customer requires our prior written consent.

9. Place of fulfilment, court of jurisdiction

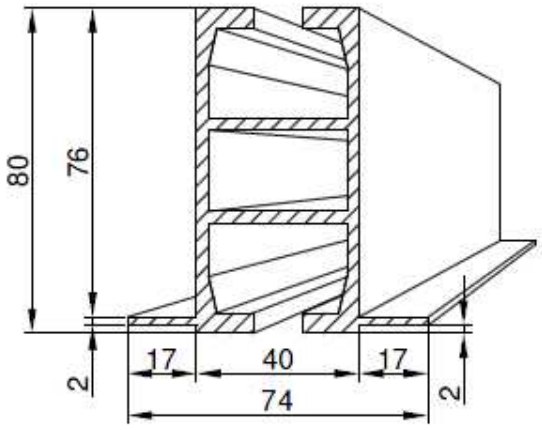
1. For both parties, the place of fulfilment for deliveries is the location of the supplier.
2. For payments, the point of payment designated in the invoice is decisive.
3. Lüneburg is the court of jurisdiction.
4. In the case of contract texts in several languages, the German version is binding.

Status: March 2016

II Product catalogue contents

1 Profiles
2 Installation components
3 Anchor systems
4 Ceiling fixtures
5 Special constructions

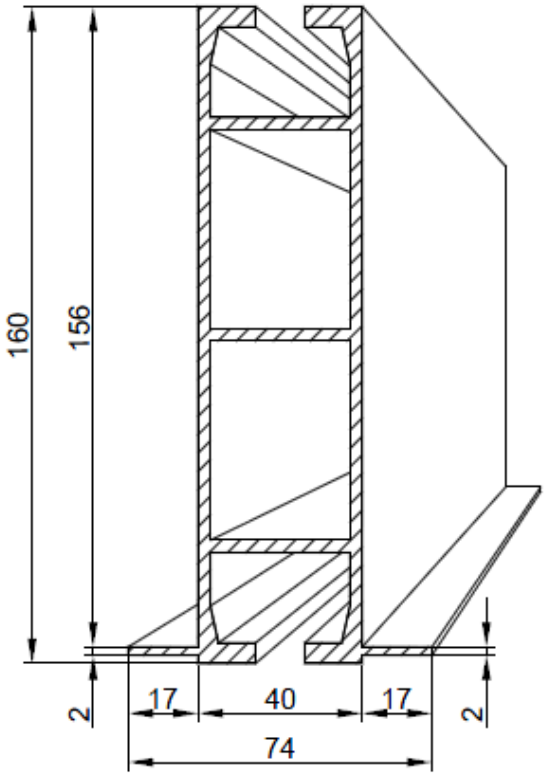
1 Profiles



Heavy-duty profile H 80

Ceiling profile for supporting ceiling plates, recessed luminaire, fans and similar installations and for fixing diagnostic devices and support facilities.

Item no.	DIB 008
Material	aluminium
Finish	powder-coated
Colour	white, like RAL 9010
Profile length	6,010 mm or in fixed length
Weight	2.72 kg/m
Packaging	loose
Billing unit	1 m

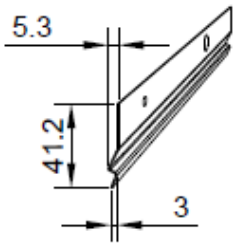


Heavy-duty profile H 160

Ceiling profile for supporting ceiling plates, recessed luminaire, fans and similar installations and for fixing diagnostic devices and support facilities with high load and greater range.

Item no.	DIB 073
Material	aluminium
Finish	powder-coated
Colour	white, like RAL 9010
Profile length	6,010 mm or in fixed length
Weight	4.70 kg/m
Packaging	loose
Billing unit	1 m

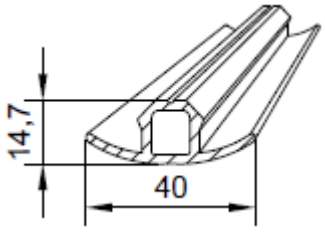
1 Profiles



Clamping profile

Half clamping profile for on one side fixing the heavy-duty profile and holding a metal tile.

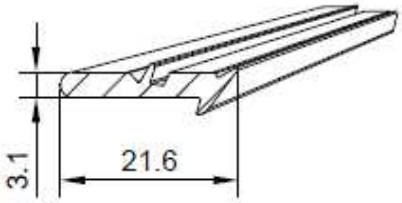
Item no.	DIB 018
Material	steel
Material thickness	0.80 mm
Finish	galvanised
Profile length	2,000 mm
Weight	0.28 kg/m
Packaging	loose
Billing unit	1 m



Cover profile

Additional profile for sealing the slot of the heavy-duty profile. This profile is used in higher hygiene requirements, for example heart catheter.

Item no.	DIB 017
Material	PVC
Colour	white, like RAL 9010
Profile length	6,000 mm
Weight	0.19 kg/m
Packaging	1 pcs. in polybag 10 pcs. in box
Billing unit	1 m

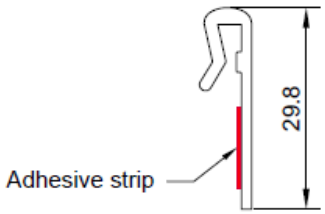


Supporting profile

Supporting angle on the heavy-duty profile and on the overlying metal tile. This angle is used in higher hygiene requirements, for example heart catheter.

Item no.	DIB 026
Material	PVC
Colour	white, like RAL 9010
Profile length	25,000 mm
Weight	0.05 kg/m
Packaging	25 m to reel
Billing unit	1 m

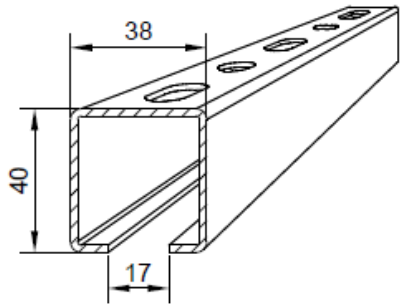
1 Profiles



Joint clip profile

The joint clip profile provides a tight seal at the joints between adjacent ceiling tiles. It prevents the joints between tiles from opening.

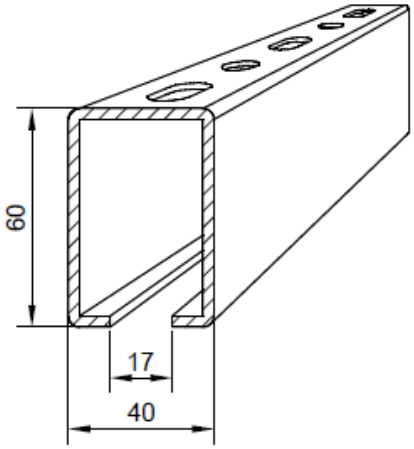
Item no.	
Material	PVC
Colour	white, like RAL 9010
Length	620 mm
Weight	0.074 kg/unit
Packaging	loose
Billing unit	1 pcs.



Mounting rail 38/40

Reinforcement rail for diagonal reinforcement of the heavy-duty ceiling construction or for horizontal reinforcement with variable grid spacing with mounting angle 45° (installation with rail bracket).

Item no.	DIB 024
Material	steel
Material thickness	2.00 mm
Finish	galvanised
Profile length	4,000 mm
Weight	1.90 kg
Packaging	4 pcs./bunch
Billing unit	1 m

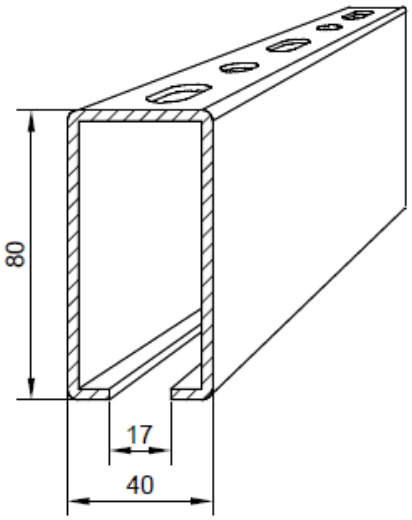


Mountain rail 40/60

Truss profiles for bridging the cable- and ventilation-channel and similar installations in the ceiling void.

Item no.	DIB 028
Material	steel
Material thickness	3.00 mm
Finish	galvanised
Profile length	4,000 mm
Weight	3.50 kg/m
Packaging	Loose
Billing unit	1 m

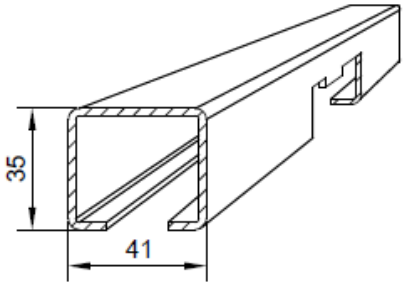
1 Profiles



Mounting rail 40/80

Truss profiles for bridging the cable- and ventilation-channel and similar installations in the ceiling void.

Item no.	DIB 028
Material	steel
Material thickness	3.00 mm
Finish	galvanised
Profile length	6,000 mm
Weight	4.68 kg/m
Packaging	Loose
Billing unit	1 m

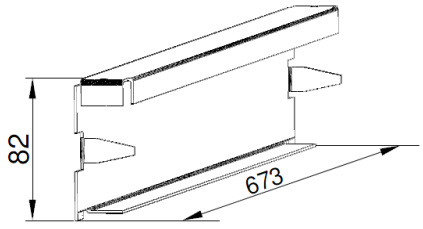


System rail for horizontal bracing

Mounting rail is used for the horizontal bracing of heavy-duty profiles.

Material	steel
Material thickness	2.00 mm
Finish	galvanised
Packaging	loose
Billing unit	1 m

Item no.	Suitable for grid [mm]	Profile length [mm]	Weight [kg/unit]
	650	2,678	4.62
DIB 028	675	2,778	4.85



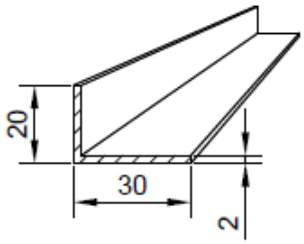
Edge reinforcement

Face sided bottom profile for heavy-duty ceiling profile to support the ceiling plate and fix the frieze profile.

Material	steel
Material thickness	1.50 mm
Finish	galvanised
Colour	white, like RAL 9010
Packaging	loose
Billing unit	1 pcs.

Item no.	Suitable for grid [mm]	Weight [kg/unit]
	650	0.98
DIB 006	675	1.08

1 Profiles



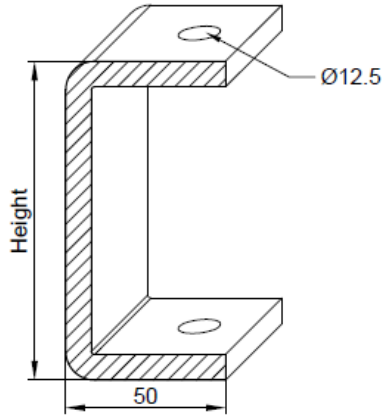
Alu wall angle

Wall bottom profile for installing heavy-duty ceiling construction from wall to wall to support metal tile or other installations.

Material	aluminium
Material thickness	2.00 mm
Finish	powder-coated
Colour	white, like RAL 9010
Length	3,000 mm
Packaging	loose
Billing unit	1 m

Item no.	Dimension [mm]	Weight [kg/m]
	15 x 15	0.16
	20 x 20	0.21
DIB 030	20 x 30	0.28

2 Installation components

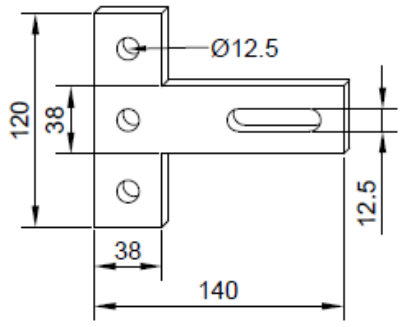


Adaptor bracket

Adjusting element for defining the suspended ceiling height. Item DIB 078 is used with a suspension height of 171 mm to 200 mm between the bare concrete ceiling and the lower edge of the heavy-duty profile. If the suspension height is higher than 201 mm, item DIB 014 is used.

Material	steel
Material thickness	8.00 mm
Finish	galvanised
Packaging	25 pcs./box
Billing Unit	1 pcs.

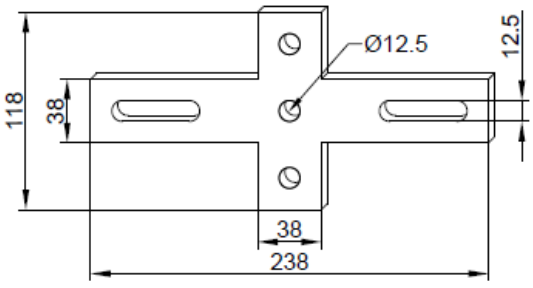
Item no.	Weight [kg/unit]	Height [mm]
DIB 078	0.36	50
DIB 014	0.54	100



T-connector

For single-side fixing the heavy-duty profile with a transverse profile.

Item no.	DIB 005
Material	steel
Material thickness	10 mm
Finish	galvanised
Weight	0.62 kg/unit
Packaging	loose
Billing unit	1 pcs.

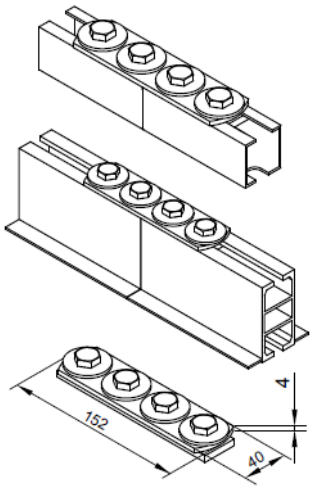


X-connector

For double-side fixing the heavy-duty profile with a transverse profile.

Item no.	DIB 009
Material	steel
Material thickness	10 mm
Finish	galvanised
Weight	0.90 kg/unit
Packaging	loose
Billing unit	1 pcs.

2 Installation components



Longitudinal connector

A connector, which consist of a longitudinal connector and counterplate with M10 hex-head bolt for fixing the system rail, mounting rail or the heavy-duty ceiling profile.

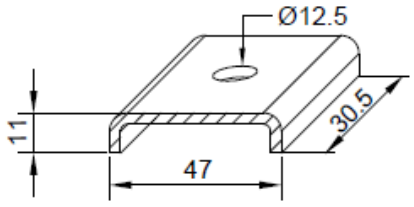
Item no.	DIB 076
Material	steel
Material thickness	4.00 mm / 6.00 mm
Finish	galvanised
Weight	0.53 kg/unit
Packaging	25 pcs./box
Billing unit	1 pcs.

Threaded rod

Adjusting element for setting the suspended ceiling height.

Material	steel
Finish	galvanised
Grade	8,8
DIN	976-1
Packaging	loose
Billing unit	1 m

Item no.	Thread	Weight [kg/m]	Standard length [mm]
DIB 031	M6	0.18	1,000
DIB 032	M8	0.32	1,000
DIB 033	M10	0.50	3,000
DIB 034	M12	0.73	3,000
DIB 036	M16	1.33	3,000

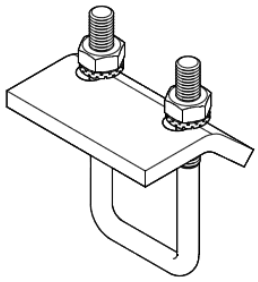


Fixing clip

For increasing the protection against opening the profile head.

Item no.	DIB 002
Material	steel
Material thickness	3.00 mm
Finish	galvanised
Weight	0.04 kg/unit
Packaging	100 pcs./box
Billing unit	1 pcs.

2 Installation components

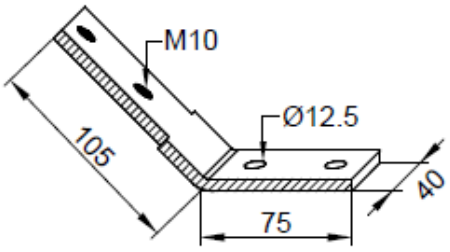


Flange clamp

For fixing the heavy-duty ceiling profile and the steel beams. Scope of supply: carrier plate, nuts, U-bracket, toothed washer.

Material	steel
Finish	galvanised
Packaging	20 pcs./box
Billing unit	1 pcs.

Item no.	Suitable for rail profile	Weight [kg/unit]
DIB 019	40/60	0.47
DIB 077	40/80	0.48

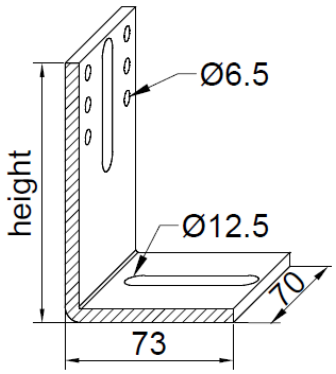


Mounting angle 45°

Angle for fixing the diagonal bracing, the bare, concrete ceiling and the heavy-duty profile with washer, screw and nut.

Item no.	DIB 004
Material	steel
Material thickness	6.00 mm
Finish	galvanised
Weight	0.36 kg/unit
Packaging	25 pcs.
Billing unit	1 pcs.

2 Installation components

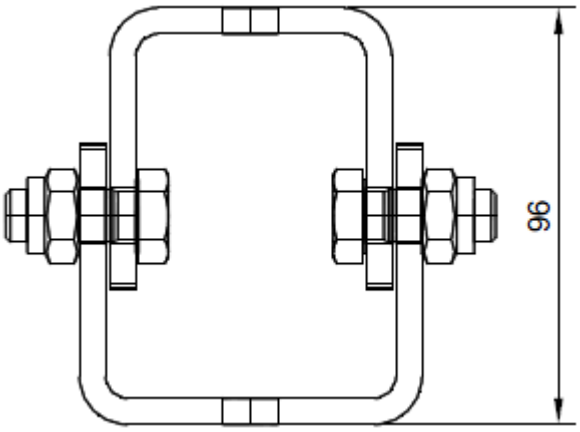


Angle for direct mounting

Angle for direct mounting of the heavy-duty profile and the bare concrete ceiling, with threaded bolt M10 x 89 mm, nut and mounting bolt 4.8 x 19 mm. Item DIB 010 is used with a suspension height of 80 mm to 120 mm between the bare concrete ceiling and the lower edge of the heavy-duty profile. If the suspension height is between 121 mm and 160 mm, item DIB 074 is used and if the suspension height is between 161 mm and 200 m, item DIB 075 is used.

Material	steel
Material thickness	5.00 mm
Finish	galvanised
Packaging	loose
Billing unit	2 pair

Item no.	Height [mm]	Weight [kg/unit]
DIB 010	73	0.32
DIB 074	113	0.43
DIB 075	153	0.54

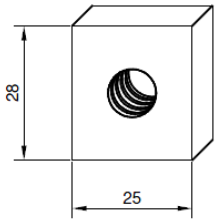


Joint bracket

Joint bracket for suspensions and anchoring, e.g. hangers, which are directly connected to the heavy-duty profile, could be supported by joint brackets fixed to the side of the ribs.

Item no.	
Material	steel
Material thickness	6.00 mm
Dimension	96 x 79 x 40 mm
Finish	galvanised
Thread	M12
Weight	0.76 kg/unit
Packaging	loose
Billing unit	1 pcs.

2 Installation components



Slide Nut

Sliding blocks for the upper profile groove in the heavy-duty profile for fixing with the equipment rail.

Material	steel
Finish	galvanised
Packaging	100 pcs.
Billing unit	1 pcs.

Item no.	Thread	Weight [kg/100 pcs.]
DIB 054	M6	2.50
DIB 055	M8	3.30
DIB 013	M10	3.00
DIB 003	M12	2.90

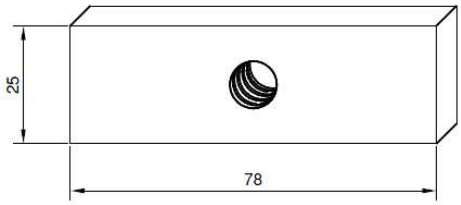
Hexagonal nut

Used to secure against loosening of a screw connection.

Material	steel
Finish	galvanised
Grade	8
DIN	934
Packaging	100 pcs./box
Billing unit	1 pcs.

Item no.	Thread	Weight [kg/100 pcs.]	Wrench size [mm]
DIB 056	M6	0.25	10
DIB 057	M8	0.52	13
DIB 058	M10	1.16	17
DIB 059	M12	1.73	19
DIB 060	M16	3.33	24

2 Installation components

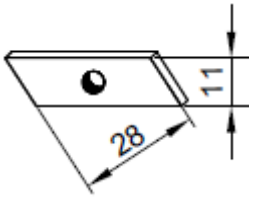


Nut

Slide block for the lower profile slot in the heavy-duty profile to fix it with the equipment rail.

Material	steel
Finish	galvanised
Packaging	25 pcs./box
Billing unit	1 pcs.

Item no.	Material thickness [mm]	Colour	Thread	Weight [kg/unit]
	8.00	silver	M6	0.120
	8.00	yellow	M8	0.122
DIB 012	10.00	silver	M10	0.144
DIB 023	10.00	yellow	M12	0.146

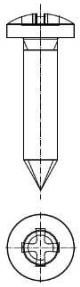


Threaded plate

Threaded plates are used to attach structural elements to heavy-duty ceiling profiles.

Item no.	DIB 081
Material	steel
Material thickness	4 mm
Finish	galvanised
Thread	M 5
Grade	D 9-1
Weight	0.1 kg/100 pcs.
Packaging	100 pcs./box
Billing unit	1 pcs.

2 Installation components

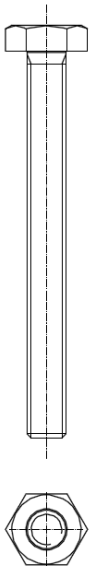


Mounting screw

Mounting screws are used to securely fasten light loads to drywall indoors.

Material	steel
Finish	galvanised
DIN	7981
Packaging	1,000 pcs./box
Billing unit	1 pcs.

Item no.	Dimension [mm]	Weight [kg/100 pcs.]
DIB 061	3.5 x 16	0.10
	3.9 x 16	0.16
DIB 062	4.8 x 19	0.20



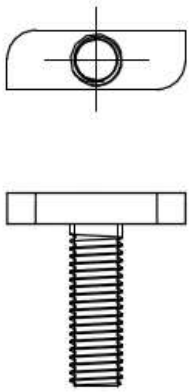
Hex-head bolt

Hex-head bolts are detachable connecting elements for positive and non-positive connections.

Material	steel
Finish	galvanised
Grade	8.8
DIN	933
Packaging	100 pcs./box
Billing unit	1 pcs.

