Gebrüder Trox GmbH

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Ceiling Cooling Elements Installation Methods and Mounting Instructions

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Figure 1: Mounting of WK-D-UM

Easy installation reconciles both the functional and the design requirements of a ceiling.

The architect has unrestricted planning options with respect to the room and ceiling design since the chilled ceiling elements are not integral parts of the conventional ceiling.
Items installed in the ceiling, such as air diffusers, lighting fittings and sprinkler systems plus fulfilling acoustic requirements do not pose any problems. The ceiling void remains accessible.

The designer is free to choose from various types of chilled ceiling elements which are most economically suited to his project. The intended ceiling layout determines the capacity of the chilled ceiling, subsequently the water volume flow rate can be determined and the water pressure drop can be optimised.

The WK-D-UM and WK-D-UL series ceiling cooling elements are delivered at the same time as the ceiling panels so that the cooling elements are smoothly integrated into the ceiling panels at the construction site.

The successful application of chilled ceilings relies on the well coordinated teamwork of architect, consultant, installer and manufacturer.

Figure 2: Pivotable chilled ceiling element WK-D-UM (e.g. for inspection)

Survey of Technical Data

Standard cooling capacity according to DIN 4715 for continuous ceilings		up to 110 W/m²
Standard cooling capacity according to DIN 4715 for open ceilings		up to 160 W/m²
Temperature difference chilled water		2-4 K
Recommended water flow temperature		16°C
Operating weight	WK-D-UM	up to 6.0 kg/m²
	WK-D-UL	up to 9.0 kg/m²
	WK-D-WF	up to 18 kg/m²
	WK-D-EL	up to 14 kg/m²
Water content		approx. 1 l/m²
Pressure drop		10-50 kPa
Connection		10, 12 or 15 x 1.0
Overall heights		100-250 mm

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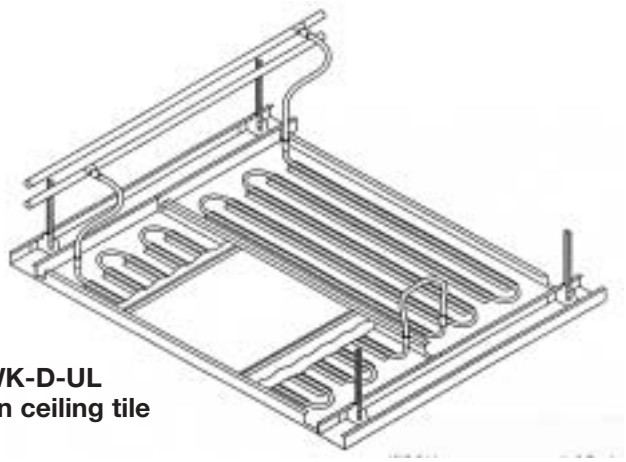
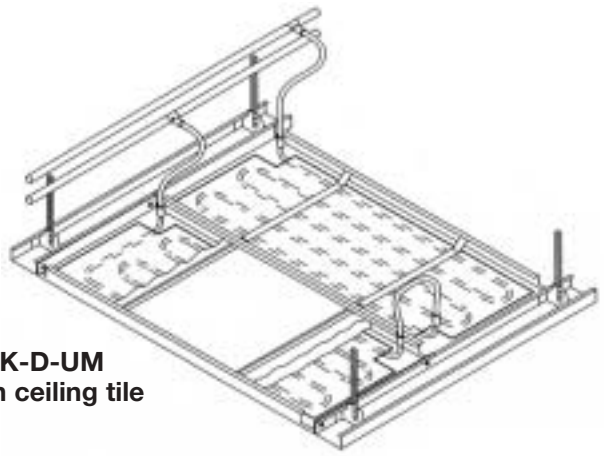


WK-D-UL on ceiling tile



WK-D-UM on ceiling tile

Installation

The chilled elements are inserted or stuck into the ceiling tiles and, in relation to the system, secured against falling out by means of clamping strips. Flow and return water connections to headers and panel to panel are with flexible plastic hoses with stainless steel overbraid.

The installation of ceiling lights, spot-lights, fire detectors, loudspeakers, etc. is no problem when TROX chilled ceiling elements are used.

Metal Ceiling Systems

A chilled ceiling system combined with a modular grid ceiling consists of the following assemblies:

- Modular grid sections
- Ceiling tiles
- Chilled elements including clamping strips, e.g., WK-D-UM or WK-D-UL
- Pipe connections up to the control valve
- Control components

No additional load-bearing structure is required because the chilled elements including all accessories do not exceed the load-bearing capacity of a normal suspension system of modular grid ceilings.

