Installation manual GB/en

TROX GmbH
Heinrich-Trox-Platz
47504 Neukirchen-Vluyn
Germany
Phone: +49 (0) 2845 202-0
Fax: +49 (0) 2845 202-265
E-mail: trox-de@troxgroup.com
http://www.troxtechnik.com

Chilled ceilings

WK-D-WF

Product overview

Fig. 1: Schematic diagram, example WK-D-WF

1 Special profile blade
2 Pipe meander (serpentine)
3 Fixing bracket

Safety

Correct use

Chilled ceilings and chilled ceiling elements are used to control the temperature of interior spaces and dissipate thermal loads through the medium of water.

Chilled ceilings only influence the thermal loads in an internal space. In comfort zones, a mechanical ventilation and air conditioning system should additionally be used to maintain the air quality required by applicable standards.

Depending on the area of application, special hygiene requirements must be observed during installation, operation, and maintenance.

Incorrect use

WARNING!

Danger of injury or risk of damage to property due to incorrect use

Incorrect use of the chilled cooling elements can lead to dangerous situations.

Do not use chilled coolings:

- in areas with potentially explosive atmospheres (EX)
- outdoors
- in humid rooms
- in rooms with aggressive or dust-laden air
- at temperatures below the dew point

Modifying the unit or using replacement parts that have not been approved by TROX is not permitted.

Personnel

Qualification

The work described in this manual has to be carried out by individuals with the qualification, training, knowledge and experience described below:

Drywall installer
Drywall installers build indoor and outdoor drywall (also called plasterboard) constructions, e.g. lightweight partition walls, that meet the requirements for thermal insulation, noise insulation, fire protection and protection from radiation. They also fit cladding to walls and ceilings, for example plasterboard, metal panels or wood, and insert the necessary insulation.

Drywall installers have the technical training, knowledge and actual experience to enable them to understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

HVAC technician
HVAC technicians are individuals who have sufficient professional or technical training in the field they are working in to enable them to carry out their assigned duties at the level of responsibility allocated to them and in compliance with the relevant guidelines, safety regulations and instructions. HVAC technicians are individuals who have in-depth knowledge and skills related to HVAC systems; they are also responsible for the professional completion of the work under consideration.

HVAC technicians are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to work on HVAC systems, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

Transport and storage

Delivery check

After delivery, carefully remove the packaging and check the unit for transport damage and completeness. In case of any damage or an incomplete shipment, contact the shipping company and your supplier immediately. After inspection of the goods, put the product back into its packaging to protect it from dust and contamination.

Fixing and installation material

Fixing and installation material is not part of the supply package (unless stated otherwise), but has to be provided by others; it has to be suitable for the installation situation.

Transport on site

CAUTION!

Danger of injury from sharp edges, sharp corners and thin sheet metal parts!

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

- Be careful when carrying out any work.
- Wear protective gloves, safety shoes and a hard hat.

Please note during transport:

- Be careful when unloading or moving the product, and pay attention to the symbols and information on the packaging.
- If possible, take the product in its transport packaging up to the installation location.
- Use only lifting and transport gear designed for the required load.
- During transport, always secure the load against tipping and falling.
- Bulky cooling equipment should be transported by at least two people to prevent injury and damage. From a cooling element length greater than 2500mm, transport it with at least 3 people to avoid injury and damage.
- Do not place or store any components on the cooling element to avoid damage.

Storage

Please note for storage:

- Store the product only in its original packaging
- Protect the product from the effects of weather
- Protect the product from humidity, dust and contamination
- Storage temperature: -10 °C to 75 °C
- Relative humidity: 95 % maximum, no condensation

Packaging

Properly dispose of packaging material.

Assembly

General installation information

Note during installation:

- Fix the product only to load-bearing structural elements.
- Load suspension systems only with the weight of the device. Adjacent components and connecting ducts must be supported separately.
- Use only approved and adequately sized fixing material (fixing material is not included in the supply package).

General installation information

Personnel:

- HVAC technician
- Drywall installer

Protective equipment:

- Protective gloves
- Industrial safety helmet
- Safety shoes

CAUTION!

Danger of injury from sharp edges, sharp corners and thin sheet metal parts!

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

– Be careful when carrying out any work.
– Wear protective gloves, safety shoes and a hard hat.

Please note:

- Installation and connections to be performed by others; fixing, connection and sealing material to be provided by others.
- Cooling panels to be installed above open cell ceilings should have a free cross-section that is as large as possible to minimise the reduction of the cooling capacity.
- Provide devices for shut-off and venting.
- Fix the product only to load-bearing structural elements.
- Continuous ceilings have to be designed to carry at least the combined load of the cooling panels plus accessories and contained water.
- Suspensions used for chilled ceiling elements have to be designed to carry at least the combined load of the panels plus accessories and contained water. Choose enough fixing points to fit the overall dimensions and the total weight.
- The installed cooling panels must be easily accessible for inspection and cleaning.
- Use only certified fixing systems that are suitable for carrying the intended load.
- Use preferably threaded rods or suitable rail systems for suspension.
- Use all the provided suspension points.
- Stand clear of suspended loads, unless properly secured!
- Check secure fixing after installation.
- Also observe the notes for the cooling panels.

The product is intended for use in internal spaces, preferably with a clear height between 2.60 m and 4.00 m. We strongly recommend combining the panels with a mechanical ventilation system. The air-circulated cooling panels / chilled ceilings should only be connected to the water network after the cleanliness of both the AHU system and the room has been sufficiently checked and documented. Only work in pairs; preferably using a lift.