Item no.	Thread [mm]	Weight [kg/100 pcs.]
DIB 063	M10 x 25	2.57
DIB 065	M10 x 30	2.82
DIB 066	M10 x 60	4.34
DIB 067	M10 x 80	5.33
DIB 068	M10 x 100	6.33
DIB 069	M10 x 110	6.84
DIB 070	M10 x 120	7.34

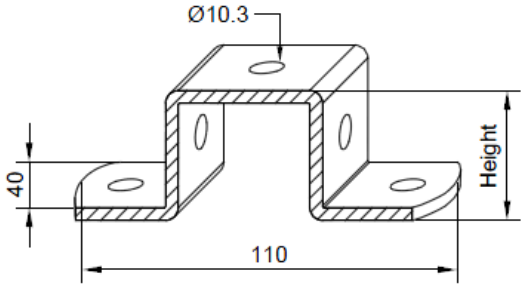
2 Installation components



Hammer-head bolt

With nut M10, without square neck on the head.

Item no.	DIB 007
Material	steel
Finish	galvanised
Thread	M10 x 30
Grade	8.8
Weight	3.40 kg/100 pcs.
Packaging	25 pcs./box
Billing unit	1 pcs.



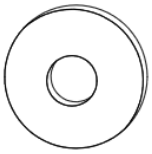
Rail bracket

Used to attach the trusses to the heavy-duty profiles.

Material	steel
Material thickness	4.00 mm
Finish	galvanised
Packaging	loose
Billing unit	1 pcs.

Item no.	Height [mm]	Weight [kg/unit]
DIB 011	41	0.198
	62	0.258
	82	0.298

2 Installation components



Washer

Washers reduce the sinking or digging of the bolt head into the material.

Material	steel
Finish	galvanised
Billing unit	1 pcs.

Item no.	DIN	Inside diameter [mm]	Outside diameter [mm]	Material thickness [mm]	Weight [kg/100 pcs.]	Packaging [pcs./box]
	125	8.40	16	1.60	0.16	100
	125	10.50	20	2.00	0.40	100
	125	13.00	24	2.50	0.56	100
	125	17.00	30	3.00	0.94	10
	440	9.00	28	2.60	0.98	100
	440	9.00	28	3.00	1.02	100
	440	11.00	34	2.60	1.56	100
	440	13.50	45	4.00	3.92	100
	522	6.40	35	1.50	0.82	200
	522	8.40	20	1.50	0.22	200
	522	8.40	25	1.25	0.40	100
	522	8.40	25	3.00	0.98	100
	522	8.40	30	1.50	0.80	200
	522	8.40	40	3.00	2.66	100
	522	10.50	30	1.50	0.60	200
	522	10.50	35	1.50	1.40	200
	522	12.50	30	1.50	0.50	100
	522	12.50	35	1.50	1.20	100
	522	17.00	50	2.00	4.34	50
	6796	21.00	45	5.00	4.38	100
	7089	17.00	40	3.00	2.23	50
	9021	6.40	18	1.50	0.24	100
	9021	8.50	24	2.00	0.54	100
DIB 071	9021	10.50	30	2.50	2.57	100
DIB 101	9021	13.00	37	3.00	2.82	100
DIB 080	9021	17.00	50	3.00	4.80	100

3 Anchor systems

Mortar

Fast curing high performance mortar for cracked and uncracked concrete and post-installed rebar connection, usable for anchor (registration no. ETA-12/0006). To be used with a caulking gun type.

Item no.	DIB 037
Registration no.	ETA-12/0083
Contents	330 ml mixer
Weight	0.59 kg/unit
Packaging	loose
Billing unit	1 pcs.

Anchor

High performance anchor rod for fixing cracked and uncracked concrete without drill hole cleaning. Including washer and nut.

Item no.	DIB 038
Registration no.	ETA-12/0006
Material	steel
Finish	galvanised
Threat diameter	M8
Thread length	60 mm
Anchor length	100 mm
Max. usable length	28 mm
Drilling diameter	10 mm
Screw Depth	100 mm
Wrench size	13 mm
Max. load	11.40 kN
Weight	1.68 kg/40 pcs.
Packaging	40 pcs./box
Billing unit	1 pcs.

3 Anchor systems

Anchor for diagonal bracing

Anchor rod for fixing diagonal bracing and bare concrete ceiling. Including washer and nut.

Item no.	DIB 039
Registration no.	ETA-98/0001
Material	steel
Finish	galvanised
Threat diameter	M10
Thread length	30 mm
Anchor length	90 mm
Max. usable length	10 mm
Drilling diameter	10 mm
Screw Depth	80 mm
Wrench size	17 mm
Max. load	4.30 kN
Weight	6.30 kg/ 100 pcs.
Packaging	100 pcs./box
Billing unit	1 pcs.

Anchor for wall mounting

The anchor is required for attaching a wall bracket, for example.

Item no.	DIB 040
Material anchor	nylon
Colour anchor	grey
Material nail screw	steel
Finish nail screw	galvanised
Anchor length	40 mm
Outside diameter	6 mm
Drilling diameter	6 mm
Borehole depth	35 mm
Weight	0.40 kg/100 pcs.
Packaging	100 pcs./box
Billing unit	1 pcs.

3 Anchor systems

Injection grout gun

Is used for injecting mortar.

Include: 1 discharge unit, 1 red tile, 1black tile, 1 safety glasses

Item no.	DIB 042
Material	steel/plastic
Weight	1.07 kg/pcs.
Packaging	single packaging bag/box
Billing unit	1 pcs.

Air gun

For fast and efficient removal of dust and debris from drilled holes of varying diameters and depths to allow correct installation of anchors.

Item no.	DIB 041
Material	steel/plastic
Finish	painted red/black
Length	330 mm
Weight	0.28 kg/pcs.
Packaging	single packaging
Billing unit	1 pcs.

Round brush

Brush with wooden handle for cleaning drill holes (max. diameter: 12 mm)

Item no.	DIB 043
Weight	0.04 kg/pcs.
Packaging	loose
Billing unit	1 pcs.

4 Ceiling fixtures

Hygiene luminaire classic

Luminaire for heavy-duty profiles in the grid 675 mm. Several luminaires are interconnected.

Name	Hygiene luminaire classic	Hygiene luminaire classic R
Item no.		
Material Case	Dull white steel plate	
Material cover	4 mm ESG-plane with screen print on the edge	
Weight	12 kg/unit	6 kg/unit
Dimensions luminaire (B x L x H)	624 x 624 x 75 mm	624 x 312 x 75 mm
Dimensions cover	598 x 624 mm	598 x 312 mm
Light sources	LED	
Luminous colour [K]	4,000	
Colour rendering	Ra ≥ 90	
Luminaire luminous flux [lm]	4,900	2,450
Connection power [W]	45.8	22.9
Mounting accessories	Installation kit for plasterboard ceiling and heavy-duty ceiling	
Scope of supply	3 m connecting cable with Wieland plug	
Protection class	IP 54	
Ballast unit	with electrical operating device, dimmable	
Life span	L80B10 = 72,000 h	
Energy efficiency class	A++	
Test mark	CE, F	
Billing unit	1 pcs.	
Packaging	loose/box	

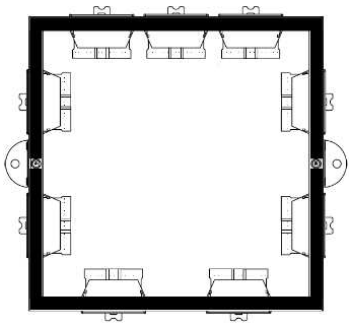
4 Ceiling fixtures

Hygiene luminaire plus

Luminaire for heavy-duty profiles in the grid 675 mm. Several luminaires are interconnected.

Name	Hygiene luminaire plus	Hygiene luminaire plus R
Item no.		
Material Case	Dull white steel plate	
Material cover	4 mm ESG-plane with screen print on the edge	
Weight	12 kg/ unit	6 kg/unit
Dimensions luminaire (B x L x H)	624 x 624 x 75 mm	624 x 312 x 75 mm
Dimensions cover	598 x 624 mm	598 x 312 mm
Light sources	LED	
Luminous colour [K]	4,000	
Colour rendering	Ra ≥ 90	
Luminaire luminous flux [lm]	4,900	2,450
Connection power [W]	45.8	22.9
Mounting accessories	Installation kit for plasterboard ceiling and heavy-duty ceiling	
Scope of supply	3 m connecting cable with Wieland plug	
Protection class	IP 65	
Ballast unit	with electrical operating device, dimmable	
Life span	L80B10 = 72,000 h	
Energy efficiency class	A++	
Test mark	CE, F	
Billing unit	1 pcs.	
Packaging	loose/box	

4 Ceiling fixtures



Distributor box

Used to connect up to eight lights at the same time.

Item no.	
Material	steel
Finish	galvanised
Dimension	320 x 260 x 50 mm
Colour	white, like RAL 9010
Weight	1.474 kg/unit
Packaging	loose
Billing unit	1 pcs.

Socket

Used to hold a plug.

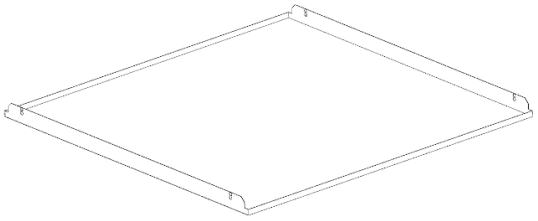
Item no.	
Material	polyamide
Colour	black
Dimension	76 x 47 x 15 mm
Weight	0.026 kg/unit
Coding mains	250/400 V 16 A
Packaging	loose
Billing unit	1 pcs.

Extension cable

The extension cable is supplied with a plug and socket.

Item no.	
Material Socket/Plug	polyamide
Colour Socket/Plug	white
Colour cable	white
Nominal cross section conductor	1.50 mm^2
Length	3,000 mm
Weight	0.515 kg/unit
Coding mains	250/400 V 16 A
Degree of protection	IP20
Packaging	loose
Billing unit	1 pcs.

4 Ceiling fixtures



Metal tile

Metal tile is suitable for placing on the heavy-duty profiles. Tiles are sharp-edged and without chamfer.

Also suitable as clip-in tiles with two-sided clamping nodules.

Material	steel
Material thickness	0.60 mm
Finish	smooth, also perforated on request
Colour	white, like RAL 9010
Edge detailing	Without chamfer, square-edge on four sides
Weight	5.23 kg/m²
Billing unit	1 m²

Item no.	Dimension [mm]	Packaging [pcs./box]
DIB 035	625 x 625.0	14
DIB 064	625 x 312.5	28

5 Special constructions

Wall bracket for anti-scatter grids

A wall bracket, which consists of three acrylic glass panes, is used to store anti-scatter grid panels.

Item no.	
Material	acrylic glass
Dimension	475 x 570 x 110 mm
Colour	white
Weight	3.00 kg/unit
Packaging	1 pcs./box
Billing unit	1 pcs.

Scope of supply	
Quantity	Designation
1 pcs.	Wall bracket (pre-assembled)
1 pcs.	Mounting template

Monitor trolley

The device enables the storage of image systems with large display containers. The dimensions can be set individually. Assembled in the factory or available in individual parts.

Item no.	
Profile material	aluminium
Profile finish	anodised
Dimension	on demand
Packaging	1 pcs./pallet
Billing unit	1 pcs.

5 Special constructions

Baby-sleeve bracket

A baby-sleeve is used to redden infants and young children. During the examination, the patients are well fixed in the sheaths without one or more people having to stay in the immediate radiation area. The baby-sleeve bracket is used to position the baby-sleeve hanging in front of the grid wall stand. The dimensions can be set individually. Assembled in the factory or available in individual parts.

Item no.	
Profile material	aluminium
Profile finish	anodised
Dimension	on demand
Packaging	loose
Billing unit	1 pcs.

5 Special constructions

Wall bracket with condensate tray

A wall bracket with condensate tray has been developed for cooling units. The tray can be installed lengthways or crossways. The condensed water is drained off directly using the hose supplied.

Item no.	
Tray material	PVC
Tray colour	grey
Wall bracket material	steel
Wall bracket colour	white, like RAL 9010
Dimension	658 x 508 mm
Packaging	loose
Billing unit	1 pcs.

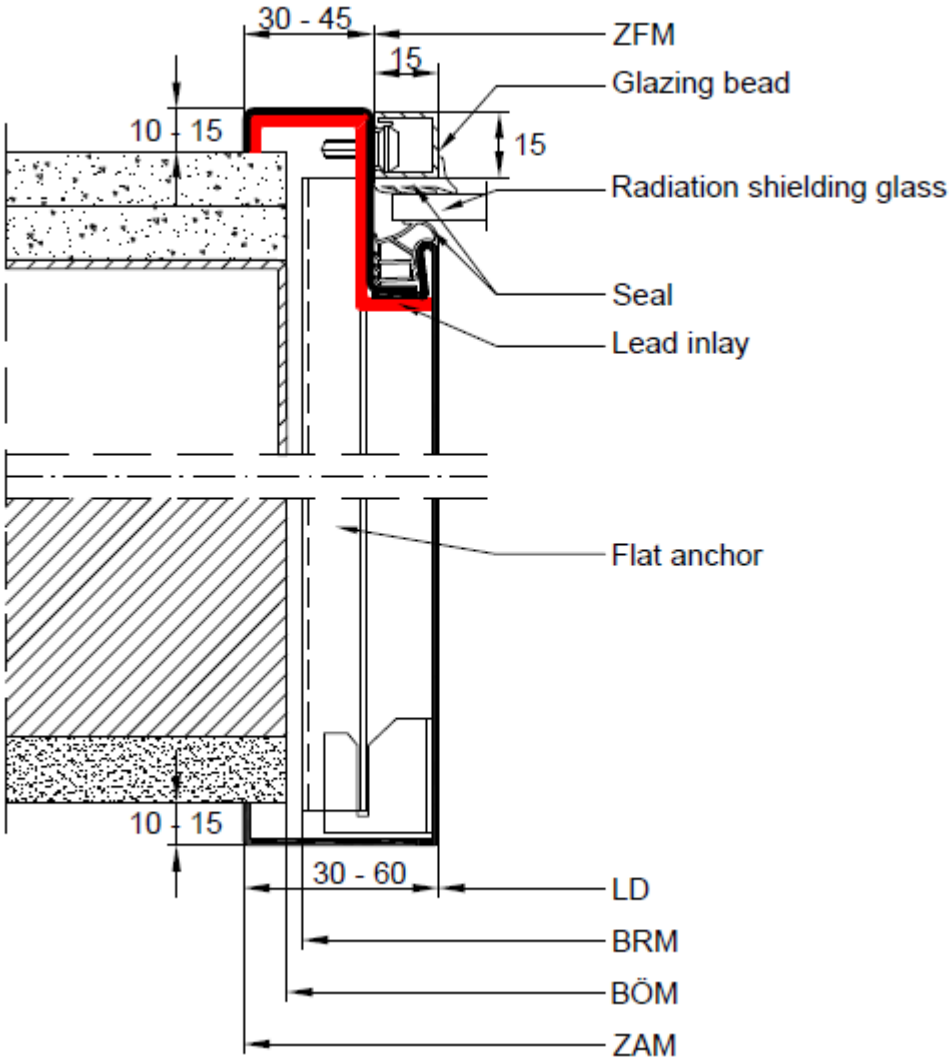
Scope of supply	
Quantity	Designation
1 pcs.	Collection tray with central drainage spout including raised installation areas and glued-in M8 x 60 mm thread pins. Dimension: 658 x 508 mm
1 pcs.	Wall mounting plate Dimension: 462 x 190 mm
2 pcs.	Bracket
4 pcs.	Universal plugs (concrete or solid brick) Dimension: 8 x 50 mm
4 pcs.	Special screw Dimension: 6 x 50 mm
4 pcs.	Spacer sleeve, black l: 20.00 mm
2 pcs.	Safety cap, white
1 pcs.	Tube Length: approx. 2.00 m Inside diameter: 12.00 mm
4 pcs.	Knurled nut Dimension: M8 x 30.00 mm
4 pcs.	Lock nut M8
4 pcs.	Washer Ø: 8.50 mm
1 pcs.	Tension clamp for secure
1 pcs.	Installation instruction

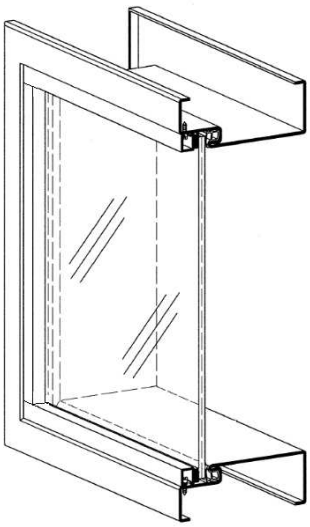
III Contents for building components

1 Radiation-shielding window frames
2 Venetian blinds
3 Laser-blocking roller blinds
4 Electrotropic laminated glass
5 Radiation-shielding glass
6 Speak-through opening with radiation-shielding glass
7 Radiation-shielding doorsets

1 Radiation-shielding window frames

Single glazing:



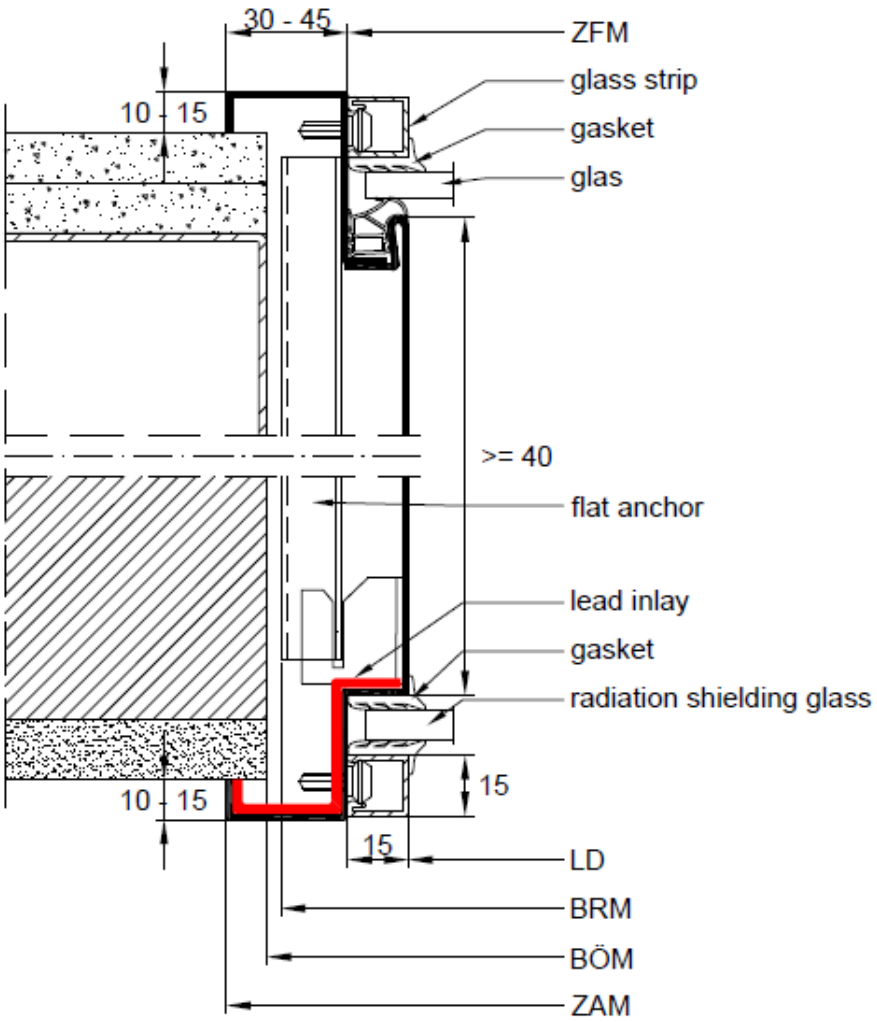


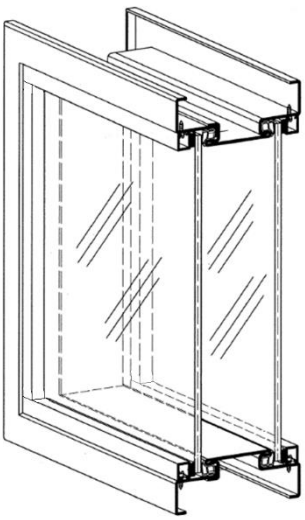
Abbr.	Designation	Width in mm		Height in mm
ZAM	Frame size	1,016	x	1,016
BÖM	Wall opening dimensions	1,000	x	1,000
BRM	Basic dimensions	990	x	990
ZFM	Frame rebate dimension	956	x	956
GLM	Glass size	946	x	946
LD	Light review measure	926	x	926
Single glazing for retrofitting with lead (Pb)				

Sizes apply for a 30_45 frame face and 1,000 x 1,000 mm wall opening dimension (BÖM).

1 Radiation-shielding window frames

Double glazing:



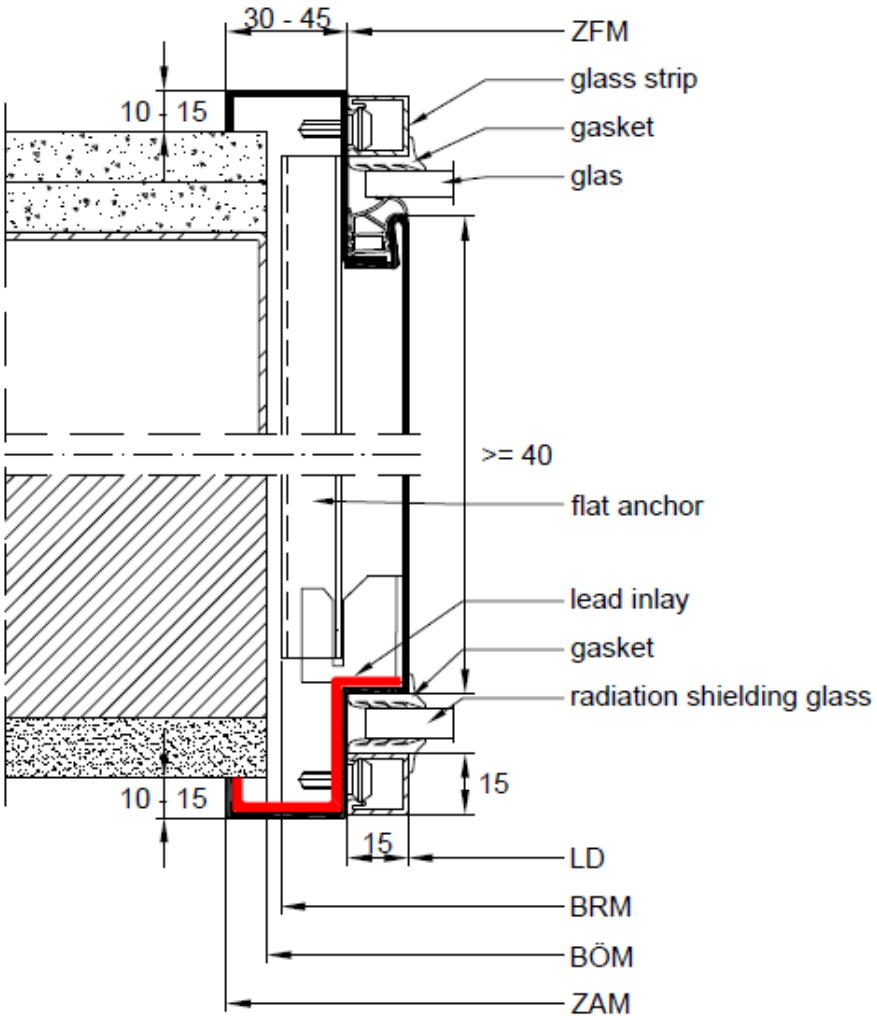


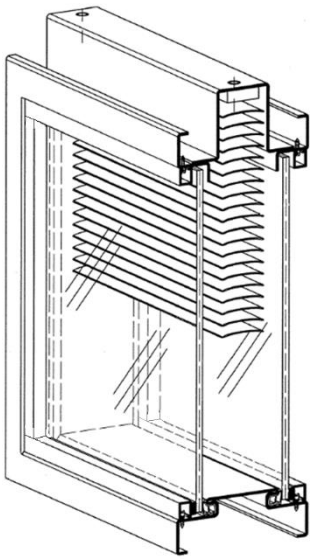
Abbr.	Designation	Width in mm		Height in mm
ZAM	Frame size	1,016	x	1,016
BÖM	Wall opening dimensions	1,000	x	1,000
BRM	Basic dimensions	990	x	990
ZFM	Frame rebate dimension	956	x	956
GLM	Glass size	946	x	946
LD	Light review measure	926	x	926
Double glazing for retrofitting with lead (Pb)				

Sizes apply for a 30_30 frame face and 1,000 x 1,000 mm wall opening dimension (BÖM).