A hook structure can also be combined with the insertion elements WK-D-UM or the bonding system WK-D-UL.
As with the normal modular grid ceiling, the clamping strips are positioned in the return edge of the ceiling tile.

A spring clip system can also be used with the WK-D-UM and WK-D-UL chilled ceiling elements.

If the ceiling tiles are to hinge down the flow and return connections of the chilled elements are arranged on the hinge axis.
The ceiling tiles usually consist of galvanised sheet steel with various perforation patterns which offer a large variety of design options to the architect.
An additional acoustic fabric on the inside of the panel or a rear insulation mat above the cooling elements provides good sound absorption properties.

Standard colour: a) Ceiling panel – RAL 9010 or on request
b) Cooling element – RAL 9005 or raw

Dimensions:
Ceiling panel length: 600 mm to 3000 mm
Ceiling panel width: 200 mm to 1250 mm

Width and length to be combined according to supplier's instructions with regard to sagging.

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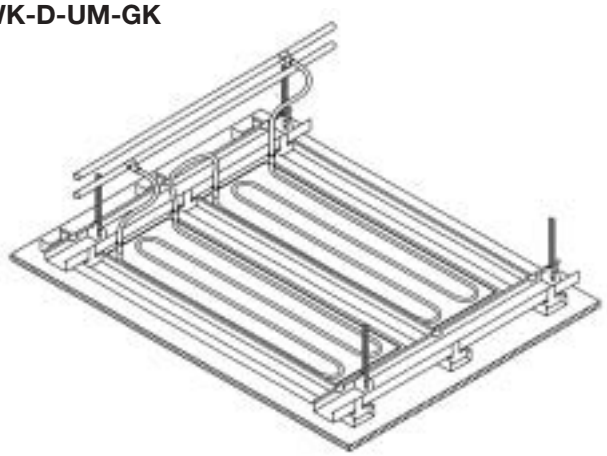
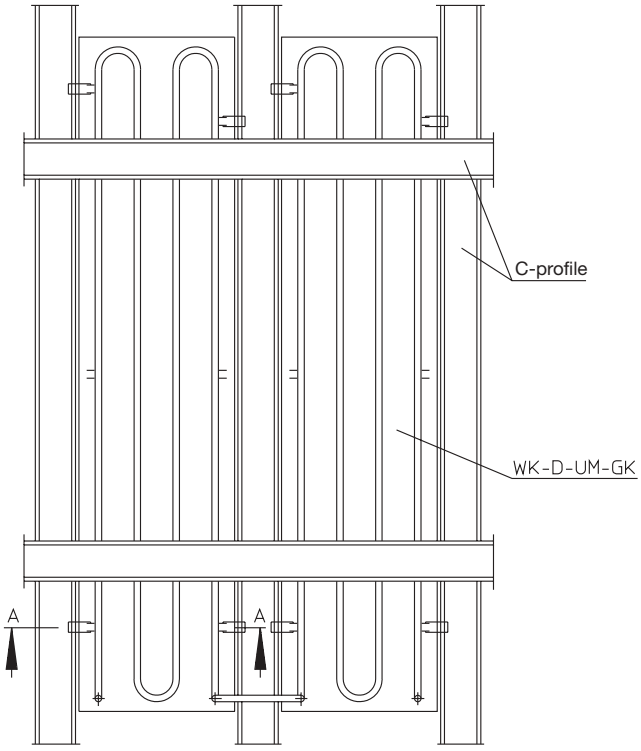
WK-D-UM-GK





Plasterboard Ceiling

A chilled ceiling system combined with a plasterboard ceiling comprises the following assemblies:

- Support sections according to DIN 18 181
- Chilled elements, adjusted to the support section, e.g., WK-D-UM
- Plasterboards, perforated or non-perforated
- Internal piping up to the control valve
- Control components

The elements are made to a length which is related to the existing structure and feasible dimensions. The width of the elements is determined by the centres of the support sections. No additional load-bearing structure is required because the chilled elements including all accessories do not exceed the maximum load-bearing capacity of a normal suspension structure for a plasterboard ceiling.

By means of the ceiling plan, the installation location is clearly identified with stickers affixed to each individual element.

Because of their own weight, the chilled elements are in contact with the plasterboard ceiling across their entire surface and thereby ensuring good thermal transfer.