1 Radiation-shielding window frames

Double glazing with blind box:





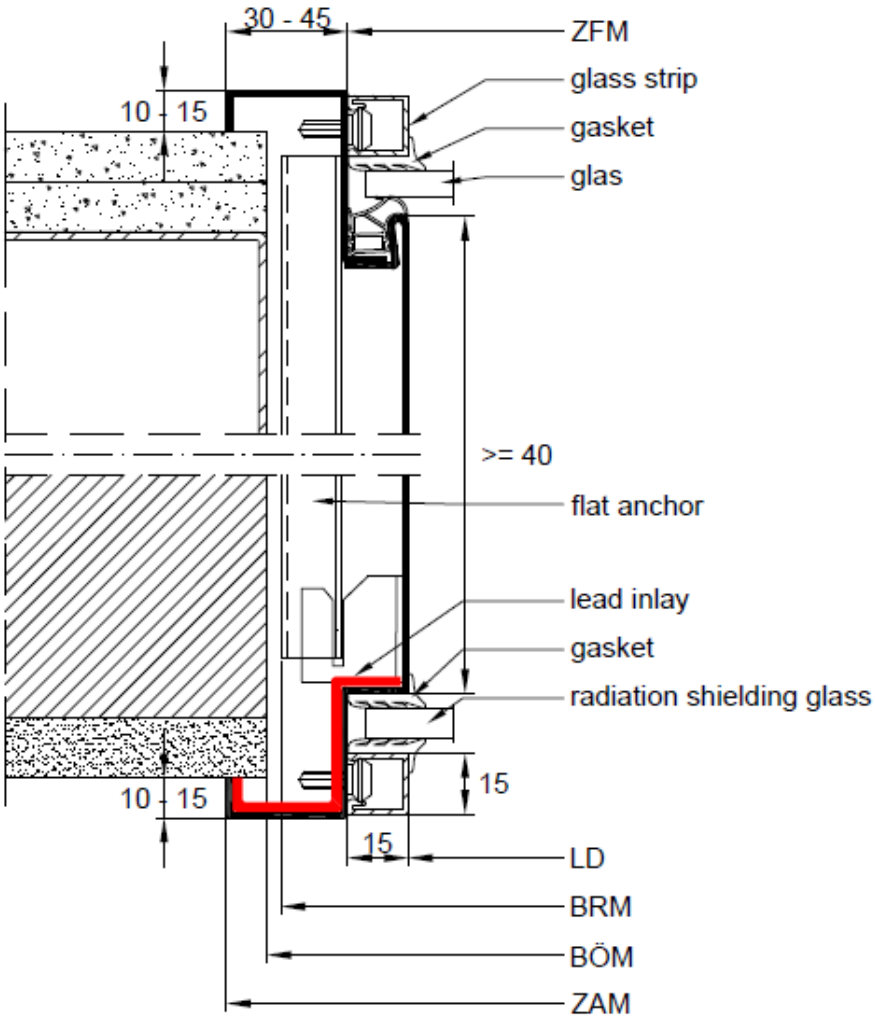
Abbr.	Designation	Width in mm		Height in mm
ZAM	Frame size	1,016	x	1,016
BÖM	Wall opening dimensions	1,000	x	1,000
BRM	Basic dimensions	990	x	990
ZFM	Frame rebate dimension	956	x	956
GLM	Glass size	946	x	946
LD	Light review measure	926	x	926

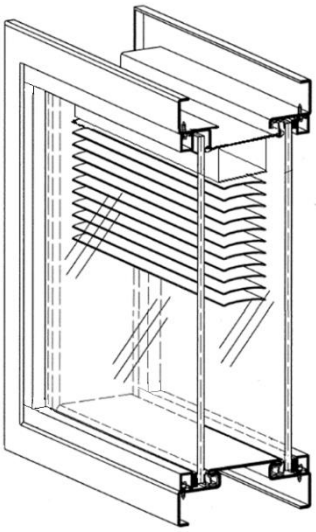
Double glazing for retrofitting with lead (Pb) with additional blind box for manually or electrically controlled venetian blinds

Sizes apply for a 30_30 frame face and 1,000 x 1,000 mm wall opening dimension (BÖM).

1 Radiation-shielding window frames

Double glazing without blind box:





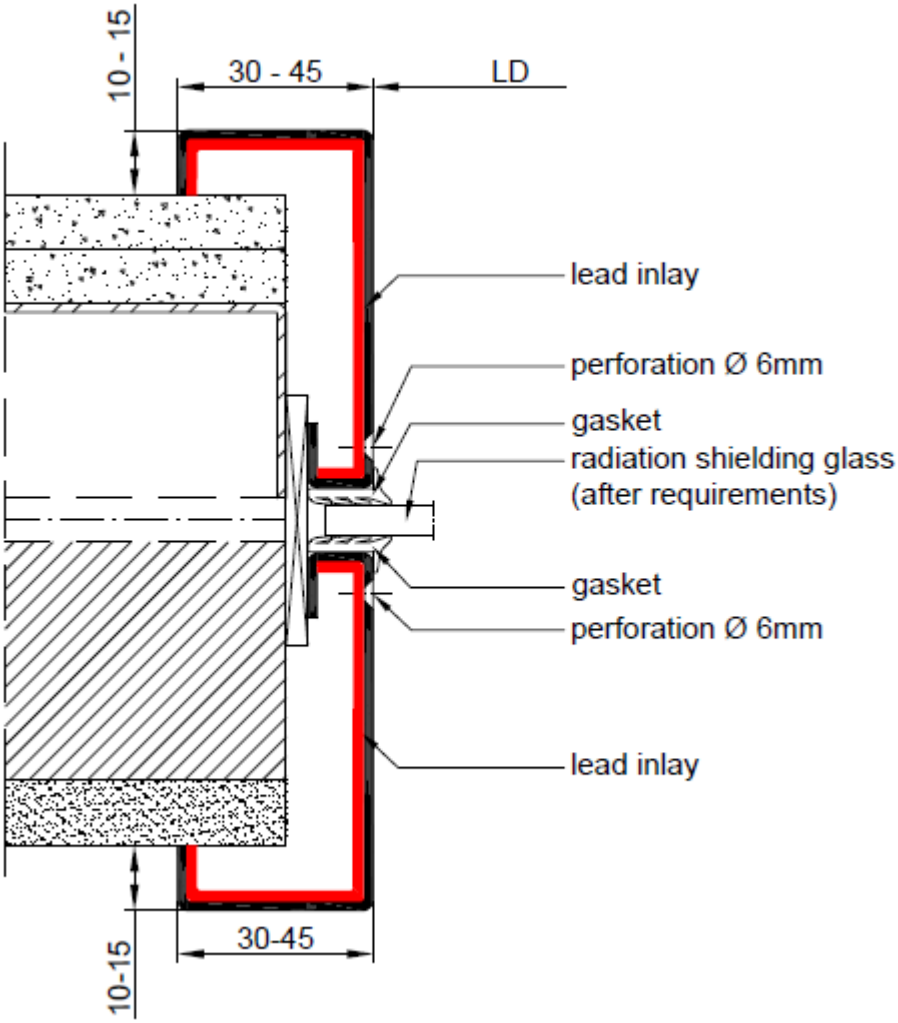
Abbr.	Designation	Width in mm		Height in mm
ZAM	Frame size	1,016	x	1,016
BÖM	Wall opening dimensions	1,000	x	1,000
BRM	Basic dimensions	990	x	990
ZFM	Frame rebate dimension	956	x	956
GLM	Glass size	946	x	946
LD	Light review measure	926	x	926

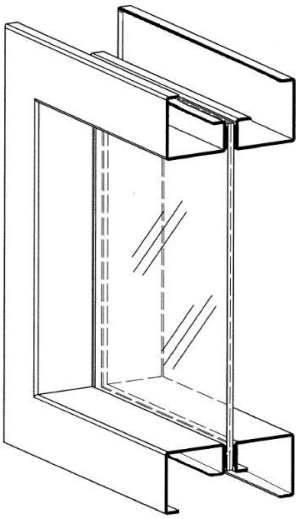
Double glazing for retrofitting with lead (Pb) without blind box for manually or electrically controlled venetian blinds

Sizes apply for a 30_30 frame face and 1,000 x 1,000 mm wall opening dimension (BÖM).

1 Radiation-shielding window frames

Centre glazing:

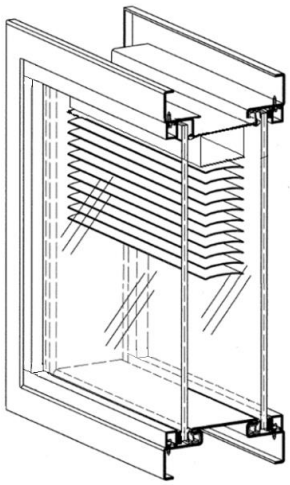


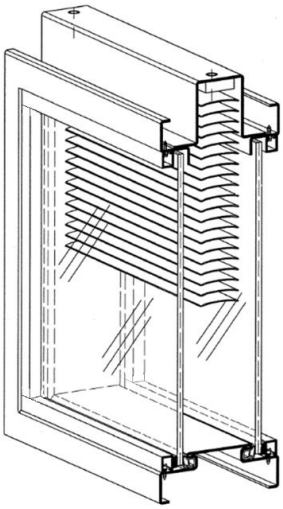


Abbr.	Designation	Width in mm		Height in mm
ZAM	Frame size	1,056	x	1,056
BÖM	Wall opening dimensions	1,000	x	1,000
BRM	Basic dimensions	996	x	996
ZFM	Frame rebate dimension	1,000	x	1,000
GLM	Glass size	986	x	986
LD	Light review measure	966	x	966
Centre glazing for retrofitting with lead (Pb) = …..				

Sizes apply for a 30_30 frame face and 1,000 x 1,000 mm wall opening dimension (BÖM).

2 Venetian blinds





Venetian blind systems

The primary function of venetian blinds in hospitals is to maintain privacy between patients, staff and visitors, i.e. through their use in patient rooms and nurses'/supervision rooms.

For this purpose, we have developed frame units with interstitial venetian blinds mounted in the cavity. Glass panes protect them against damage and prevent soiling. All hygiene and privacy requirements are met.

Three basic types of venetian blinds are available:

- venetian blinds with knob for tilting
- venetian blinds with crank handle for tilting, raising and lowering
- venetian blinds with electrical control for tilting, raising and lowering

  Cord and chain pulls are unsuitable for these frame units.

Moreover, several different frame types are available with additional functions such as radiation-shielding, sound control, fire protection or a combination of these, to name a few.

A distinction can be drawn between frames

- without a blind box, where the venetian blind is fixed in the head of the frame.
- with a blind box, where the venetian blind is parked in the wall cavity in the raised position.

Technical data: venetian blinds	
Slats	Special aluminium alloy with high tensile strength, with chemical surface finish, stove-enamelled in colours on our colour card. Gloss level "silk gloss", reflectance of up to 85%, depending on colour. The special concave/convex slat curvature serves to maximise springiness and stability.
Colour	The venetian blind units are available in a wide range of colours. For technical reasons, it is not possible to reproduce the colours faithfully in print. We would therefore be glad to provide you with the relevant colour fan on request.

2 Venetian blinds

Colour no.	100	101	102	110	111	112	113	114	115	116	117	118	119
RAL no.	9010	9016	7032	-	9006	6033	5014	4009	1011	-	6021	9007	7024
Colour no.	120	121	122	130	131	132	140	141	150	151	152	153	160
RAL no.	9002	7035	7037	1013	1015	1015	8025	8028	6019	6027	6033	6002	1000
Colour no.	161	162	170	171	172	173	174	180	181	185	199	200	202
RAL no.	1018	1021	-	-	5007	5002	5013	3002	3000	9005	-	-	-
Colour no.	203	204	210	211	212	213	214	215	216	220	221	222	223
RAL no.	-	-	3015	5014	4003	4005	6027	-	3012	-	-	-	-

The allocation of a RAL number to each colour number only denotes an approximate rather than an exact match. In specific cases, the colour required by the project team must be compared with the colour fan.

"Novis" model:
With this model, the punch holes are concealed by the slat above.

- No disturbance from light infiltrating through the punch holes
- Excellent blind closing action in one direction

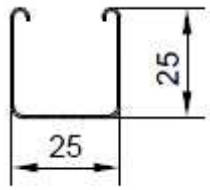
For the model with concealed punch holes, the ladder cord is available only in white and grey.

"Normal" model:

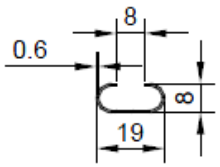
With this model, the punch holes are exposed.

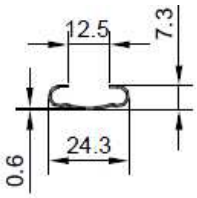
2 Venetian blinds

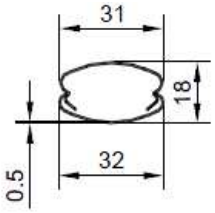
Head rail	Steel strip, roll-formed, 0.5 mm thick, with chemical surface finish and stove-enamelled in colours on our colour card, matching slats



Bottom rails	Steel strip, roll-formed, with chemical surface finish and stove-enamelled in colours on our colour card, matching slats					
Slat supports	High-grade ladder cord, colour matching slats					
Lift cords	Weather-resistant Trevira cord, colour matching slats					
Mechanical components	All mechanical components are functionally co-ordinated, fit-for-purpose and stably designed. All metal components are corrosion-protected by gloss galvanising and passivation.					
Slat width	16 mm		25 mm		35 mm	
	Manual	Electrical	Manual	Electrical	Manual	Electrical
Head rail size (W x H) [mm]	25 × 25		25 × 25		25 × 25	
Bottom rail size (W x H)	19 × 8 mm		24 × 7 mm		31 × 18 mm	
Minimum width (mm)	450	450	450	450	450	450
Max. height (mm)	(3,700)					
Max. area (m²)	4.0	4.5	4.0	5.0	4.0	5.0
Blind height	Slat stack height (mm)					
1,000 mm	75		70		75	
1,500 mm	90		80		85	
2,000 mm	105		90		95	
2,500 mm	120		100		105	
3,000 mm	135		110		115	
3,500 mm	150		120		125	







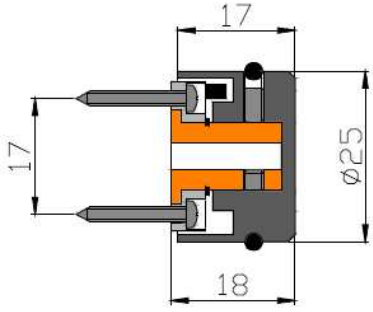
2 Venetian blinds

Venetian blinds with knob

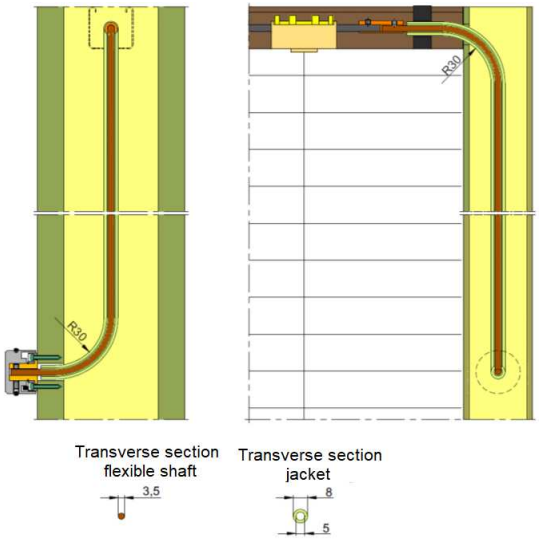
This light-metal venetian blind is fitted with a knob for tilting. It is not designed for raising or lowering. Force is transmitted from the knob to the venetian blind is via a flexible shaft, enclosed by a protective tube made from highly flexible plastics. The flexible shaft has a diameter of 3.5 mm.

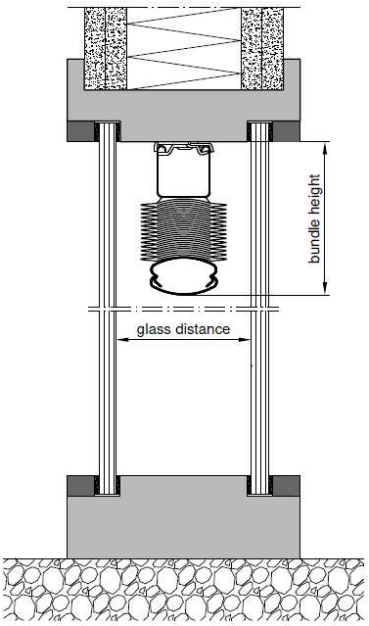
Technical data: venetian blinds with knob	
Knob colour	silver-anodised, alternatively: powder-coated in RAL 9016 white or RAL 9005 black
Knob diameter	25 mm

Controlled by knob:



Sample installation with flexible shaft:

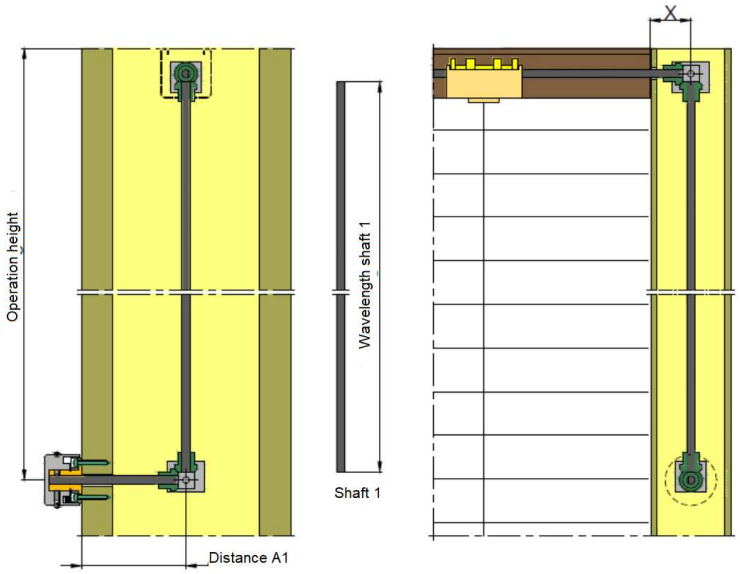




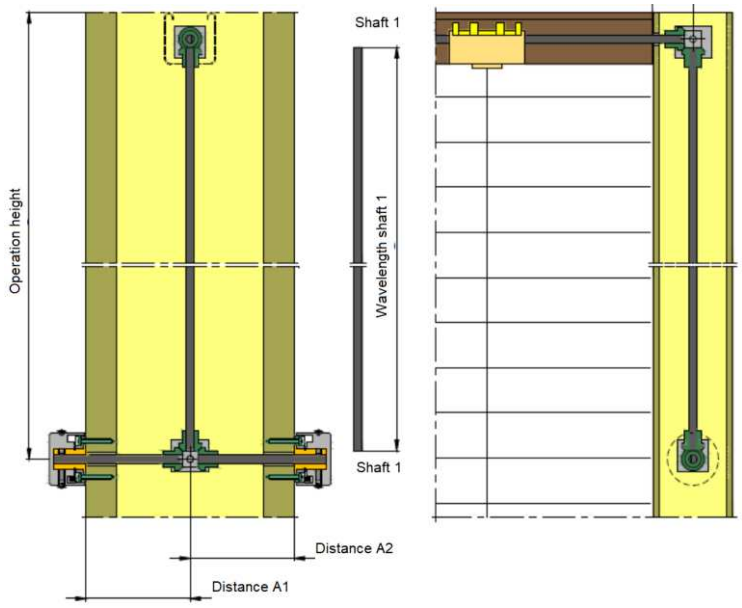
2 Venetian blinds

In case of spatial constraints, force transmission is also possible via a right-angle drive and rigid rotary axis.

Sample installation with control from one room:



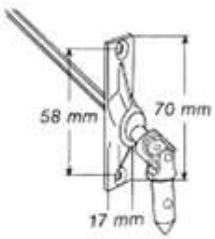
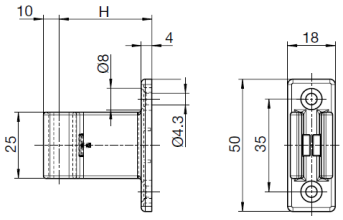
Sample installation with control from two rooms:



2 Venetian blinds

Venetian blinds with crank handle

This light-metal venetian blind is fitted with a crank handle for raising, lowering and tilting. Depending on the height and arrangement of the windows, the crank handle may be fixed to the window frame face on the right or left with a universal joint. Control from two rooms is not possible with a crank handle.

Technical data: venetian blinds with crank handle	
Crank handle rod 	Tubular aluminium rod; Powder-coated in RAL 9003 white or RAL 9018 grey or natural aluminium finish; subject to surcharge Crank handle rod length (mm): min. 380 (extended crank handle length)
Universal joint  	A wide range of universal joints is available in a host of sizes and designs. A basic distinction relates to the insertion angle (45° or 90°); this depends on the frame construction type. With the standard model, the universal joints are made from steel.
Crank handle holder  	for all 12-17 mm dia. crank handles, made from high-grade plastics with elastic properties • Available colours: grey and white

To calculate the required crank handle length, we need to know the apron wall height below the windows.

For installations adjacent to sliding doors, it is important to ensure that the doors do not collide with the glazing or control units.

2 Venetian blinds

Electrically controlled venetian blinds

This light-metal venetian blind with 25 mm or 35 mm wide slats is controlled by pushbutton or radio sensor. It is driven by a 24 V stepper motor that controls all functions, such as raising, lowering and tilting. The blind end positions are factory-programmed and no special control device is needed.

Motor and cable are connected by a RJ12 jack.

Technical data: electrically controlled venetian blinds	
Technical data on motor	up to 5.0 m²
Type	SIS 25
Max. torque	0.9 Nm
Rated torque	0.65 Nm
Recommended supply voltage	24 DC/V
Supply voltage range	20 – 28 V
Power consumption	Max. 12 W
Rated power consumption	7.2 W
Power consumption for standby	< 0.1 W
Speed (rpm)	5 – 30 (adjustable, SMI)
Max. duty cycle	10 minutes (25 °C)
Operating temperature	0 °C to +85 °C
Size	127 x 24 x 24 mm
Protection type	IP 20
Motor connection	RJ12 jack
Motor cable	6-core, core cross-section 6 x 0.2 mm²
Connection cable length	5 m as standard

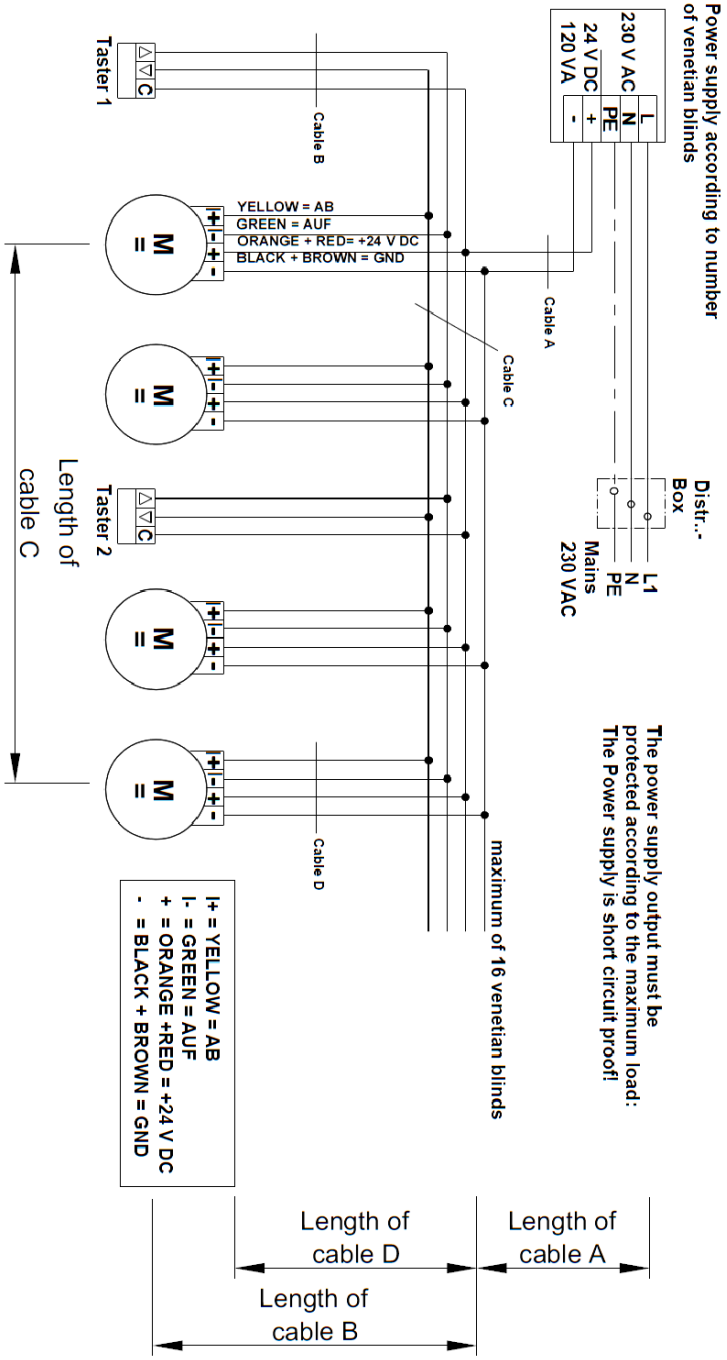
2 Venetian blinds

Control	Various control configuration is available for electrically driven venetian blind systems, as described below: **Single-side individual control – power supply unit** Individual control is the simplest form of operation. The venetian blind is activated from a single control point, either via a wired pushbutton power supply unit or wirelessly by radio. **Two-side individual control – switchbox and power supply unit** For two-side individual control, the simple solution with a pushbutton power supply unit is no longer possible. To prevent incorrect (i.e. simultaneous double-side) operation, a switchbox and power supply unit are used for 24 V operation. **Single-side group control – group power supply unit** With this control configuration, several venetian blinds are served by one pushbutton. **Two-side group control – switchbox and group power supply unit** With this control configuration, several venetian blinds are served by one pushbutton on either side of the wall. For two-side group control, the simple solution with a pushbutton power supply unit is no longer possible. A switchbox and power supply unit are used for 24 V operation to prevent incorrect (i.e. simultaneous double-side) operation in this case as well.
Design information on cable lengths	In the design of the venetian blind system, consideration must be given to the cable length and cable cross-sections in order to prevent excessive voltage losses. For this reason, due attention must be paid to the maximum distance between power supply unit and the most remote drive. The following circuit diagrams and tables allow simple determination of the maximum cable lengths. These depend on: • number of drives connected to a group power supply unit • type of drive connected • cable cross-section • cable quality
Motor cable	6-core, core cross-section 6 x 0.2 mm² one end with RJ12 jack, one end with insulation removed and fitted with cables lugs 

2 Venetian blinds

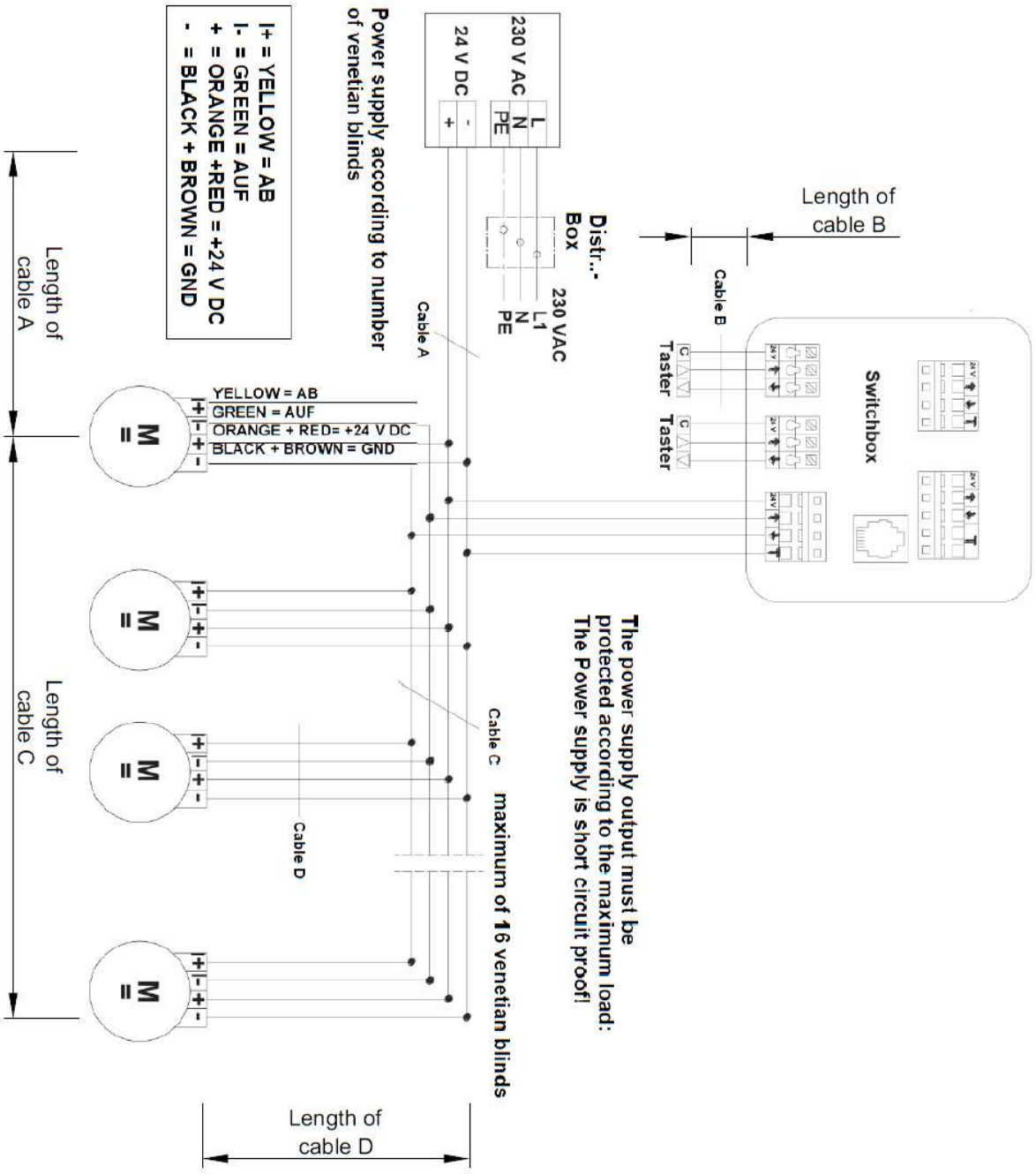
Cable lengths	5,000 mm as standard up to 10,000 mm possible
Colour coding	Yellow = Down (SMI+) Green = Up (SMI-) Red + orange = 24 V (plus) Brown + black = minus

Circuit diagram for installation with 1 pushbutton for max. 1 – 16 venetian blinds



2 Venetian blinds

Circuit diagram for installation with 2 pushbuttons for max. 1 – 16 venetian blinds



2 Venetian blinds

Required cable cross-sections and maximum cable lengths

System with a maximum of two venetian blinds (with power supply HT-24)		
Cable	Cable cross section [mm²]	Maximum of cable length [m]
A	2 X 1.50 2 X 2.50	8 14
B	3 X 0.50	15
C	4 X 0.75 4 X 1.00 4 X 1.50 4 X 2.50	40 55 80 100
D	4 X 0.2 (AWG)	5

System with a maximum of eight venetian blinds (with power supply PS SMI 120 or animeo power supply 4,5 A)		
Cable	Cable cross section [mm²]	Maximum of cable length [m]
A	2 x 1.50 2 x 2.50	2 3.5
B	3 x 0.50	15
C	4 x 0.75 4 x 1.00 4 x 1.50 4 x 2.50	10 13 20 34
D	4 x 0.2 (AWG)	5

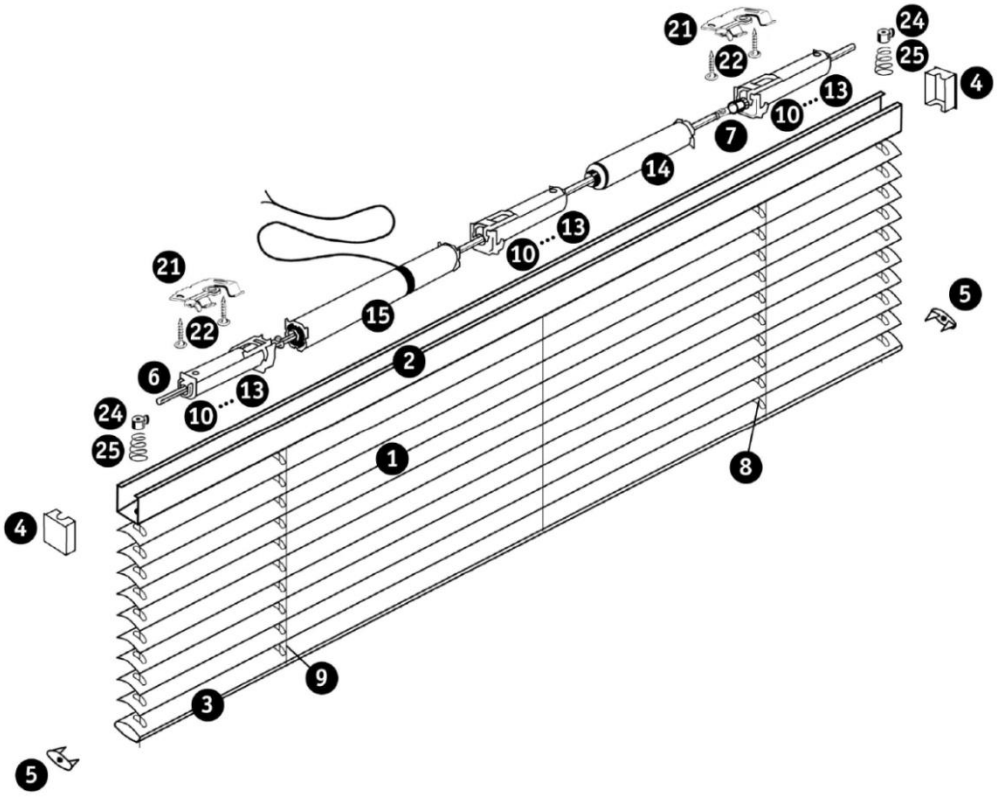
System with a maximum of twelve venetian blinds (with power supply PS SMI 240)		
Cable	Cable cross section [mm²]	Maximum of cable length [m]
A	2 x 1.50 2 x 2.50	1 1.5
B	3 x 0.50	15
C	4 x 0.75 4 x 1.00 4 x 1.50 4 x 2.50	7 10 13 18
D	4 x 0.2 (AWG)	5

System with a maximum of sixteen venetian blinds (with power supply PS SMI 240)		
Cable	Cable cross section [mm²]	Maximum of cable length [m]
A	2 x 1.50 2 x 2.50	0.5 1.0
B	3 x 0.50	15
C	4 x 0.75 4 x 1.00 4 x 1.50 4 x 2.50	4 6 9 15
D	4 x 0.2 (AWG)	5

The maximum cable length depends both on the cable cross-section and, to a large extent, on the cable quality. During installation and commissioning, provision must be made in all cases for the drive to be supplied with a minimum operating voltage of 20 V.

2 Venetian blinds

Parts schedule



The drive motor may optionally be positioned on the right, in the centre or on the left in the head rail of the venetian blind.

Item	Item designation	Number
1.1	Slats, width 16 mm	depending on blind height
1.2	Slats, width 25 mm	depending on blind height
1.3	Slats, width 35 mm	depending on blind height
2	Head rail	1
3.1	Bottom rail for 16 mm slat width	1
3.2	Bottom rail for 25 mm slat width	1
3.3	Bottom rail for 35 mm slat width	1
4	End cap for head rail	2
5.1	End cap for 16 mm bottom rail	2
5.2	End cap for 25 mm bottom rail	2
5.3	End cap for 35 mm bottom rail	2
6	Tilt shaft, 5 mm, hex	2
7	Holding device	2

2 Venetian blinds

Item	Item designation	Number
8	Lift cord	depending on blind size
9.1	Ladder cord, 16 mm	depending on blind size
9.2	Ladder cord, 25 mm	depending on blind size
9.3	Ladder cord, 35 mm	depending on blind size
10	Block bearing	depending on blind size
11	Cone	depending on blind size
12	End ring	depending on blind size
13	Top cover	depending on blind size
14	Spindle stop MS 25	1
15.1	Motor LV 25 B 44 (for venetian blinds < 3 m^2)	1
15.2	Motor LV 25 B 64 (for venetian blinds > 3 m^2)	1
16	Double shaft adapter	3
17	Head rail adapter	3
18	Seals at top	depending on blind size
19	Bottom rail seals	depending on blind size
20	Bottom rail end	depending on blind size
21	Ceiling support bracket	depending on blind size
22	Fixing screw for 3.9 × 16 ceiling support bracket to DIN 7982	depending on blind size
23	Steel wire, 1.2 mm	2
24	Tension nipple	2
25	Conical spring	2

2 Venetian blinds

HT-24 – group power supply unit for up to 2 venetian blinds

Group power supply unit for up to two 24 V (DC) drives; does not allow individual control; group control by pushbutton or via radio receiver; standard proprietary pushbuttons connectable: blind series push button, not electrically locked.

Item no.	
Maximum number of venetian blinds	2
Rated output voltage	24 V DC ± 5%
Output current	1A
Protection type	IP 55
Operating temperature range	0 °C to +40 °C
Weight	approx. 200 g
No-load power consumption	< 0.3 W
Approvals	CE, RoHS
Size (L x W x H)	133 x 24 x 21 mm

PS SMI 120 – group power supply unit for up to 8 venetian blinds

Group power supply unit for up to two 24 V (DC) drives; does not allow individual control; group control by pushbutton or via radio receiver; standard proprietary pushbuttons connectable: blind series push button, not electrically locked.

Item no.	
Maximum number of venetian blinds	8
Installation	On support rail
Operating voltage	230 V AC/50Hz, switchable to 110 V AC/60Hz
Output voltage, regulated	24 V DC, 5 A,120 VA (short-circuit-proof)
Protection type	IP 20
Operating temperature range	-10 °C to +60 °C
Weight	800 g
Current consumption for standby	20 mA
Test mark	CE
Size (L x W x H)	126 x 66 x 110 mm

2 Venetian blinds

Animeo power supply 4.5 A – group power supply unit for up to 8 venetian blinds

Group power supply unit for up to two 24 V (DC) drives; does not allow individual control; group control by pushbutton or via radio receiver; standard proprietary pushbuttons connectable: blind series push button, not electrically locked.

Item no.	
Maximum number of venetian blinds	8
Installation	Surface-mounted
Operating voltage	230 V AC/50 Hz
Output voltage, regulated	24 V DC SELV
Protection type	IP 20
Operating temperature range	0 °C to +40 °C
Output current	4.5 A
Output fuse	electronic
Test mark	CE
Size (L x W x H)	180 x 130 x 61 mm

PS SMI 240 – group power supply unit for up to 16 venetian blinds

Group power supply unit for up to two 24 V (DC) drives; does not allow individual control; group control by pushbutton or via radio receiver; standard proprietary pushbuttons connectable: blind series push button, not electrically locked.

Item no.	
Maximum number of venetian blinds	16
Installation	On support rail
Operating voltage	100 V AC to 240 V AC at 50/60 Hz
Output voltage, regulated	24 V DC, 10 A; 240 VA (short-circuit-proof)
Switching line	10 A
Protection type	IP 20
Operating temp. range	-10 °C to +60 °C
Weight	1,200 g
Current consumption for standby	30 mA
Test mark	CE
Size (L x W x H)	126 x 126 x 110 mm

3 Laser-blocking roller blinds

Laser-blocking glazing units

In hospitals, laser-blocking roller blind systems primarily serve to protect persons outside treatment rooms from hazardous laser beams.

For this purpose, we have developed frame units with laser-blocking roller blinds mounted in the cavity and special glass panes to protect against harmful laser radiation in the 315-11,000 nm range.
The laser-blocking roller blind is electrically driven.

A wide range of different frame types are available with additional functions such as radiation-shielding, sound control, fire protection or a combination of these, to name a few.
To meet the specific requirements, special glass types such as radiation-shielding, fire-resistant or sound-control glass can also be fitted in the frame.

With regard to the glazing units, a distinction is drawn between

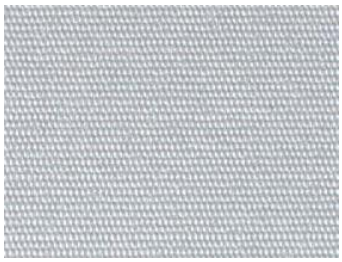
- frames without a roller blind box, where the roller blind is fixed in the head of the frame.
- frames with a roller blind box, where the roller blind is parked in the wall cavity when raised.

Technical data:

Test basis	DIN EN 12254: 2010 + AC: 2011 Basic requirements in accordance with Annex II of PPE Directive 89/686/EEC
Blocking material	glass / fabric / glass
Designation	DIR AB 315-1050 D AB4 + IR AB5 >1050 – 1400 DI AB2 + I AB3 >1400 – 9000 DI AB5 9000 – 11500
Possible roller blind system sizes:	min. width: 70 cm; max. width: 310 cm min. height: 20 cm; max. height 400 cm (depending on fabric) The system height may not exceed three times the system width.

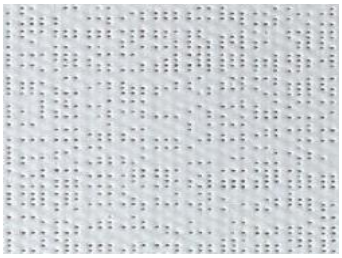
3 Laser-blocking roller blinds

Roller blind box	Roller blind boxes are available in the following sizes to accommodate different window widths and heights: • 62 x 60 mm • 82 x 80 mm • 102 x 100 mm Colour: aluminium anodised (E6/EV1) or white (RAL 9016) Other RAL colours on request.
Laser-blocking fabric	Several fabrics are available, all of which exhibit the following properties: • suitable for laboratory rooms subject to laser-related requirements. • 100% opaque, light and UV rays up to 100,000 lux are blocked, • high mechanical strength. • care: damp-wipeable • reaction to fire: low flammability, B1 rating to DIN 4102-1



Laserprotect white

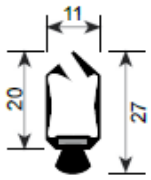
- Material: glass-fibre woven, PVC- and polyester-free
- Laser side white woven
- Rear side white
- Fabric width: 240 cm
- Transmission: 0%
- Reflection: 76%
- Lightfastness: 7/ 8
- Health/safety: bacterial resistance: over 99% of bacteria are destroyed – ASTM E
- Low flammability, M1 rating to NFP 92 503



Laserprotect grey

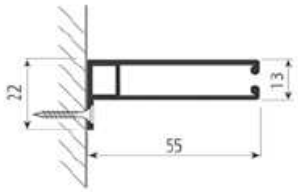
- Material: polyester yarn with synthetic coating
- Laser side white woven
- Rear side grey
- Fabric width: 170 cm
- Transmission: 0%
- Reflection: 72%
- Eco-performance: sustainable, 100% recyclable, Greenguard
- Low flammability, M1 rating to NFP 92 503

3 Laser-blocking roller blinds

Blind termination  	Bottom bar with brush Exposed Made from aluminium, 20 x 11 mm The bottom bar is carried along the lateral guide rails by plastic fins. To minimise light penetration, a brush seal is fitted to the lower edge of the bottom bar. Colour: aluminium anodised (E6/EV1) or white (RAL 9016) Other RAL colours on request.
Drive	The roller blind operates with a plug-in drive with single-phase capacitor, integral limit switches, brake and gear. 3 Nm, 30 rpm, 95 W, 50 Hz, 230 V The drive is certified by VDE (German Association for Electrical, Electronic & Information Technologies) and TÜV (German Technical Inspection Association). The power supply is via a 250 cm long supply cable, optionally fitted with a Hirschmann cable coupling, incl. mating connector, for connection by others. • 24 V DC Roll Up tubular motor 28 WT Drive cable with plug connector
Guide rails	The roller blind is provided with lateral guide rails. Their size is determined by that of the roller blind box:

Roller blind box sizes	Guide rail sizes
60 x 62 mm	55 x 13 mm
80 x 82 mm	70 x 27 mm
100 x 102 mm	70 x 27 mm

Lateral guide profiles



Optionally fitted with brush seal to minimise light penetration.