Installation

The support sections of a plasterboard ceiling are conventionally mounted by the ceiling installer. Simple suspension of the chilled elements in a fine grid is by means of the tie bars supplied which results in quick installation on site. Once the chilled elements have been installed according to the ceiling plan and connected to the flow and return headers, the pressure test is performed before the plasterboards are screwed into position. After the successful completion of the pressure test, the ceiling installer can close the ceiling with plasterboard and skim the ceiling.

Advantage: The trades can work separately.

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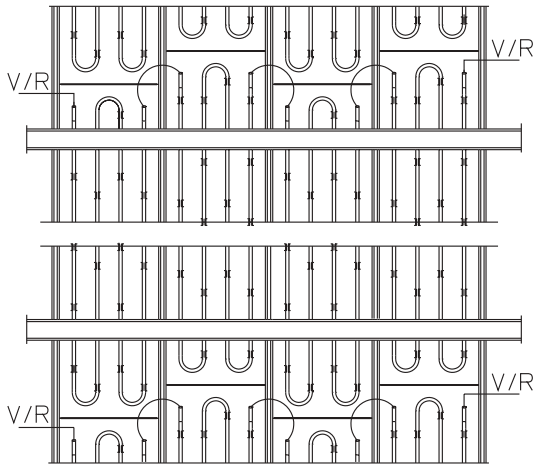
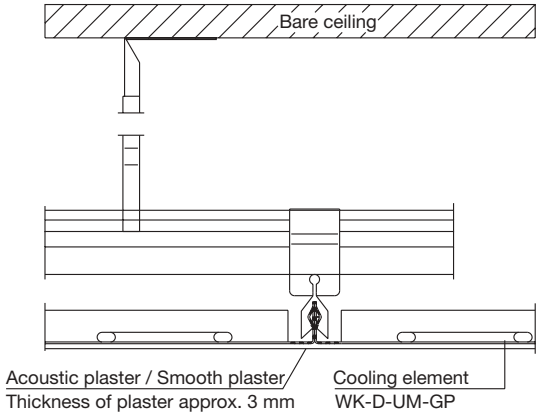
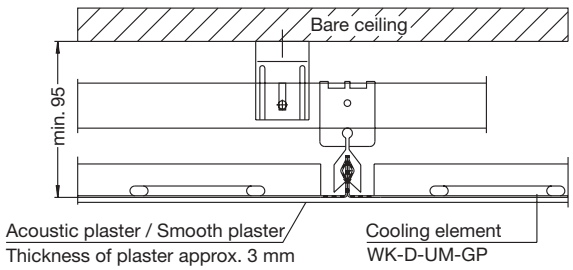
WK-D-UM-GP







Plastered ceilings

A chilled ceiling system for subsequent plastering, consisting of the following elements:
- Clamping profile with substructure for suspension
- Cooling elements matching the pitch of the clamping profile
- Layer of acoustic or smooth plaster
- Internal tubing up to control valve
- Control components

The length of the elements is determined according to the given facts of the building, e. g. room geometries, ceiling installations etc. The width of the elements is fixed by the pitch of the lower clamping profiles 320 mm. Further mounting accessories for the cooling elements are not required, as they are designed for direct insertion into the clamping rails.

Stickers on each single element clearly indicate the place of installation according to the ceiling layout. The cooling elements are constructed for connection with the clamping profile on the longitudinal side in such a way that flatness for subsequent plastering is ensured.

Mounting

Depending on the suspension height the clamping profiles with the appropriate substructure are suspended with either clamping profiles, transverse connectors and nonius hangers or with cross connectors, support profiles and direct hangers.

When arranging the lower clamping profiles it is to make sure that the pitch 320 mm and the vertical adjustment are guaranteed.

As with commonly traded ceiling panels the cooling elements are clamped into the clamping construction on the longitudinal side. It must be pointed out that the cooling elements have to be inserted into the clamping construction up to the limit stop so that the joints are even. When the cooling elements are mounted according to the ceiling lay-out and connected to the supply and return water pipes with flexible hoses a pressure test is made before plastering. After the successful pressure test the plaster can be applied according to the instructions of the plaster manufacturer.

Plaster application only to be made by trained and licensed personnel of the interior fittings trade.