Colour: aluminium anodised (E6/EV1) or white (RAL 9016)
Other RAL colours on request.

3 Laser-blocking roller blinds

Laser products are classified in terms of the hazard they pose to humans. The manufacturer is responsible for classification under DIN EN 60825-1 "Safety of laser products".

Under accident prevention provisions, laser products are deemed to include equipment, systems or test facilities through which laser radiation is produced, transmitted or applied.

Under accident prevention provisions, laser radiation is deemed to include all electromagnetic radiation in the wavelength range from 100 nm to 1 mm produced by a process of controlled stimulated emission.

Under accident prevention provisions, the laser product class denotes the hazard potential entailed by the accessible laser radiation, subject to the following conditions:

Laser class	Definition
Class 1	The accessible laser radiation is not dangerous under reasonably foreseeable conditions. **Note:** The "reasonably foreseeable conditions" are deemed met if the products are used in accordance with their intended purpose. With higher-power-range Class 1 laser products, glare, impairment of colour vision and other inconveniences cannot be ruled out.
Class 1M	The accessible laser radiation is in the wavelength range from 302.5 nm to 4,000 nm. The accessible laser radiation is not dangerous to the eyes, provided the beam cross-section is not reduced by optical instruments, e.g. magnifiers, lenses, telescopes. **Note:** Provided no optical instruments are used that reduce the beam cross-section, the hazard posed by Class 1M laser products is similar to that for Class 1 laser products. The use of beam-narrowing instruments may result in similar risk levels as for Class 3R or 3B products.
Class 2	The accessible laser radiation is in the visible spectral range (400 nm to 700 nm). Short exposure times (up to 0.25 s) are not dangerous to the eyes. Additional beam components outside the wavelength range from 400 nm to 700 nm meet the conditions for Class 1. **Note:** With Class 2 laser products, brief, accidental exposure to the laser radiation, i.e. for up to 0.25 s, is not dangerous to the eyes. Class 2 laser products can therefore be used without any additional protective measures, provided there is no requirement, for the particular application, to look deliberately into the laser beam for longer than 0.25 s nor to look repeatedly into the laser beam or specular-reflected laser beam. As a rule, the eye protection provided by the natural blink reflex or other aversion responses must not be assumed. For this reason, the affected person should consciously close their eyes and avert their head if eyes are exposed to Class 2 laser radiation. (See also BGI (German statutory accident insurance association guidance paper) 5092).For continuously operating Class 2 lasers, the accessible emission limit (AEL) is equal to $P_{grenz.}$ = 1 mW (for C_6 = 1).

3 Laser-blocking roller blinds

Class 2M	The accessible laser radiation is in the visible spectral range from 400 nm to 700 nm. Short exposure times (up to 0.25 s) are not dangerous to the eyes, provided the beam cross-section is not reduced by optical instruments, e.g. magnifiers, lenses, telescopes. Additional beam components outside the wavelength range from 400 nm to 700 nm meet the conditions for Class 1M. **Note:** Provided no optical instruments are used that reduce the beam cross-section, the hazard posed by Class 2M laser products is similar to that for Class 2 laser products. The use of beam-narrowing instruments may result in similar risk levels as for Class 3R or 3B products.
Class 3A (old)	The accessible laser radiation becomes dangerous to the eyes when the beam cross-section is reduced by optical instruments, e.g. magnifiers, lenses, telescopes. Otherwise, the emitted laser radiation in the visible spectral range (400 nm to 700 nm) poses no hazard for short exposure times (up to 0.25 s), nor in the other spectral ranges even for longer exposure times. **Note:** Class 3A laser products are products that were classified under DIN EN 60825-1:1997 or an earlier version. Class 3A laser products that only emit radiation in the visible wavelength range may be treated in the same way as Class 2M products. Class 3A laser products that only emit radiation in the non-visible spectral range may be treated in the same way as Class 1M products. Provided no optical instruments are used that reduce the beam cross-section, the hazard posed by Class 3A laser products that only emit radiation in the visible spectral range is similar to that for Class 2 laser products. The hazard posed by Class 3A laser products that only emit radiation in the non-visible spectral range is similar to that for Class 1 laser products.
Class 3R	The accessible laser radiation is in the wavelength range from 302.5 nm to 10P6P nm and is dangerous to the eyes. The power or energy is a maximum of five times the Class 2 AEL for the wavelength range from 400 nm to 700 nm and five times the Class 1 AEL for other wavelengths. **Note:** Class 3R laser products are potentially as dangerous for the eyes as Class 3B laser products. The risk of eye injury is reduced by limiting the AEL for the visible wavelength range to five times the Class 2 AEL and, for the other wavelength ranges, to five times the Class 1 AEL. For continuously operating Class 3R lasers, the accessible emission limit (AEL) is equal to P_{grenz} = 5 mW (for C_6 = 1) for the wavelength range 400 nm to 700 nm.

3 Laser-blocking roller blinds

Class 3B	The accessible laser radiation is dangerous to the eyes and often also to the skin. Note: Looking directly into the beam of Class 3B laser products is dangerous. As a general rule, beams can be safely viewed via a suitable diffuse reflector providing the following conditions are simultaneously met: •The minimum viewing distance between diffuse reflector and eye cornea is 13 cm. •The maximum viewing period is 10 seconds. •The eye is not exposed to any directional beam components. In case of many diffusors, directional beam components are likely. The accessible laser radiation of Class 3B laser products is dangerous to the skin where the maximum permissible exposure (MPE) values specified in Annex 2 are exceeded.
Class 4	The accessible laser radiation is very dangerous to the eyes and dangerous to the skin. Even diffusely scattered radiation can be dangerous. The laser beams may pose fire and explosion risks. Note: Class 4 laser products are high-power lasers whose output power and energy exceed the Class 3B AEL. The laser beam of Class 4 laser products is so intensive that any kind of eye or skin exposure is likely to cause injury. Moreover, applications involving Class 4 laser products always require a check on whether adequate measures have been taken to combat fire and explosion risks.

Laser safety officer for Classes 3B and 4:
German statutory accident insurance association guidance paper BGI 832 (Operation of laser devices – Application of the accident prevention regulation "Laser Radiation" (BGV B2)) contains the following provision: Under § 6 of the accident prevention regulation "Laser Radiation" (BGV B2), companies are required, for the operation of Class 3B and 4 laser devices (based on the existing classification), to appoint in writing a laser safety officer. The laser protection officer must provide certification of the necessary expertise for the associated duties.

4 Electrotropic laminated glass

Switchable electrotropic (ET) laminated glass can alternately take on an opaque and a clear (transparent) condition, as required by users. Switching between the two states is brought about by applying or removing a voltage ($U_{\sim}$) of 115 V, 50 Hz.
This function is made possible by an assembly comprising two glass panes and an ET film interlayer.

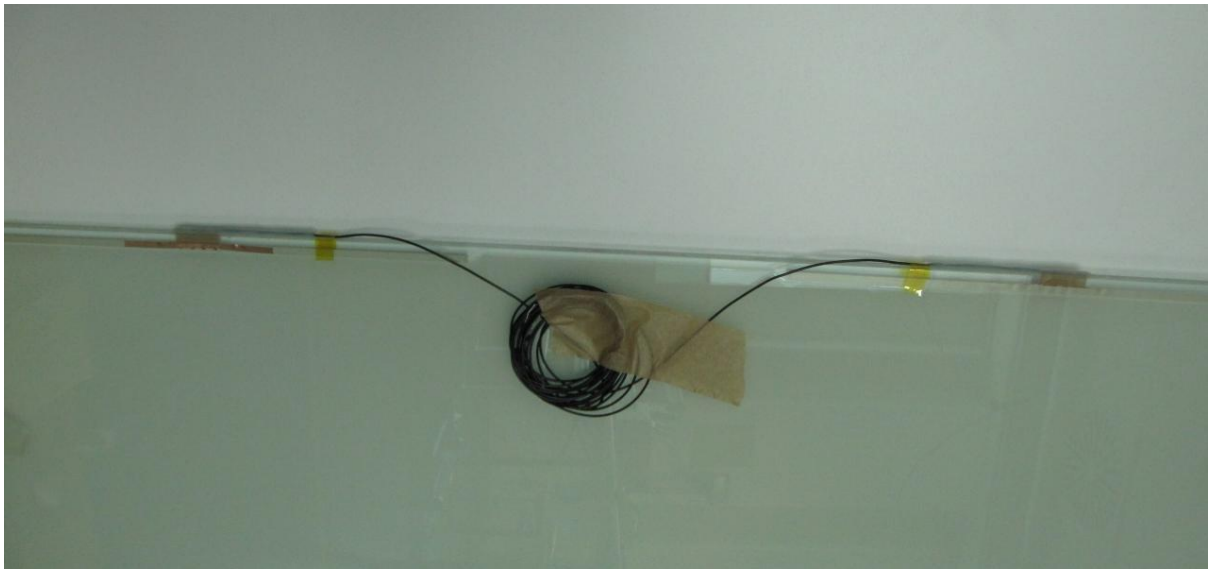
Technical data	
Optical data	
Switch status OFF Switch status ON	light transmission: 75%, scattered light 90% light transmission: 82%, scattered light 5%
Electric power	power requirement: approx. 10 W/m² (power only required for switch status ON)
Switching voltage	max. $U_{\sim}$ = 115 V, 50 Hz
Permissible temperature range for storage and transportation	-30 °C to +60 °C
Temperature range for switching	0 °C to +40 °C
Switching speed at room temperature	approx. 10 msec
Number of tested switching cycles	5 million
Switching voltage permanently applied	5,000 h
Voltage transformer	STEU 100/23 isolating transformer dimensions (L x W x H): 11 x 8.5 x 9.7 cm, weight: approx. 2.5 kg 1 input: $U_{\sim}$ = 230 V, 50 Hz 2 outputs: $U_{\sim}$ = 115 V, 50 Hz, 100 VA
Design	Pane 1 + EVA film + ET film + EVA film + Pane 2
Possible glass types	float glass, low-iron glass, insulating glass pane as heat-strengthened or toughened glass

4 Electrotropic laminated glass

Glass thicknesses (mm)	3, 4, 5 or 6
Total thickness	The total laminated glass thickness is equal to the total of the two pane thicknesses plus approx. 1.2 mm for the film stack between the two panes.
EVA film	ethylene vinyl acetate (EVA) laminating film
ET film	electrically switchable film based on PDLC (polymer-dispersed liquid crystal) technology
Max. size	1,100 x 2,530 mm

The laminated glass has a clear, approx. 5 mm wide, full-perimeter border without ET film. This border serves to provide a seal and electrical insulation.

The two electrical contacts of the ET film are located on one of the glass edges, where they are carried out of the unit.



No ET film is located in the area of the contacts.

This area is approx. 13 mm wide and extends the full length of the relevant edge over a distance of approx. 250 to 450 mm, depending on the unit size and design.

Either one two-core cable (approx. 5 mm external diameter, standard 2 m cable length) or two single-core cables are soldered to the contacts, which are insulated with silicone tape. The cables serve to connect the conductive film to the supply voltage (see Section 3).
Note! No strain relief is provided for the contacts on the glass unit. Please ensure careful handling and avoid mechanical loads.
Our installation tip: The unit should best be installed with the contacts located at the top or side. This prevents any possible loads from the unit from acting on the contacts or cables.

4 Electrotropic laminated glass

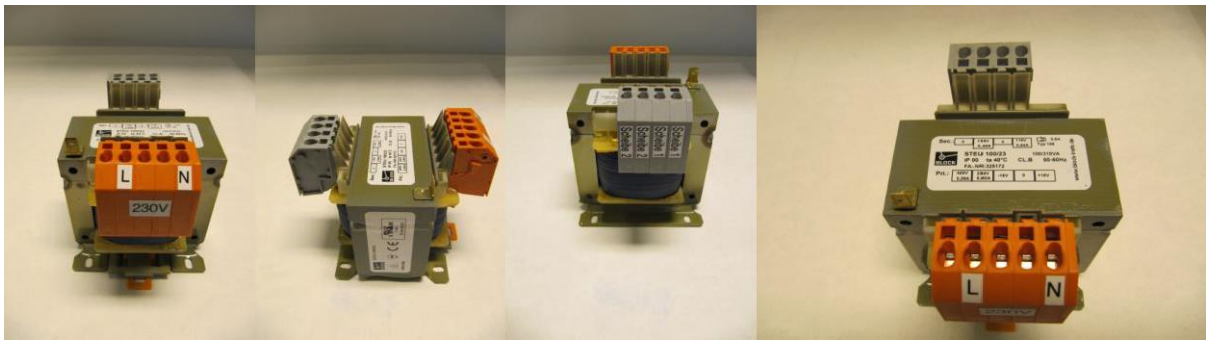
The ET laminated glass is switched between states by applying an alternating voltage of max. U~ = 115 V, 50 Hz. With no voltage applied, the glass is in an opaque condition. With voltage applied, the glass switches to the clear (transparent) condition.

CAUTION: Application of the wrong (excessively high) voltage may very quickly result in the destruction of the ET laminated glass! Under no circumstances should a voltage U~ = 230 V, 50 Hz be applied!

The electrical power requirement depends on the project-specific area of electrotropic laminated glass for switching. The larger the area, the greater the power requirement. As a rule, we select the appropriate voltage transformer for the project and supply this in conjunction with the ET laminated glass. Such a voltage transformer converts the normal mains voltage of U~ = 230 V +/-10%, 50 Hz to the switching voltage of U~ = 115 V, 50 Hz for the ET laminated glass. The voltage transformer contacts to be connected to the mains voltage and ET laminated glass

are marked. The isolating transformer is factory-fitted with a type 3 surge protective device (to DIN EN 61643-11), installed on the transformer primary side (U~ = 230 V). Moreover, the storey distribution board feeding the transformer must be fitted with a type 2 surge protective device and the building intake with a suitable type 1 device (lightning protection). Operation of the glass unit without the required surge protective devices entails the risk of irreversible damage to the unit in case of mains overvoltage (voltage flashover, in conjunction with complete failure of the unit). After any occurrence of overvoltage (recognisable through the tripping of the surge protective devices), the surge protective devices must be replaced or reset.

STEU 100/23 isolating transformer supplying the correct voltage for ET glass units



No other voltage sources or transformers may be used as a substitute for the supplied STEU 100/23 transformer, incl. surge protective device.

The transformer is connected up as follows:
Connect mains voltage (U~ = 230 V) on orange primary side of isolating transformer:

- line conductor to terminal marked "L" ("230 V")
- neutral conductor to terminal marked "N" ("+15 V")
- connect protective earth (PE) conductor with cable lug to transformer

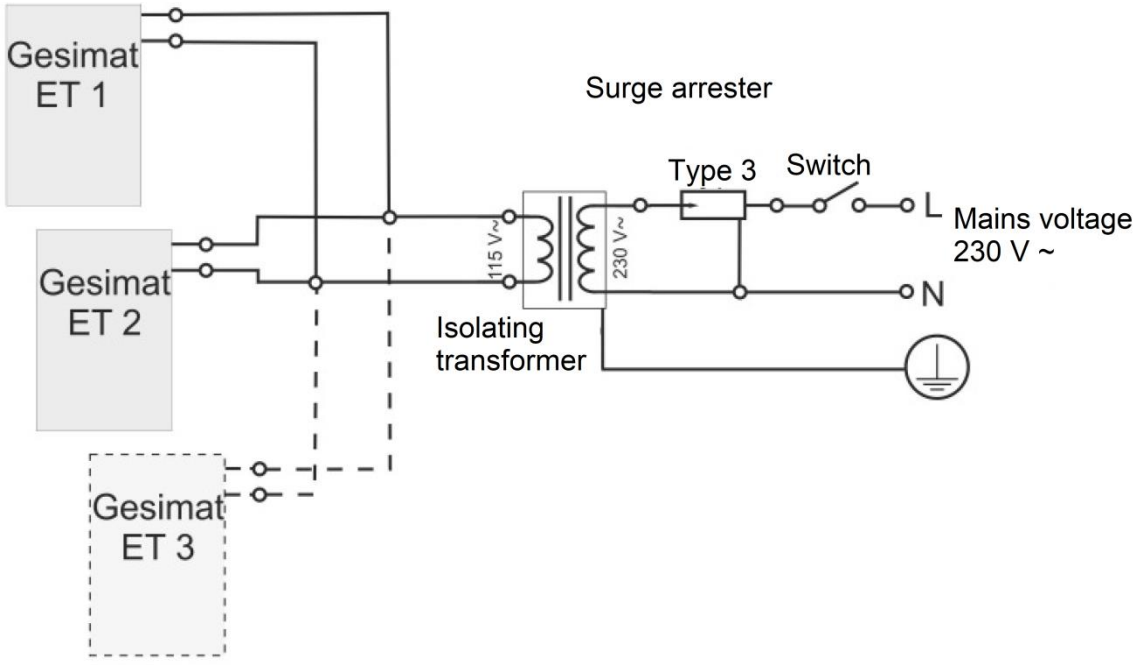
4 Electrotropic laminated glass

Where several ET glass units are operated with a single voltage transformer, they must always be connected in parallel to the $U_{\sim}$ = 115 V (50 Hz) output or relevant outputs.
The STEU 100/23 isolating transformer has two $U_{\sim}$ = 115 V outputs on the grey secondary side. Two electrotropic laminated glass units are to be connected in parallel to each of the two outputs with:

- Cable 1 connected to "0" terminal
- Cable 2 to the "115 V" terminal
- Cables 1 and 2 are exchangeable.

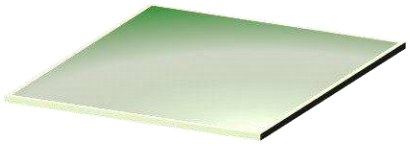
The supply voltage wiring for the glass unit must be performed by a professional tradesperson in accordance with good practice. The electrical contacts for the unit must be properly isolated from each other and any electrically conductive frames. If the glass is fitted in electrically conductive metal glazing frames, these must be earthed as appropriate. Should the ET laminated glass be fractured, then the voltage supply must be immediately switched off.

Schematic circuit diagram for electrical installation with one or several glass units.



Installation:
The ET laminated glass units must be installed in accordance with good practice. The relevant technical regulations and glazing guidelines must be observed.
The glass units should be installed with the contacts located at the top or side to prevent any possible loads from the units from acting on the contacts or cables. Glazing blocks must be positioned so as to prevent both the cables and the area of the contacts from being squashed.

5 Radiation-shielding glass



Radiation-shielding glass products serve to provide transparent protection against ionising radiation.
Common applications include X-ray rooms, operating theatres, radiotherapy units, dental surgeries and laboratories, e.g. for observation and speak-through windows, door glazing, panorama glazing and mobile radiation-shielding screens.

Our glass units can be supplied in virtually all geometric shapes, subject to the maximum sizes, in line with your specific requirements.

Technical data	PB 0.5	PB > 1.0
Refractive index n_e at 20 °C (cooled at 40 °C/h)	1.579	1.79
Luminous transmittance (t=5.0 mm)	90.5	85
Hydrolytic resistance class to DIN ISO 719	HGB 3	HGB 1
Lead oxide (PbO) content	≥ 22.0%	≥ 65.0%
Total heavy metal oxide content	≥ 23.0%	≥ 70.0%
Density (g/cm^3) (as supplied)	≥ 3.13	≥ 5.05
UV resistance	very good, practically no transmission loss measurable after long-term radiation exposure	very low, non-visible (< 1%) transmission loss after long-term radiation exposure

5 Radiation-shielding glass

Supplied sizes and lead equivalents (mm Pb)					
	Tube voltage (kV)				
Glass thickness (mm)	80	110	200	Max. fixed sizes (mm) (L x W)	Max. weight per m^2/kg
5.75 – 6.25	0.5	0.5	0.5	2,400 x 1,700	31
5.0 – 7.0	1.5	1.5	1.4	2,400 x 1,100	35
5.0 – 6.5	1.7	1.7	1.6	2,000 x 1,000	32
5.0 – 6.5	1.7	1.7	1.6	1,800 x 1,200	32
7.0 – 9.0	2.1	2.1	2.0	2,400 x 1,100	44
7.0 – 8.5	2.3	2.3	2.1	2,730 x 1,350	42
8.5 – 10.5	2.5	2.5	2.4	2,400 x 1,100	52
8.5 – 10.0	2.8	2.8	2.7	2,100 x 1,200	49
10.0 – 12.0	3.1	3.0	2.9	2,000 x 1,000	59
10.0 – 12.0	3.3	3.3	3.2	2,000 x 1,000	59
11.5 – 14.0	3.5	3.5	3.3	2,000 x 1,000	69
11.0 – 13.0	3.6	3.6	3.4	2,400 x 1,200	64
16.0 – 19.0	-	4.9	4.6	1,500 x 800	94
20.0 – 23.0	-	6.1	5.8	1,500 x 800	113

Please note:
Radiation-shielding glass surfaces are sensitive to scratches, acids and alkalis. For this reason, they should never be exposed to acidic air, moisture and wide temperature fluctuations in conjunction with moisture.
Radiation-shielding glass is only suitable for interior applications!

Installation guidance:
Only use sealants containing no acids or alkaline substances (e.g. acetic acid, ammonia) during installation. Adhesive labels may cause discoloration due to the reaction of the adhesive with the glass surface.

Only remove the protective film from the RD 50 radiation-shielding glass immediately prior to installation. Do not use any sharp objects to remove it!

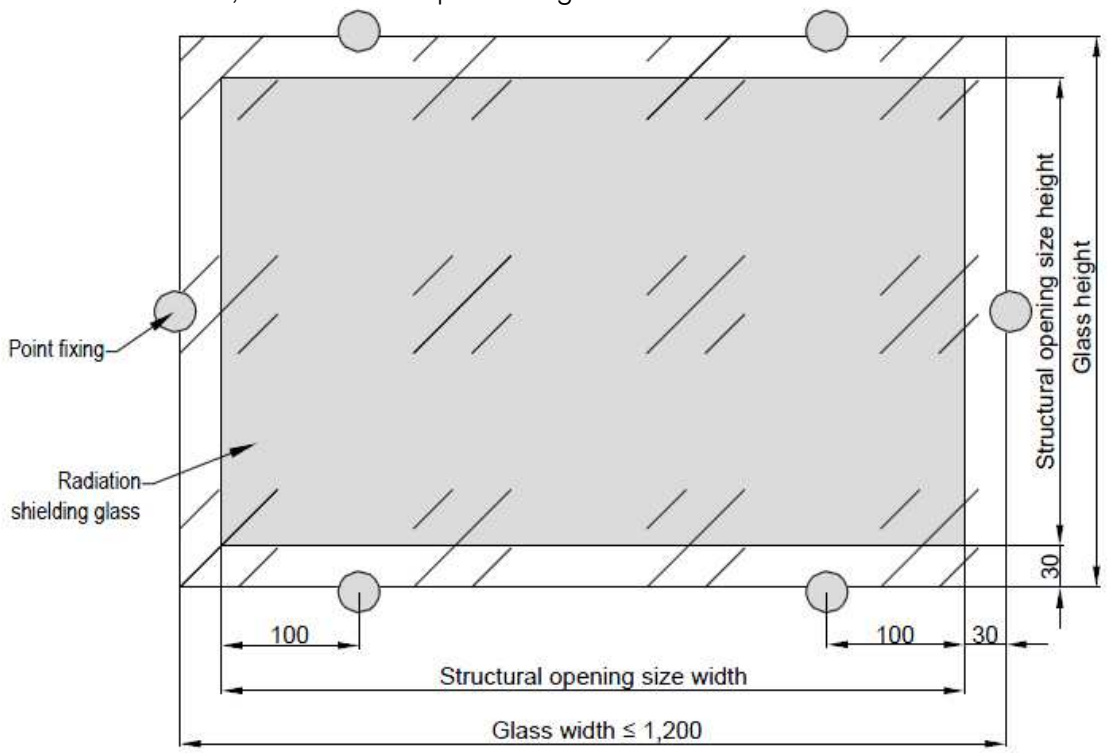
Cleaning guidance:
Use only water, mild cleaning agents and a soft cloth. Wipe the glass dry after cleaning. This will prolong its service life.

Disinfection guidance:
Radiation-shielding glass can be disinfected with standard proprietary disinfectants. A prior trial application of the disinfectant at an inconspicuous location is still recommended. Disinfection by UV radiation is also possible.

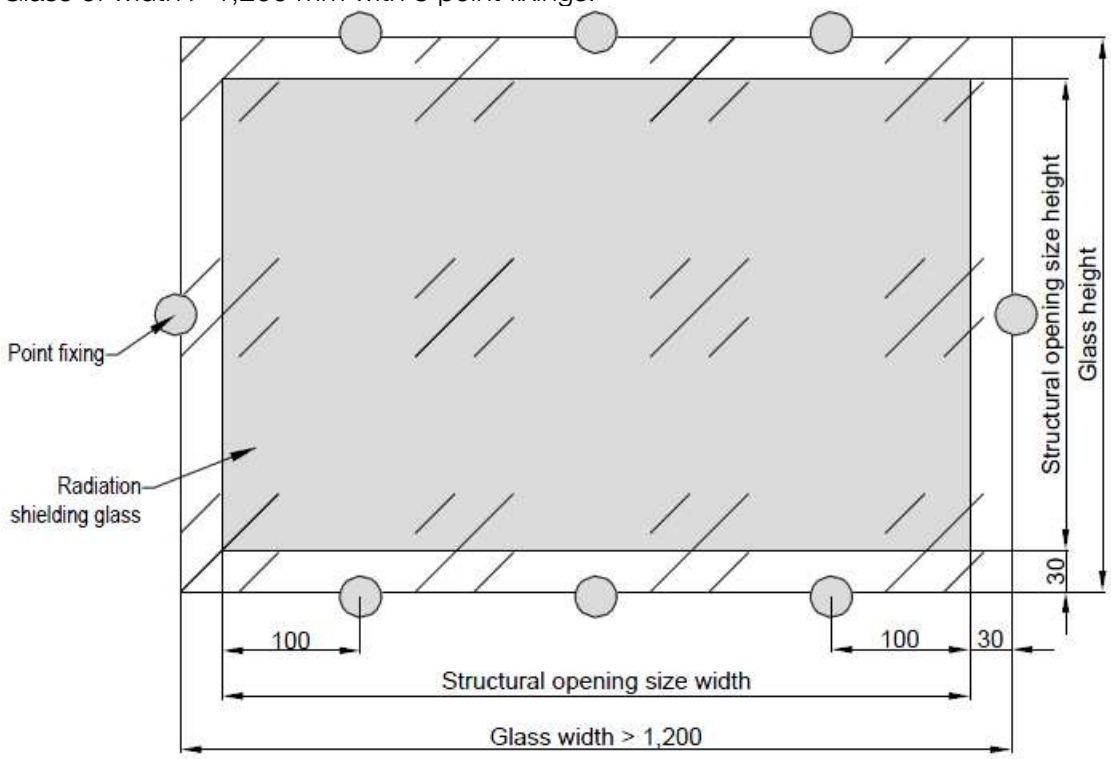
6 Speak-through opening with radiation-shielding glass

Radiation-shielding glass with point fixings, as speak-through model.

Glass of width ≤ 1,200 mm with 6 point fixings:

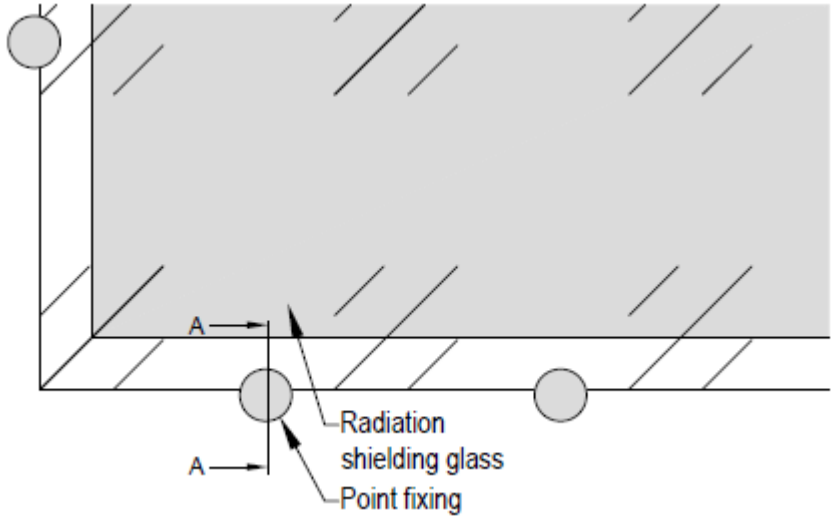


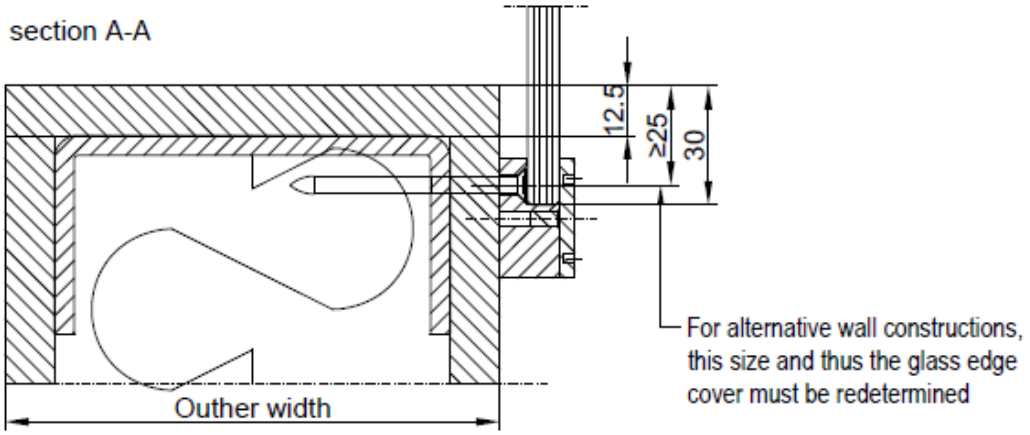
Glass of width > 1,200 mm with 8 point fixings:

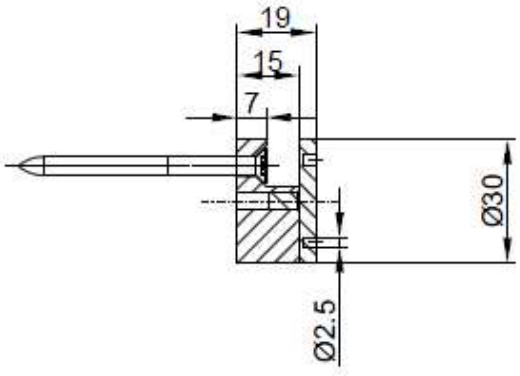


6 Speak-through opening with radiation-shielding glass

A section of the speak-through opening is shown:







Point fixing

The point fixing is used to attach the glass plane without the glass having to be processed.
Scope of delivery: Point fixing, wood screw 4.5 x 60 mm

Item no.	
Material	aluminium
Material thickness	19 mm
Diameter	30 mm
Glass thickness	8.00 mm
Weight	0.085 kg/unit
Packaging	loose
Billing unit	1 pcs.

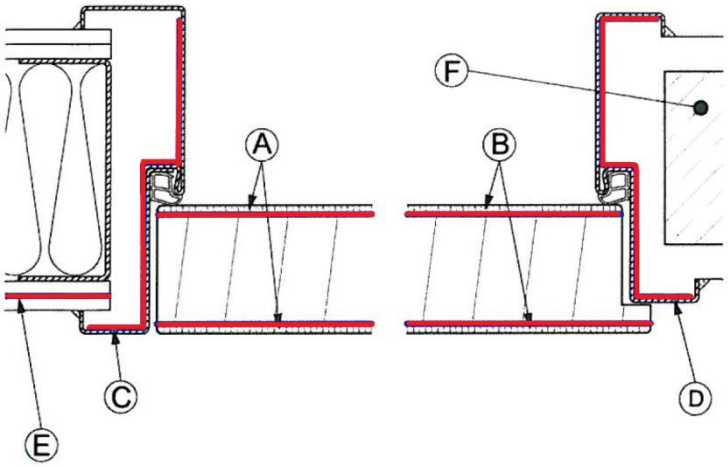
7 Radiation-shielding doorsets

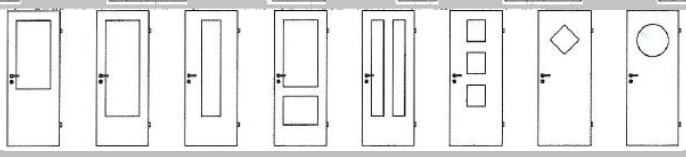
Radiation-shielding requirement	Under DIN 6834, radiation-shielding doors are required to protect against electron, X-ray and gamma radiation. They are typically used in medical treatment rooms (in medical practices, hospitals etc.).
Properties	Lead inlays in the cross-banding of door leaves and on the inner side of steel frames achieve a reduction in radiation and are sized according to the radiation intensity. The thickness of the lead inlay (mm) dictates the lead equivalent (attenuation ratio to DIN EN 61331-1) and is expressed in Pb + mm (Pb = plumb, Latin for “lead”). For door leaves, the standard allows the lead equivalent to be divided into two components and distributed symmetrically between the two cross-bands. Example: A lead equivalent of Pb = 1.0 mm is divided into 2 x 0.5 mm. Example of radiation-shielding plan for diagnostic systems: The required lead equivalent is dictated by the radiation intensity of the equipment installed in the room. The lead equivalent is normally specified by the equipment manufacturer as part of a radiation-shielding plan, with due allowance also made for the adjoining building elements (walls, ceilings, floor). The required lead equivalent may, for example, run to Pb 0.7 mm – in which case it would have to be rounded up to the available lead equivalent of Pb 1.0 mm. Available lead equivalents: The use of “thin” lead sheet allows provision of a 0.5 mm lead equivalent as the lowest value for radiation shielding. The next highest lead equivalents are 1.0, 1.5, 2.0 and 3.0 mm. Higher lead equivalents are also possible subject to technical co-ordination. In terms of the door design, care must also be taken to ensure shielding against obliquely incident radiation. Under DIN 6834-1, the gap between bottom door edge and finished-floor level may not exceed 10 mm. Unlike fire and smoke doors, radiation-shielding doors require no testing. Any door can, in principle, be converted into a radiation-shielding door if it is appropriately fitted with lead sheet.

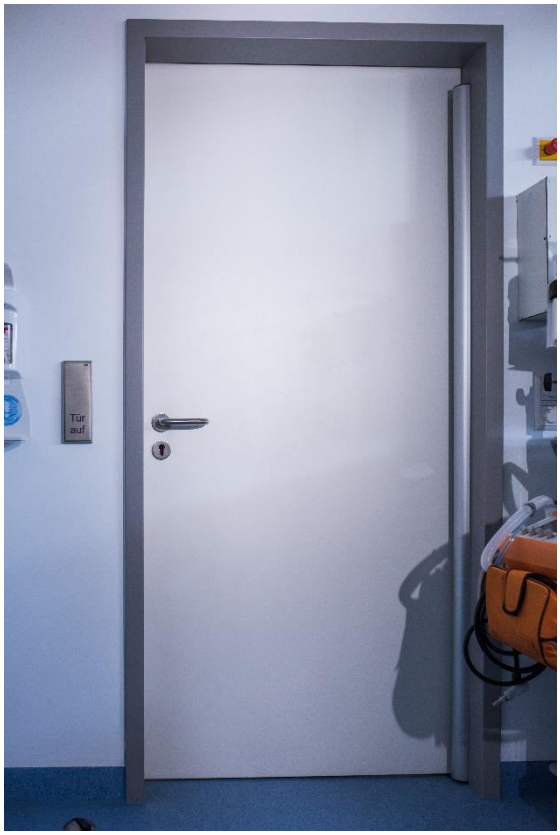
7 Radiation-shielding doorsets

Radiation-shielding door assembly:

A. Square-edge door leaf
B. Rebated door leaf
C. Steel frame
D. Full lead lining
E. Lead in plasterboard partition
F. Solid wall



Design options	
Glass cut-outs	



7 Radiation-shielding doorsets

Radiation-shielding doors – stock doors						
Technical data						
Size of wall opening dimensions [mm] (nominal size)	Width	635	760	885	1,010	1,260
	Height	2,010				
	Width	635	760	885	1,010	1,260
	Height	2,130				
	Recommended max. size 1,260 mm x 2,130 mm Larger sizes are possible in line with the requirements for the door leaf. If needed, please send appropriate enquiry.					
Door leaf finish	both sides with Resopal HPL, colour Pearl White					
Door leaf thickness	wood, approx. 49 mm thick, 1-leaf					
Door blank	tubular chipboard core					
Internal assembly	HDF cross-banding, hardwood lipping					
Construction	1-leaf, left-hand and right-hand (as DIN definition)					
Lead inlay	incl. lead inlay 2 x 1.0 mm = lead equivalent 2.0 Pb					
Rebating	rebated, 13 x 25.5 mm					
Edge construction	painted to match to surface colour					
Lock 	Standard lock, prepared for profile cylinder, with latch lever, single-turn Galvanised lockcase Nickel-plated latch/bolt With 8 mm follower Spindle on hinge side 40 mm, incl. 20 x 235 mm stainless-steel forend Under DIN 6834, profile cylinder locks to DIN 18251 may only be used for up to a max. lead equivalent of Pb = 2.0 mm due to the “continuous drillings” for handle hole and keyhole. For Pb values exceeding 2.0 mm, the lock must be divided into two parts to ensure the required radiation shielding, thus requiring two-part lever handles and two-part profile cylinder locks.					
Hinges 	VX 160 3 D, stainless steel up to 1,010 mm structural opening size 2 hinges up to 1,260 mm structural opening size 3 hinges Door hinges must be adequately sized to ensure long-term accommodation of the heavy doors and high leverage forces (particularly acting on the upper door hinge). 3D hinge assemblies with suitably stable hinges are used for this purpose.					

7 Radiation-shielding doorsets

Lever handle height	1,050 mm
Lever handle 	Prepared for double-side stainless-steel lever handle/lever handle or lever handle/knob with round rose. Given the high door weights and accordingly extreme mechanical loads acting on the handle furniture, we use high-grade, fixed-rotatably-mounted contract handle furniture.
Door closer	Given the heavy weight of radiation-shielding doors, the controlled closing action offered by a door closer is recommended.

Sized examples for single-leaf door frames

	Width [mm]					Height [mm]	
Wall opening dimensions (BÖM)	635	760	885	1,010	1,260	2,010	2,135
Basic dimensions (BRM)	625	750	875	1,000	1,250	2,000	2,125
Frame rebate dimension (ZFM)	591	716	841	966	1,216	1,983	2,108
External size of rebated door leaf	610	735	860	985	1235	1,985	2,110
External size of square-edge door leaf	584	709	834	959	1,209	1,972	2,097

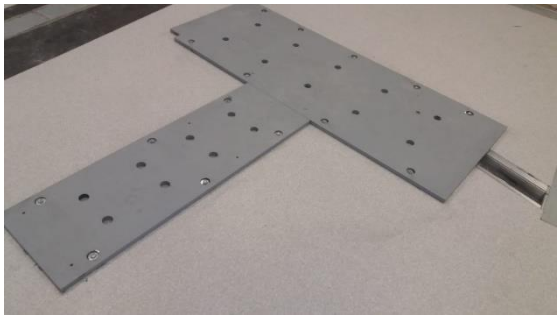
Weight	Radiation-shielding doors are manufactured with lead equivalents of 0.5 mm and upwards. For a lead equivalent of Pb = 1.0 mm, the door weight increases by approx. 13 kg/m². Example: A contract door with a solid chipboard core has a weight of approx. 24 kg/m². For a lead equivalent of 1.0 mm, the weight increases to around 37 kg/m², which means that a door leaf for a Basic dimension of 1,000 x 2,000 mm would weigh approx. 74 kg.
Steel frames	Steel frames for radiation-shielding doors are manufactured with the required lead protection incorporated. This includes a lead sheet lining to the rear side of the frame face (on the rebated side). Steel frames are also suitable for extremely heavy doors. Steel frames with 2.0 mm sheet thicknesses are manufactured to accommodate higher loads.
Sound reduction R_w	Varying sound-reduction values are achievable depending on the doorset design.

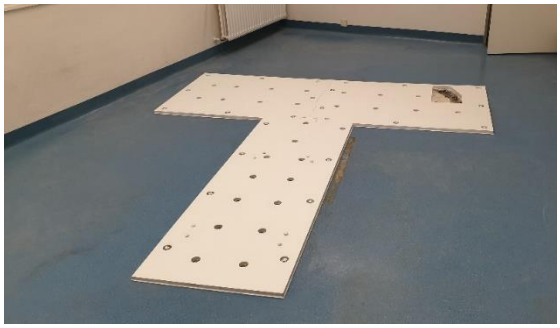
IV Contents for floor systems

1 Steel plates – on finished floor
2 Steel plates – on structural floor
3 Steel plates – for raised floors
4 Cast resin floors
5 Special solutions
6 Floor trunking systems

1 Steel plates – on finished floor

Floor plate for direct fixing to existing concrete/screed:

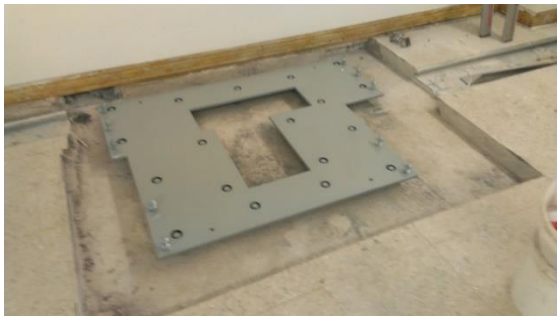




Floor plate made from 15/20/25 mm; sheet steel, connected as unit;
assembly primed in specified colour;
openings and thread holes as drawing;
fixing and adjustment using threaded bolts and sleeves.

2 Steel plates – on structural floor

Floor frame with supporting structure for bonded screed or floating screed:



Floor plate made from 15/20/25 mm; sheet steel
setting out of equipment in accordance with manufacturer's drawing;
openings and thread holes as drawing;
fixing and adjustment using threaded bolts and sleeves;
assembly primed in specified colour.

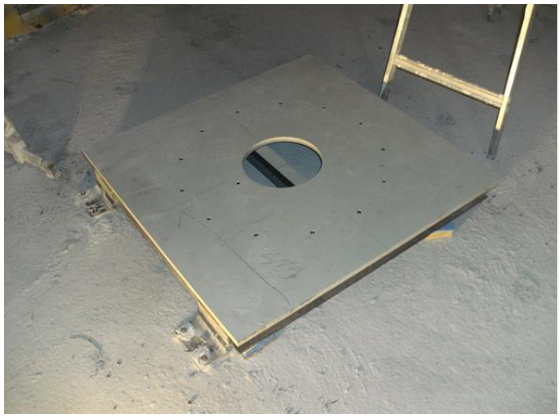
2-part floorplate

Floor plate with plastics plate for screed termination

Floor plate already cast in screed

2 Steel plates – on structural floor

Floor plate with frame



Floorplate fixed with feet brackets

2-part floorplate

Floor plate on load-spreading supporting structure

3 Steel plates – for raised floors

Floor frame as drawing for raised floor assembly:

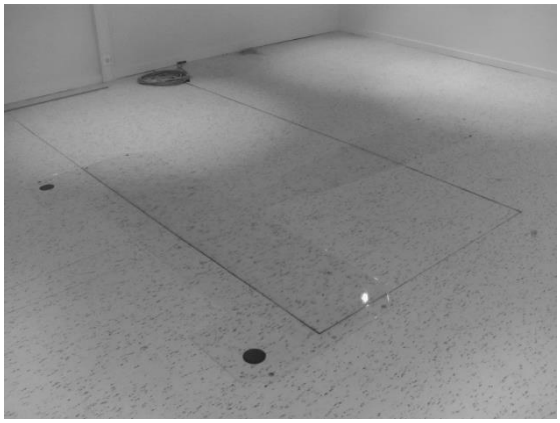
Floor plate made from 15/20/25 mm; sheet steel, connected as unit;
assembly primed;
openings and thread holes as drawing;
fixing and adjustment using threaded bolts;
additionally, secured by welded-on steel brackets,
incl. fixings.

For 50 mm installation height – unlimited adjustment in line with raised floor.

Optional:
supports for raised floor panels
support angles screwed to side of channel section.

4 Cast resin floors

Cast resin floors



Direct fixing to existing screed or finished floor.

Material: special synthetic resin mix
Thickness: 3.0 – 10 mm
Requirement: 12 – 16 l
Flatness tolerance: 0.5 mm/m
Colour: crystal clear
Non-conductive
Odourless

If the finished floor is already laid, the outline of the equipment footprint can be cut out of the floor and filled with cast resin to produce a flush base for installation.