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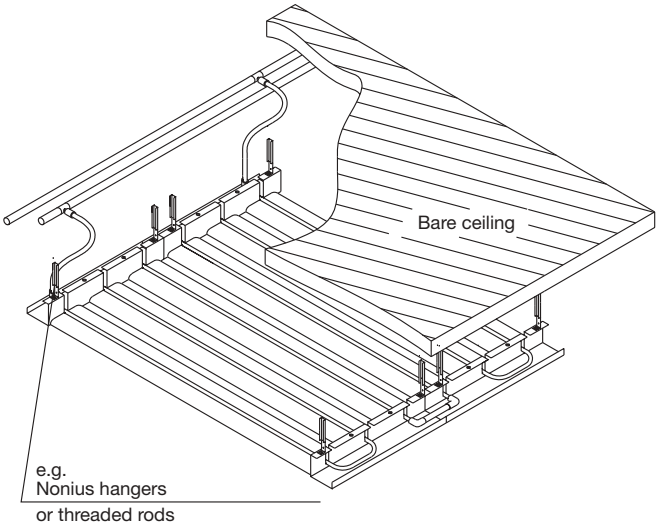


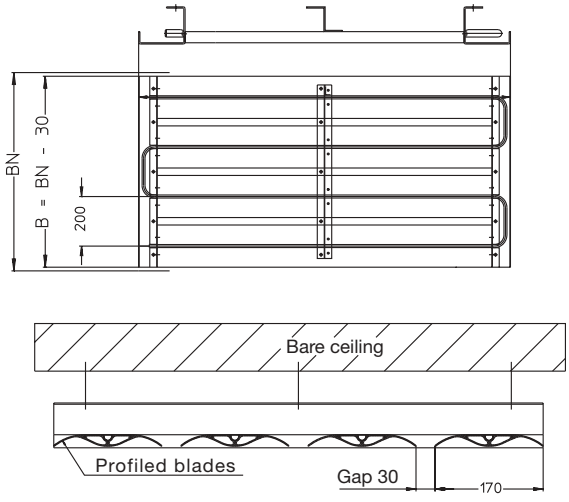
Series WK-D-WF and WK-D-EL Open ceiling systems

The WK-D-WF and WK-D-EL series cooling elements are especially suited for open ceiling systems. Both series combine the high cooling capacity of a convective chilled ceiling with the advantage of a low installation height.

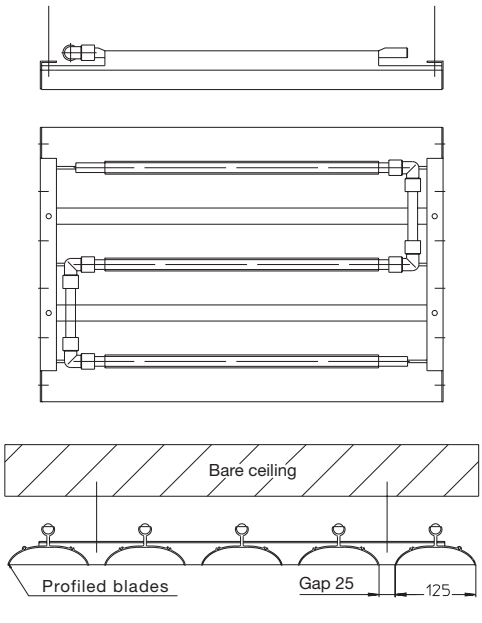
Owing to their pleasant panel design the cooling elements are suitable for all-over installation as well as for creative integration in metal or gypsum plasterboard ceilings and also as freely suspended chilled ceiling sail. With additional open grid ceilings suspended underneath the effective free area should be rather high in order to maintain the high efficiency of the convective chilled ceiling.

Mounting
TheWK-D-WF and WK-D-EL series cooling elements are made with profiles for suspension from the bare ceiling. They can be suspended with threaded rods or nonius hangers as well as a suitable substructure system.
For integration into other ceilings the means of hanging can be adapted to the existing system.
The chilled ceiling modules are then interlinked according to the tubing plan and connected to the supply and return pipes of the chilled water system, followed by a pressure test.

Series WK-D-WF



Series WK-D-EL



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Examples of project-related special constructions

As a matter of principle, chilled ceilings in special design can be supplied. An example of this is provided by the Trox thermal conduction bars with aluminium panels screwed to the underside and then surfaced with special plaster, see Figures 4 and 5.

Please contact Trox.

Each chilled element of the module (which is a preassembly of several elements) is marked with a sticker as a unique identifier for the element. On the basis of the ceiling plan, the element can then be installed at its correct location, see Figure 3.

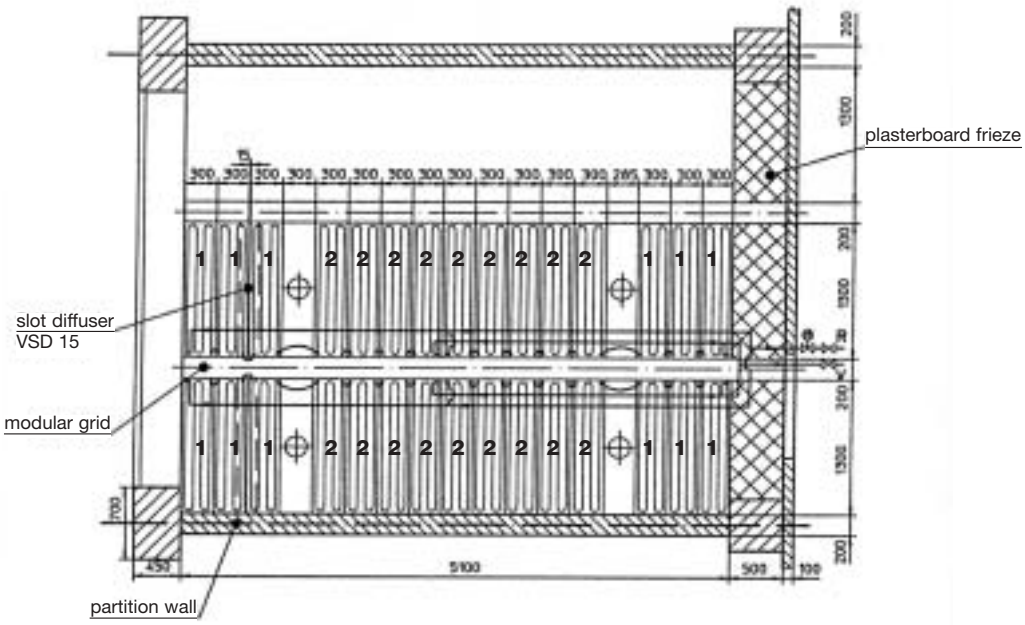

Figure 3: Example of ceiling plan

Figure 4: Thermal conduction bars with changing pitch according to the ceiling tiles

Figure 5: Chilled ceiling for plastering

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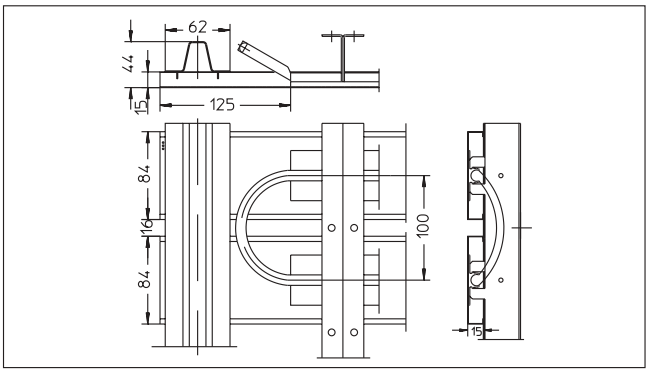
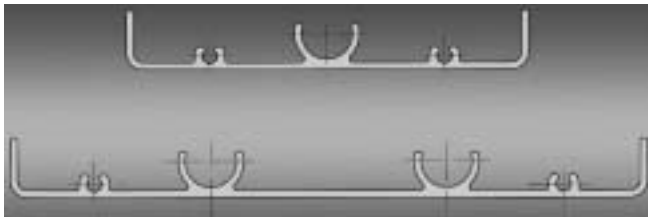
Figure 6: WK-D-UL combined with panel ceilings