With floating screeds, core drillings (d = 80 – 150 mm) are performed at the equipment pressure points or at the fixing points.

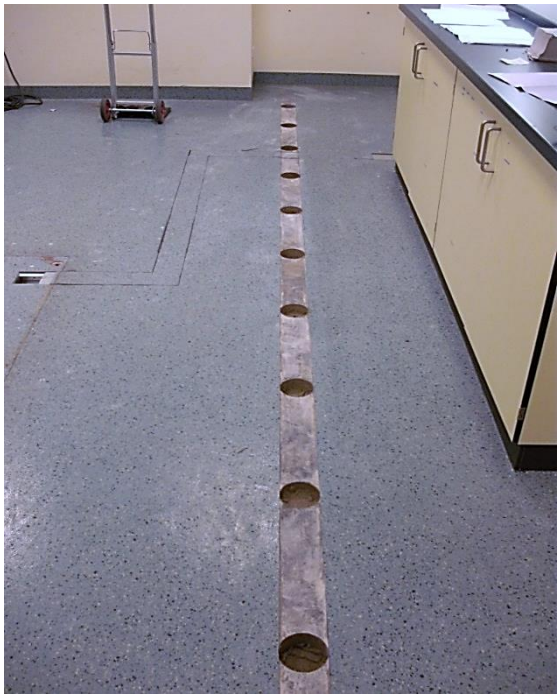
The drillings are then cleaned and filled with a cast resin mix up to the top face of the screed.

Cast resin is then poured over the entire surface.

The surface achieves full resistance to mechanical loads after 24 hours!

5 Special solutions

Installation of floor equipment rail:



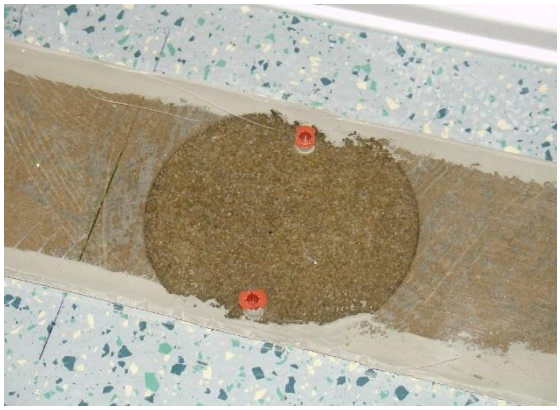
Cast resin offers a useful means of delivering quick special solutions.

With a resin cure time of 24 hours, the installation works for the following trades can proceed after only a short waiting period.

This method has been very successfully implemented by us on a number of projects.

Material: special synthetic resin mix
Thickness: 3.0 – 10 mm
Requirement: 12 – 16 l
Flatness tolerance: 0.5 mm/m
Colour: crystal clear
Non-conductive

To install an equipment rail, the flooring is neatly removed first. Core drillings are then performed at the required centre-to-centre distances for secure fixing of the rail.



The drill hole is then filled with a silica sand/cast resin mix.

5 Special solutions

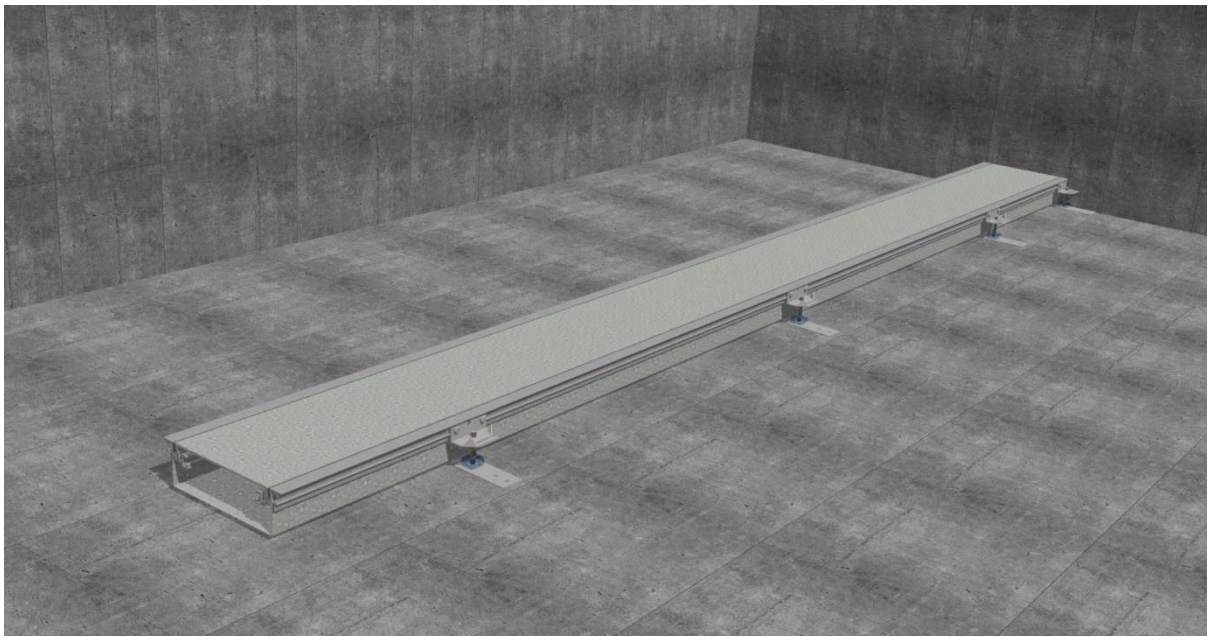
Here, the cut-out floor has already been filled with crystal-clear cast resin.

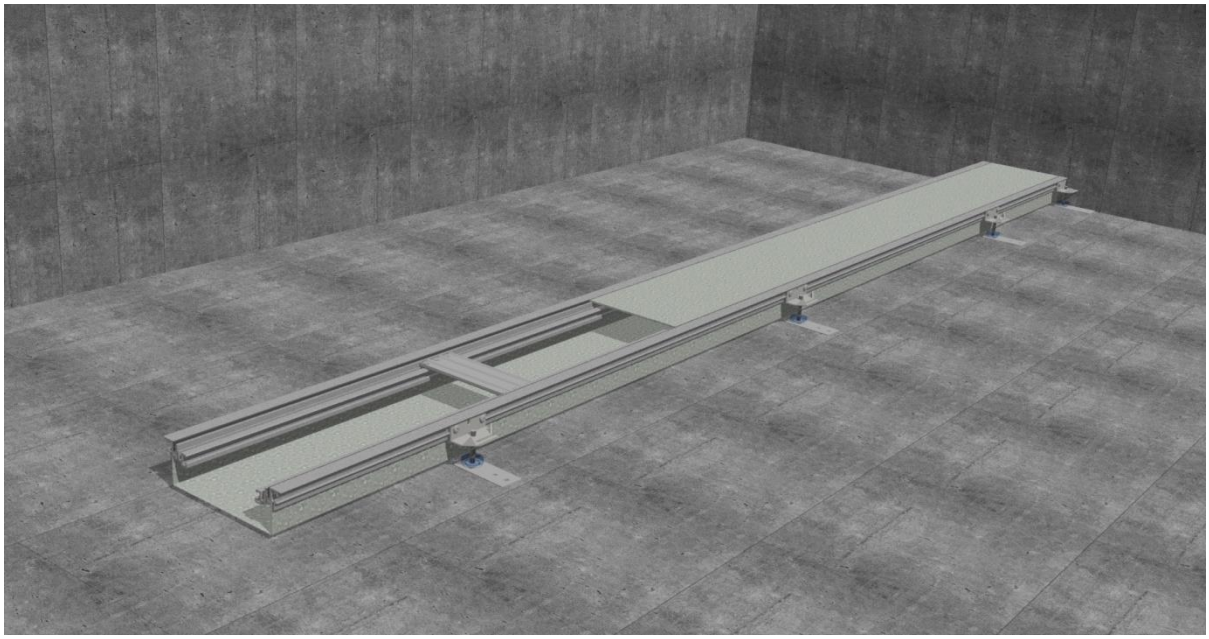
Installation of equipment rail

With this system, we can guarantee installation of the equipment rail within a very short time and, most importantly, in a perfectly level position.

6 Floor trunking systems

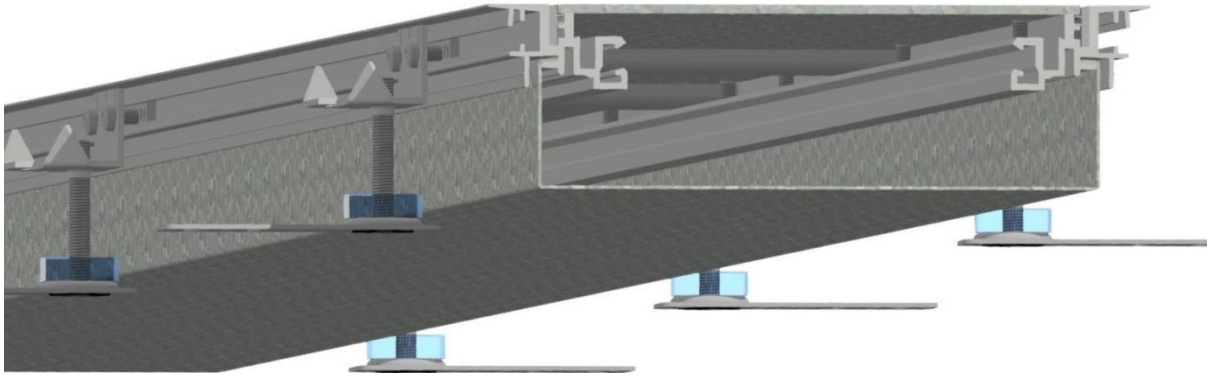
Systems flush with screed

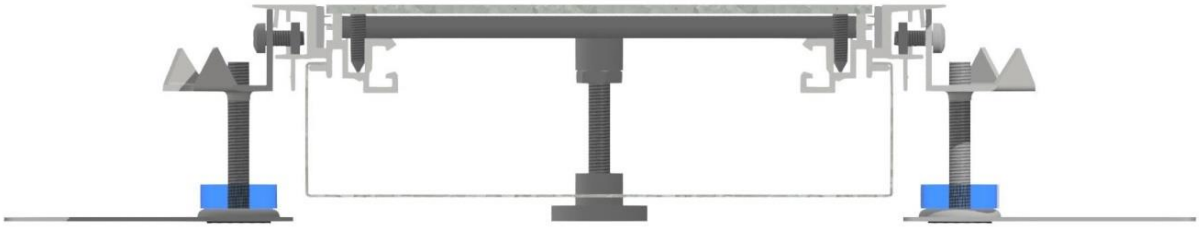




6 Floor trunking systems

Cable trunking with underfloor tray





A centre pedestal is required for trunking widths from 400 mm and upwards.

Product features:

- Flush with screed, open, with underfloor tray, to DIN VDE 0634 Part 2;
  the trunking system with the enclosed underfloor tray offers maximum safety for EMC (electromagnetic compatibility) wiring and meets the requirement for all-side cable protection by means of an enclosed system
- Suitable for wet- and dry-cleaned floors
- The trunking units are fitted with invertible blind covers made from 3 mm galvanised sheet steel
- Simple draw-in provision for cables
- 200 mm and 300 mm trunking widths are standard
- 60 – 100 mm levelling height
- Stock 90° angle and tee fittings

6 Floor trunking systems

Parts schedule for 2.4 m length:

- The trunking is supplied in 2,400 mm long ready-to-install units.
- Bottom trunking profile made from 1 mm hot-dip galvanised sheet steel, 2 side profiles and 2 floor-abutting profiles (installed flush or 3 mm proud), length: 2,400 mm
- 6 fixing angles for levelling and connection of trunking units
- 3 cover joint seals as underlay and seal at cover junctions without additional pedestal (up to 300 mm)
- 3 blind covers made from 3 mm hot-dip galvanised sheet steel, standard model with aluminium side profiles screwed on

General guidance:

- The following profile presents some basic guidance to be observed prior to and during installation of the trunking system.
- The trunking is normally installed on the structural floor.
- Where floor trays are used, these must be properly packed below with screed/concrete to prevent deformation.
- The levelling units for the trunking and any components supporting the cover joints must always be carried down to the structural floor.
- Compliance with DIN standards is mandatory:
  The system components are to be included in the earthing measures under DIN VDE 0100.

  The standard applicable to date, DIN VDE 0634 Part 2, specified a point load of 1.5 kN (equivalent to approx. 150 kg) for underfloor installations installed flush with the screed. This standard made no provision for heavy-duty requirements.

  In future, the systems will be governed by standard DIN EN 50085-2-2. This provides for two load classes, one for standard applications and one covering heavy-duty requirements.
  Under (DIN) EN 50085-2-2, the tests for the two loads are performed as follows:
  with a (1 cm^2) stamp for standard applications, as specified in 6.102, and with a (130 mm dia.) plate for high loads, as specified in 6.103.

6 Floor trunking systems

Tests	Class	Load classification to EN 50085-2-2
Standard application	6.102.1	500 N
	6.102.2	750 N
	6.102.3	1,000 N
	6.102.4	1,500 N
	6.102.5	2,000 N
	6.102.6	2,500 N
	6.102.7	3,000 N
Tests	Class	Load classification to EN 50085-2-2
Heavy-duty loading	6.103.1	2,000 N
	6.103.2	3,000 N
	6.103.3	5,000 N
	6.103.4	10,000 N
	6.103.5	15,000 N

The last-named application has no relevance for our system!

Load capacity of installation systems (live loads):
Electrical installation systems must comply with standard (DIN) EN 50085-2-2.
In the sense of the standard, electrical trunking systems are required to exhibit adequate mechanical strength.

Underfloor electrical trunking systems are subject to live loads that they must resist in the installed condition while maintaining their function. At the same time, the loads that normally occur during service may vary in type: from simple walking-over by persons and office furniture legs to the loads imposed by vehicles and other means of transport.

The loads imposed on floors (slab constructions) – and thus also on the trunking systems installed on them – act directly. The weight of the loads exerts a force on the base extending over a certain area. If forces are considered as acting over a certain area of the base, then these may be described as “live loads”, which are normally specified with the unit kN/m^2.
Live loads acting on slab constructions, floor assemblies, system floors etc. are defined as follows:

Live load = load/equipment footprint

By contrast, if only the weight of an individual component and its action on the contact area with the base is considered, then this is described as a “point load”.

6 Floor trunking systems

Live loads and point loads must always be considered separately. A hospital bed can serve as an example to illustrate this:
A hospital bed with patient has a weight of 300 kg. Given an axle spacing of 2.2 m and a wheel spacing of 1.0 m, the loads are calculated as follows:

Load = weight x 9.81 m/s² = 300 kg x 9.81 m/s² = 2,943 kN
Footprint = axle spacing x wheel spacing = 2.2 m x 1.0 m = 2.2 m²
Live load = 2.943 kN / 2.2 m² = 1.337 kN/m²

The weight of the hospital bed is transmitted to the base via four wheels. The point load therefore totals 75 kg or 0.735 kN.

In assessing the load capacity of trunking systems, only the action of point loads should be considered.

The load capacity for components mounted flushfloor totals 2.0 kN. Slight deflection is permissible.

General guidance:
Protection
Protective measures must be co-ordinated with the screed layer.

No loading
The trunking system must not be walked over or mechanically loaded until the screed has fully cured.

Protective cover
Protective covers for installation openings must only be removed immediately prior to floor laying.

For heavy-duty applications, due consideration must be given during the design, selection and ordering phase to relevant special solutions.

Other guidance
Prior to laying, it is essential to ensure observance of the installation guidance for screed layers and flooring fitters, and to forward this guidance to the relevant tradespersons.

Caution!

The trunking system must not be walked over or exposed to any other inadmissible loads during installation (i.e. without bedding in the screed). Suitable precautionary measures must be taken by others!

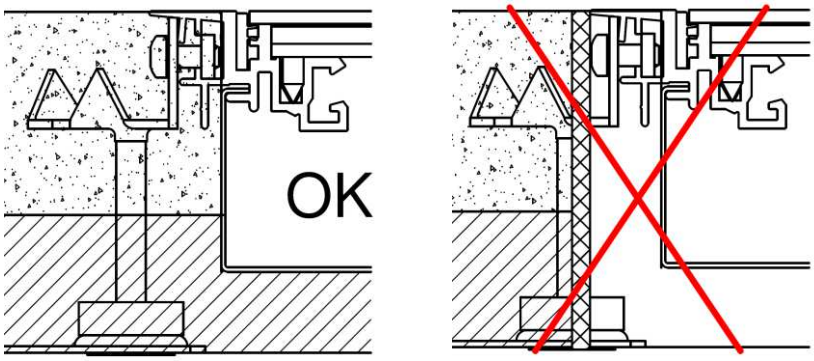
6 Floor trunking systems

Screed types

The trunking systems are essentially suitable for installation in all screed types to DIN 18560: self-levelling, floating and bonded screeds. In conjunction with some screed types (aggressive screeds, such as magnesite or mastic asphalt screeds), all metal parts (side walls, levelling units and underside of aluminium profile) must receive a chloride- and alkali-free bitumen coat or another suitable barrier provided to protect against corrosion (VOB (German Construction Contract Procedures) Part C).

Notes:

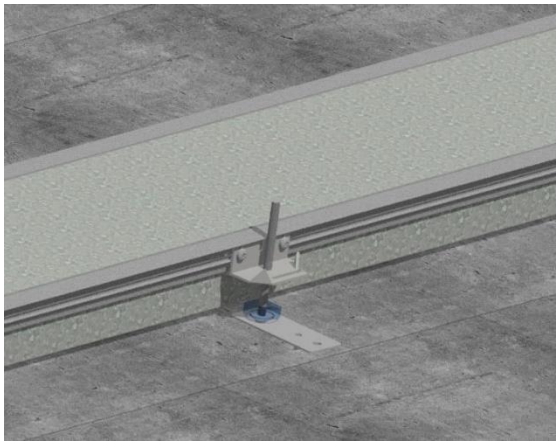
- In conjunction with self-levelling screeds, suitable measures are required to seal all openings in the trunking.
- Where the trunking system is installed in conjunction with mastic asphalt, an approx. 15 – 20 mm wide protective strip must be incorporated by others in order to prevent direct heat transmission and the consequent deformation of the aluminium profile! This insulating strip must be removed after the mastic asphalt has fully cured. The resulting gap between aluminium side profile and mastic asphalt surface must be filled by suitable means. These works require early co-ordination with the screed layer.
- The aluminium side profile must not be covered over by insulating strip as the live loads can only be accommodated through a direct connection with the laid screed.



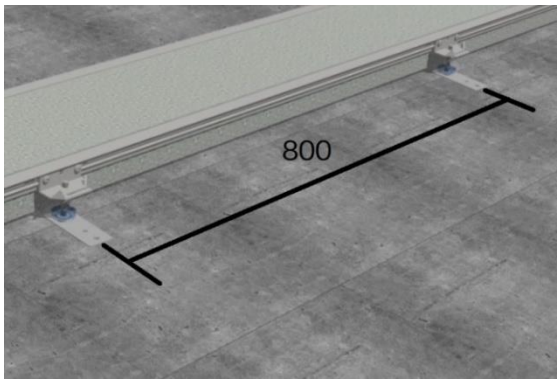
Expansion pressure from screed slab: The screed may expand during curing and thereby exert pressure on the trunking. Any such expansion depends on the size of the screed slab and composition of the screed. At the recommendation of screed contractors, we offer a tight-fitting, self-adhesive sponge rubber strip that is fitted to the top part of the profile in order to reduce the expansion pressure exerted by the screed slab on the trunking. The decision as to its use must be taken in consultation with the screed layer.

6 Floor trunking systems

The exact position of the trunking is set out and suitably marked in accordance with the layout drawing.
The positions of the trunking branch fittings are likewise marked out on the structural slab.
The effective levelling heights must be checked on the structural slab.

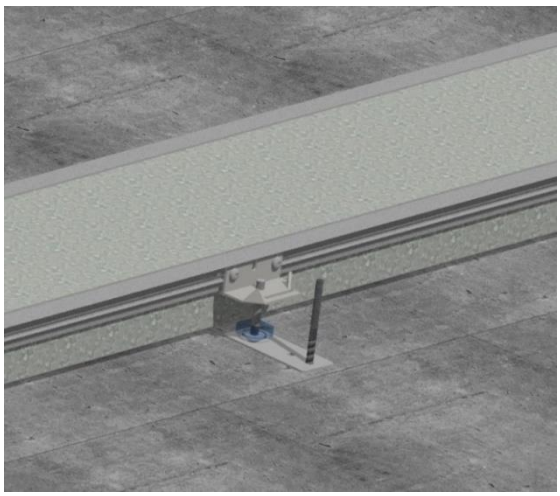


When joining up the trunking units, care must be taken to ensure that the connections are properly formed so that no gaps are left. The brackets with M8 levelling units supplied with a product are fitted to the side profile of the trunking units and roughly adjusted to the specified screed height.



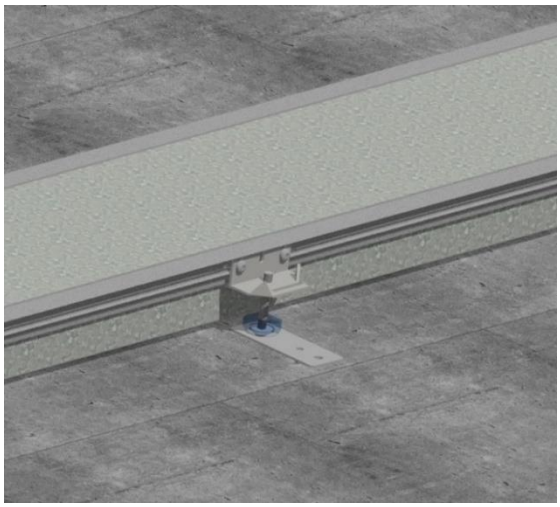
The levelling clamps should be spaced at 800 mm along the trunking side profile. At the junctions between trunking components, they are mounted so as to “overlap”. This additionally secures the trunking joints while also ensuring a continuous, electrically conductive connection of the trunking system.

6 Floor trunking systems



The properly aligned and roughly levelled trunking profile is fixed to the structural slab by fastening down the retaining tabs with nail plugs.

The levelling units should first be fixed at the trunking joints, then subsequently also in the intermediate areas.

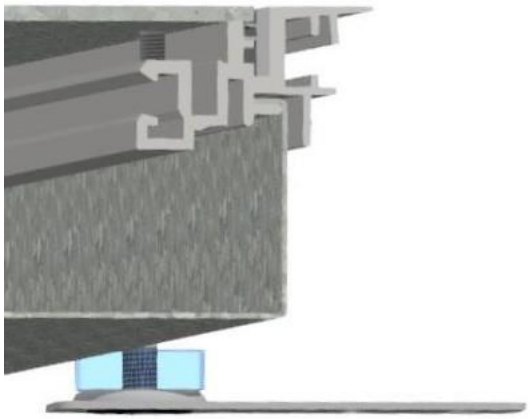


The fixed and aligned trunking units can then be fine-adjusted to the required height using the levelling units.