Figure 7: WK-D-P as chilled panel ceiling



Detail: WK-D-UL

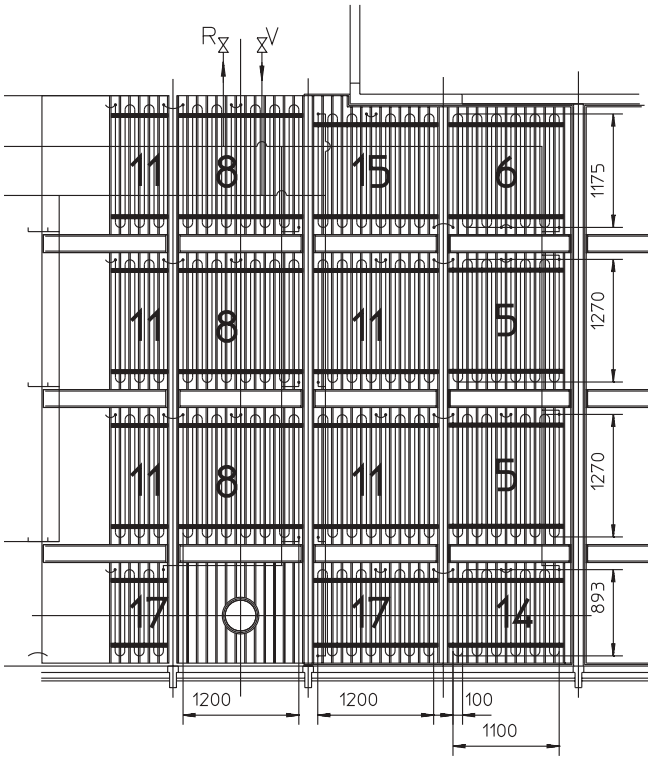


Detail: WK-D-P

Special constructions, e. g. panel ceilings

Cooling elements have to be adapted to common ceiling designs if the visible ceiling has already been planned or if restoration work has to be done.

Examples for the adaptation to a visible panel ceiling are demonstrated in pictures 6 and 7.
A special construction of the chilled ceiling series WK-D-UL and the chilled ceiling series WK-D-P were installed.
The series WK-D-P is an extruded profile of which the dimensions were adapted to the panel ceilings. It allows to partially insert "active chilled ceilings" without changing the standard substructure.



Ceiling plan WK-D-UL

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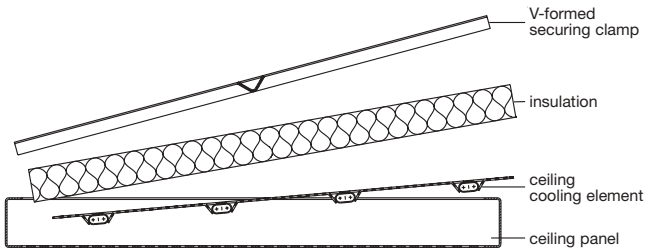
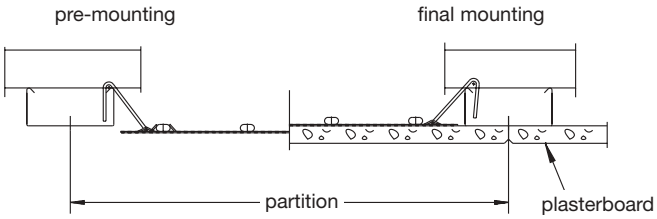
Installation Details (Examples)

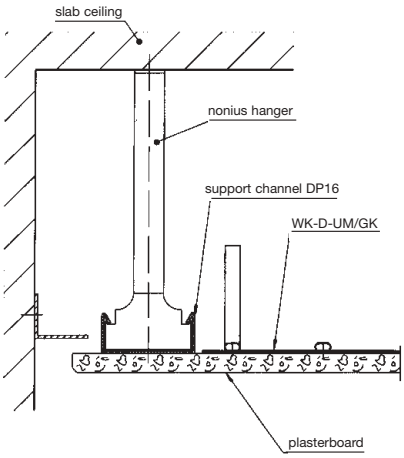
WK-D-UM metal ceiling



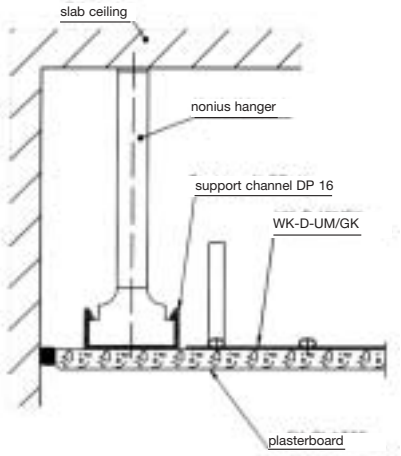
WK-D-UM-GK plasterboard ceiling



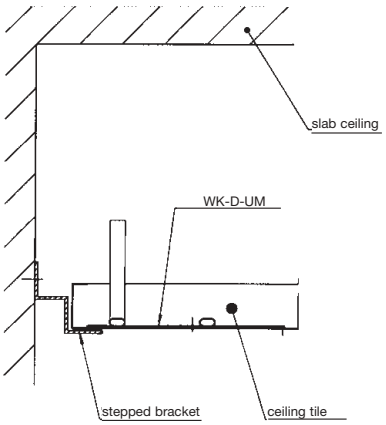
WK-D-UM-GK with gap



WK-D-UM-GK without gap



WK-D-UM metal ceiling with gap



WK-D-UM metal ceiling without gap