Prior to screed laying, any set screws projecting beyond the top face of the trunking shall be trimmed (so that they are at least 5 mm below screed height).

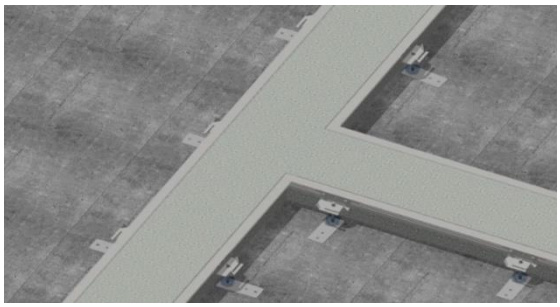
This step must be precisely co-ordinated with the screed layer.

After levelling, the trunking system must not be exposed to any further loads.



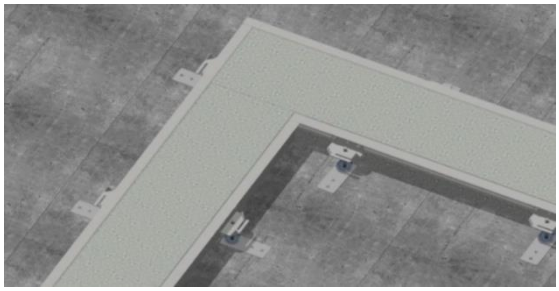
In the supplied state, the PVC floor-abutting profiles are installed flush to allow the screed to be struck off above the trunking.

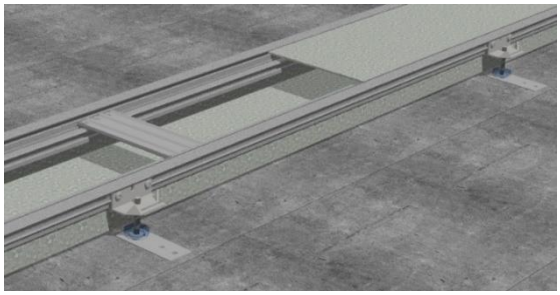
6 Floor trunking systems



Tee and cross-branch fittings are factory-preassembled prior to delivery. As with modular components, they are then fitted to the standard trunking on site.

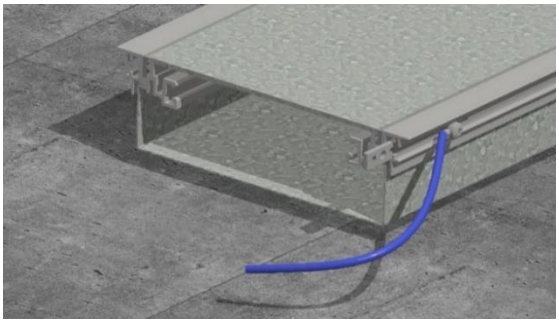
All fittings are supplied with factory-preassembled levelling clamps.





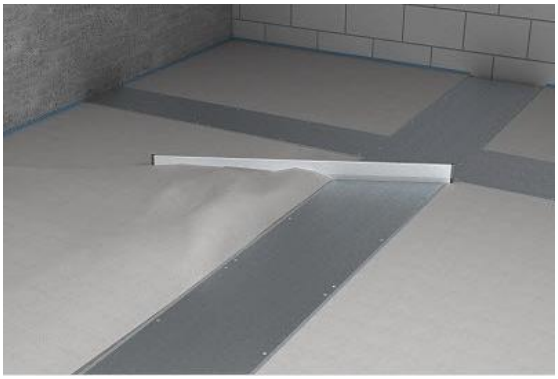
All cover joints need to be supported by a truss. For trunking with nominal size 300 and upwards, additional cover supports are provided between the end joints. The centre-to-centre distance between cross-pieces must be uniform.

6 Floor trunking systems



All metal parts of the trunking system must be included in a system to protect against indirect contact with live electrical components and must therefore be provided with a suitable means of attaching connection lugs for the circuit protective conductor.

This is achieved by fitting the circuit protective conductor connection lug in the C profile of the aluminium side profiles and connecting it to the relevant circuit protective conductor. With regard to the trunking, an additional connection with a minimum cable cross-section of 2,5 mm^2 must be provided between the aluminium profile and the underfloor tray as well as between the individual floor trays.



Important notes:

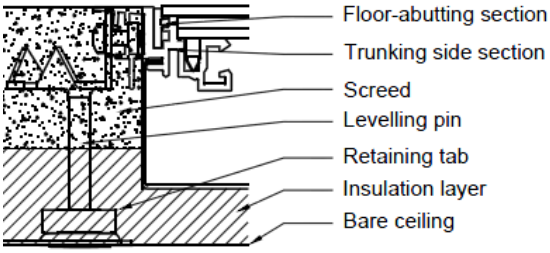
- The screed should be laid immediately after installation of the trunking system.
- The screed layer is required to ensure solid packing below the side profiles and to take care to form a proper, neat junction with the trunking.
- No edge insulating strip may be placed against the side profile!
- The trunking may not be loaded until the screed has fully cured.

The aluminium profile of the trunking system may not be positioned directly by the side of a wall. Depending on screed type and properties, a minimum distance of 100 mm must be maintained.

Consultation with the screed layer is required in case of any divergent requirements.

After levelling in line with the design screed height, the trunking system and floor junction boxes may not be loaded until the design screed strength has been achieved!

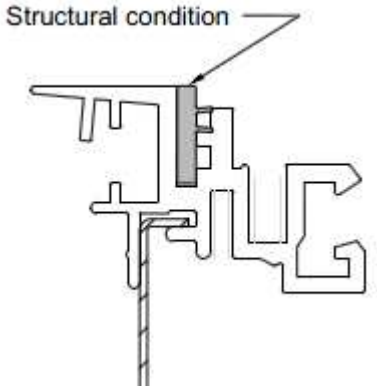
6 Floor trunking systems

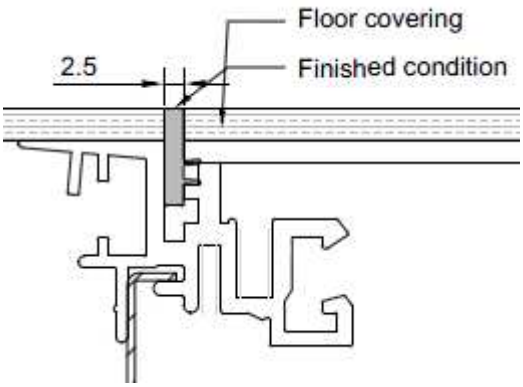


The floor-abutting profiles serve to protect the cut edges of the adjoining floor and indicate the layout of the trunking in the floor. For installation of the finished flooring, the profile can simply be rotated by 180° around its longitudinal axis and fitted (proud). It is formed so that the required clearance for the cover is guaranteed in finished condition.

When fitted proud, the floor-abutting profile has a height of 3 mm and a visible edge of 2,5 mm!

However, a decision is always required in each particular case as to whether the floor covering is to be laid continuously or whether the flooring-abutting profile is to be incorporated! The profile is supplied ready fitted by us and must be left in place! (Repositioning only later by the floor layer.)





To allow removal of the screwed-down cover for the later drawing-in of wiring/cables, care shall be taken when fitting the floor covering to the cover to ensure that the covering material is secured, for example, with double-sided adhesive tape at the cover screw positions. This facilitate access to these screws without damaging the floor covering.

Additional floor trunking options:

- In case of wet-cleaned rigid flooring, a sealing strip should be incorporated lengthwise in the side profile of the trunking. Please contact us for further advice on this subject.
- Partitions can be installed in the trunking to separate cables from each other.
- Lateral sponge rubber strips can be fitted to reduce the expansion pressure from the screed slab.

V Contents for radiation-shielding curtain systems

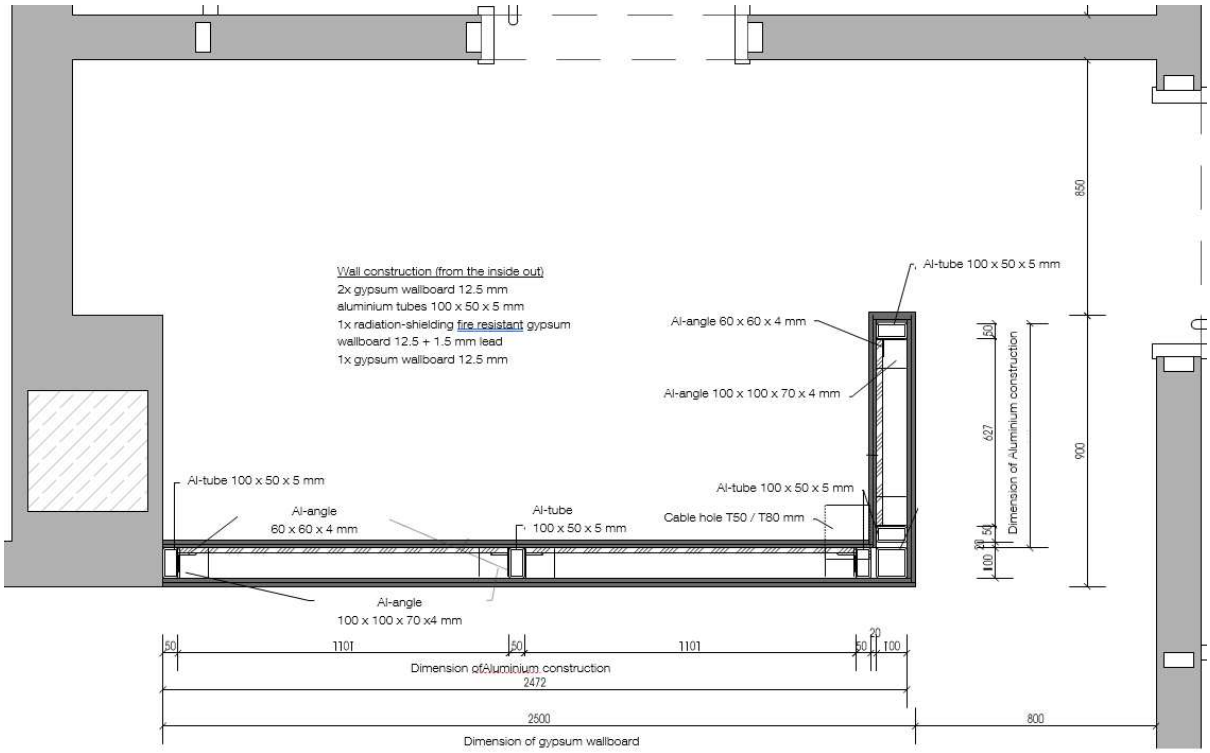
1 Radiation-shielding control booths
2 Vertical blinds
3 Panel blinds

1 Radiation-shielding control booths

Radiation-shielding control booths – mobile and stationary:

Our modular design concept allows us to custom-fabricate a variety of radiation-shielding screens made from wood, plasterboard lining, steel or stainless steel. The radiation-shielding, architectural and functional requirements are factored into the design and construction process. The screens can be assembled as mobile or stationary units.

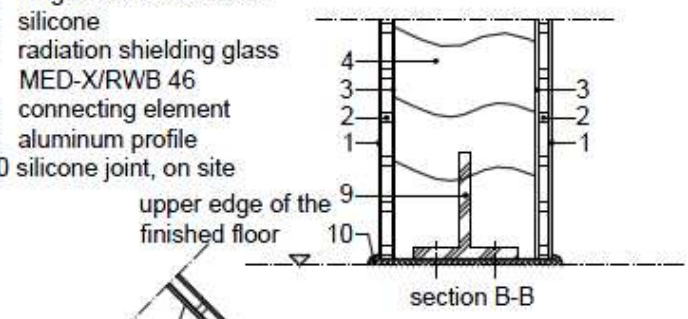
Additional fixtures, such as worktops, glass units, lighting and PC mounts, are also possible.



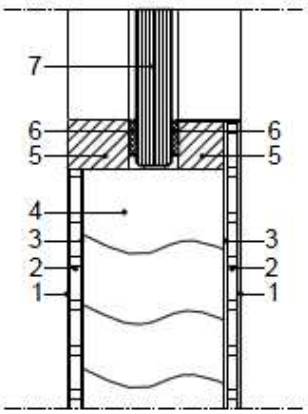
Radiation-shielding screen, as plasterboard model, with 90° angle:

1 Radiation-shielding control booths

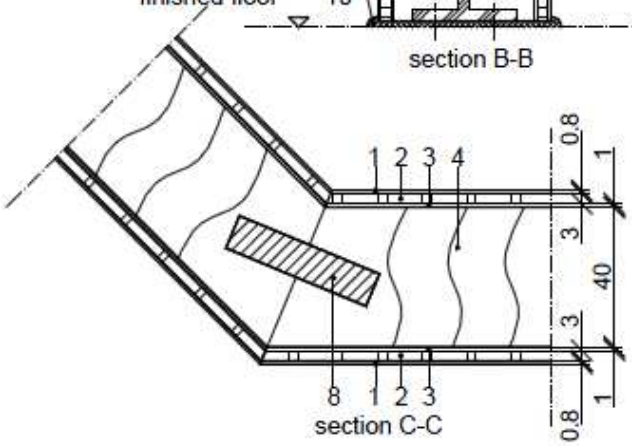
legend:
1 high pressure laminate, white
2 high density fiberboard, beech edge bands, natur
3 sheet thickness 0.5 mm
4 first pass yield, solid core, centre position
5 hinge subconstructions
6 silicone
7 radiation shielding glass MED-X/RWB 46
8 connecting element
9 aluminum profile
10 silicone joint, on site



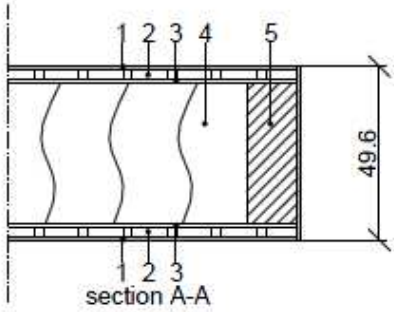
section B-B



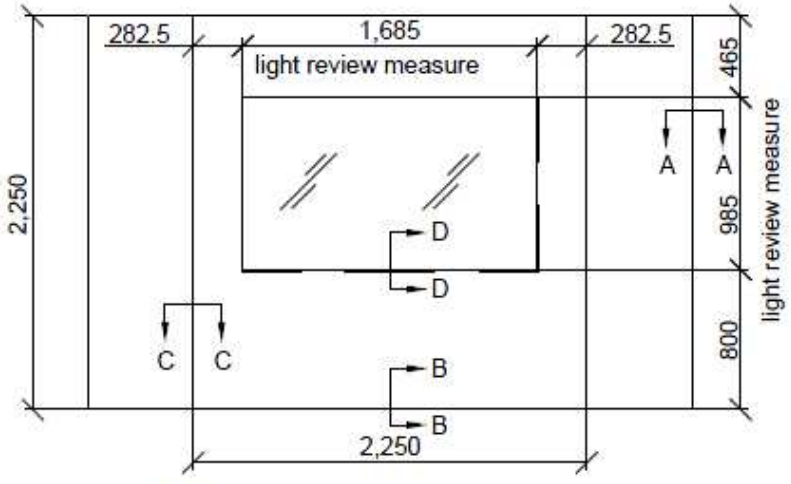
section D-D



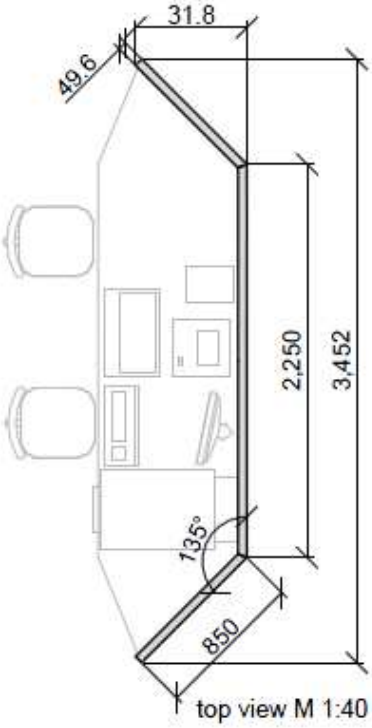
section C-C



section A-A



view M 1:40



top view M 1:40

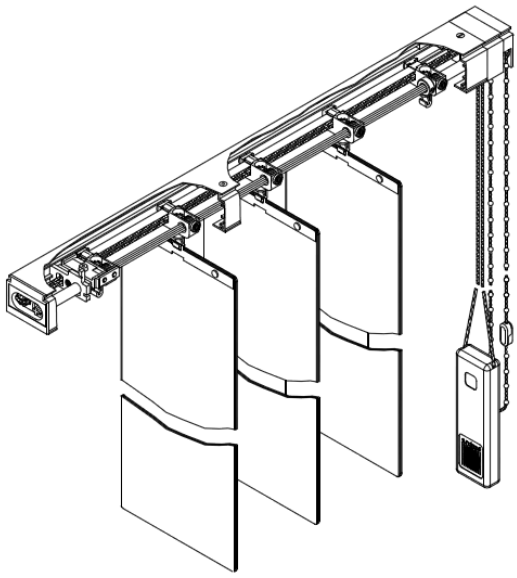
1 Radiation-shielding control booths

Custom-fabrication of radiation-shielding screens – stationary model:

With worktop and movable side panel.

Custom-fabrication of radiation-shielding screens – mobile model:

2 Vertical blinds



Radiation protection-vertical blinds

Our radiation protection vertical blinds are ideal wherever there is radiation protection in the outside area of window systems. The lead slat are supplied in different thicknesses depending on the radiation protection requirements.
Our curtains are characterized by a resilient rail system.
The roller-bearing carriage has a built-in slip clutch and a transparent, high-strength Makrolon hook that can be replaced without removing the running track.

System dimensions		
System height [mm]	max. 2,500	Other dimensions on request
System width [mm]	max. 4,000	

Rail		
Width [mm]	45	
Height [mm]	36.5	
Material	Aluminium	
Colour	white, like RAL 9010 Powder coated	

Slat		
Width [mm]	127 mm	
Material	Plastic-slat with embedded lead insert	
Lead equivalent [mm]	0.5 1.0 1.5 2.0	
Colour	white by default	Other colours on request
	Highly lightfast bactericidal suitable for wet rooms washable	

2 Vertical blinds

Slat package

The package width depends on the number of slats and is determined using the following formula:

$$\frac{\text{system width - 113 mm}}{\text{114 mm}} + 1$$

The slat package can be on the right, left or on both sides. For curtains over 120 kg, only a two-sided package should be used to distribute the loads.

Service

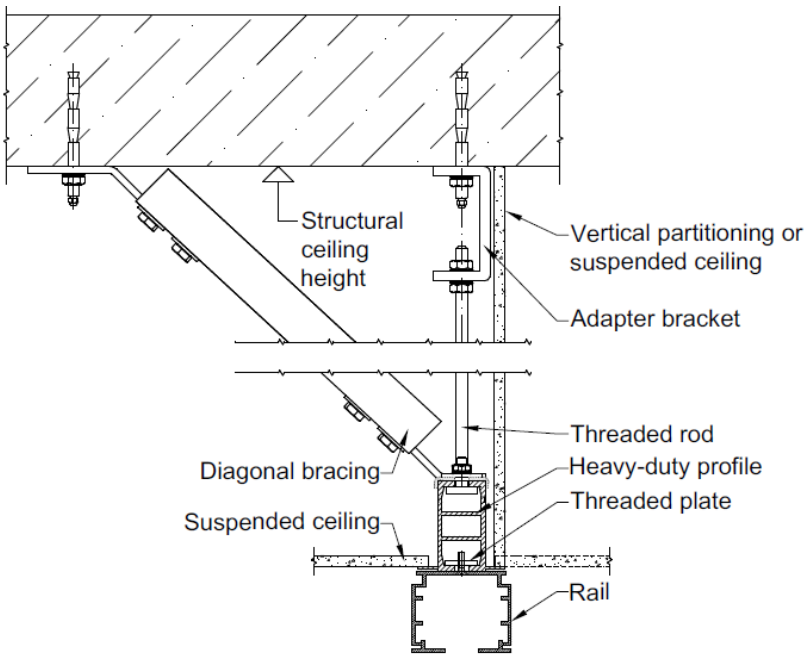
Thanks to an endless plastic bead chain on the side, the slats can be turned (180°) using a reduction gear. The process of the one- or multi-part curtain is done by pulling the cord.
The operation of the cord or the pearl chain can be ordered on the left or right.

Radiation protection

Flawless radiation protection is guaranteed by precise overlap of the closed slats. All adjacent wall sides should overlap with the curtain by at least 100 mm.

Assembly example

The ceiling is installed directly with screw connections through the rail to a suspended ceiling.



2 Vertical blinds

Information required to submit tender for radiation-shielding blind

1. Blind size _____ Width [mm] (= total width/rail length)

   (only complete if known) _____ Height [mm] (= total height incl. rail)

   Only state these sizes with due regard for Points 2.1 to 4.0; additionally complete Points 2.0, 6.2 and, if appropriate, 7.0.

		
2. Mounting position	☐ ceiling	☐ wall
2.1. Mounting option	☐ within window recess	☐ outside window recess
2.2. Other details	_____ recess height [mm] _____ recess width [mm]	
2.3. Distance Left	_____ niche wall/window [mm]	_____ room wall/window [mm]
Right	_____ niche window/wall [mm]	_____ window/room [mm]
	(if adequate distance is available, louvre stack can be parked outside clear window opening)	(if adequate distance is available, louvre stack can be parked outside clear window opening)
3. Windows size	_____ Width [mm]	_____ Width [mm]
(including frame)	_____ Height [mm]	_____ Height [mm]
4. Window position	_____ window/recess at top [mm]	_____ window/ceiling at top [mm]
	_____ window/recess at bottom [mm]	_____ window/floor at bottom [mm]

5. Slat properties

Lead equivalent Pb	Max. slat length [mm]
☐ 0.50	6,800
☐ 1.00	4,080
☐ 1.50	2,820
☐ 2.00	2,040

6. Slat parking position
   ☐ right
   ☐ left

6.1. Control device position
   ☐ right
   ☐ left

7. Additional information — Please separately specify special construction features, e.g. projecting window board, radiators etc., giving position/size differences.

Note:

- For safety reasons, the slats should provide an overlap of 100 mm to the left and right of the window, and over the apron wall at the bottom.
- The slats must terminate at least 10 mm (20 – 30 mm recommended) above the floor or window board to allow the curtain to be drawn and the slats tilted.

3 Panel blinds

Radiation-shielding panel curtains

The panel curtains can be operated manually or electrically. They are designed as sandwich units, the Pb value is up to 3 mm and the louvre length is up to 3.00 m. Easily to clean and disinfect. Also, for integration in X-ray ceilings.