Installation types

Fig. 2: Freely suspended chilled ceiling element

1 Raw ceiling or suspended ceiling
2 Chilled ceiling element
Freely suspended installation is possible with all ceiling systems. A continuous airflow also on the upper surface must be ensured. With open cell ceilings, the cooling panels have to be installed above the grid. The free cross-section of the grid ceilings should be as large as possible.

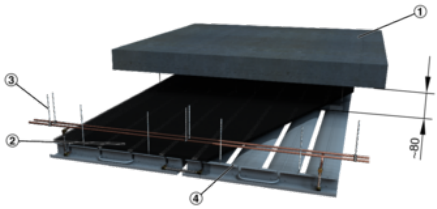

Fig. 3: Freely suspended chilled ceiling element with acoustic insulation

1 Raw ceiling or suspended ceiling
2 Acoustic pad (optional)
3 Threaded rods or other suitable and approved fixing material
4 Chilled ceiling element
If freely suspended, chilled ceiling elements can be fitted with additional acoustic insulation material (to be fitted to the upper side). These acoustic pads have to be fitted above the fixing brackets to maintain as much cooling capacity as possible. Note that the capacity will be reduced to some extent.

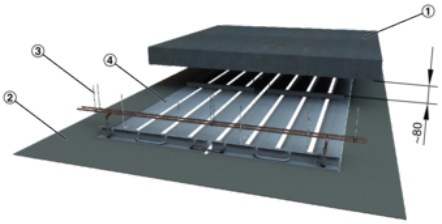

Fig. 4: Cooling panel integrated into continuous ceilings

1 Raw ceiling
2 Continuous plasterboard or metal ceilings
3 Threaded rods or other suitable and approved fixing material
4 Chilled ceiling element
Flush ceiling installation in continuous ceilings is possible with or without adjacent gaps. The cooling capacities are determined, depending on the structure/design of the ceiling. Installation with gaps allows for higher effective cooling capacities.

Additional insulation mats can be placed above the cooling panels to minimise power losses caused by the suspended ceiling.

Cooling ceiling designs not covered by these installation instructions must be installed in consultation. Here, for example, a drawing with visible fixing points is provided to our customer in addition to these installation instructions.

WK-D-WF cooling panels, notes on installation

Connecting the water pipes

If cooling elements were supplied with plugs in the connection area (only on project-specific customer request), these must be removed before connection.

The cooling panel has one water connection point each, one for supply and one for return flow. Do not change the position of the water connections.

NOTICE!

When selecting the water-side connection, ensure that oxygen is prevented from entering the water system, as this can lead to corrosion. When using flexible hoses, an oxygen diffusion-proof design must be used.

NOTICE!

We recommend using flexible hoses to make the water connections because they ensure that no significant loads are imposed on the cooling panels. Flexible hoses also simplify disassembly and maintenance.

Water connections on the cooling panel: copper pipe tails, 12 x 0.5 mm, with support sleeve. Suitable types of connection: flexible hoses recommended (accessory type FS). If flexible connection hoses are used, the connection points on the copper pipes must be professionally deburred, otherwise the hoses may be damaged. This is to be checked.

Fig. 5: Deburring

Do not thermally treat any part of the cooling panels except for the pipe tails.

When using flexible hoses, we recommend using 90° angled hoses.

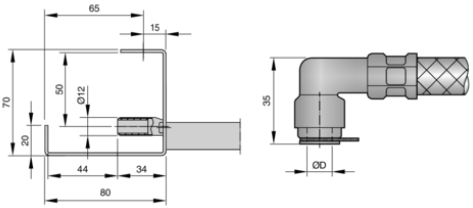

Fig. 6: WK-D-WF connection

Technical data

Description	Value
Maximum operating pressure, water side	20 bar; 6 bar (limitation in combination with flexible hoses)
Maximum operating temperature, water side	75°C; 50°C (limitation in combination with flexible hoses)
Heating: recommended water flow temperature	Limit ≤ 35°C (comfort criteria)

DANGER!

Risk of scalding.

Working on the hot water system carries a risk of scalding.

– Only specialist personnel should work on the water-side connections.
– Before working on the water-side connections, shut down, depressurise, and, if possible, cool down the system.

Cooling/heating capacities depending on Δt. When heating, surface temperatures > 35 °C should be avoided as otherwise comfort will suffer.

Make connections to the cooling elements in such a way that external effects on the cooling elements due to, e.g. thermal expansion, weight of the piping, vibrations, condensation and tensions are prevented.

Installation with regard to energy efficiency

- Hydraulic balancing is necessary to ensure economic operation of the system. When you design the control circuits and the interconnection of cooling panels, enable turbulent water flow in each group of panels.
- Insulate the water pipes to prevent energy losses and the formation of condensate when cooling.
- Make sure that the water temperature does not fall below the dew point.
- Provide devices for shut-off and venting.
- Control, shut-off and safety fittings are required; if not part of the supply package, they have to be provided by others.

NOTICE!

Take suitable precautions to avoid contamination of the cooling panels during installation, commissioning and operation.

Checking the system for leaks

Check the system for leaks immediately after installation and then at regular intervals.

NOTICE!

Risk of damage to the copper tube meander due to frost

Chilled ceilings are used indoors only. To avoid hazards and damage due to frost, rooms with filled cooling circuits must be frost-free.

If there is a risk of frost, especially on construction sites, we recommend completely draining the water-bearing system.

NOTICE!

Temperatures below the dew point

The formation of condensate by falling below the dew point can lead to injuries and/or damage to the building structure and must therefore be avoided by taking suitable measures. Possible hazards would be mould growth or slipping on damp surfaces.

Technical data
Fixing types

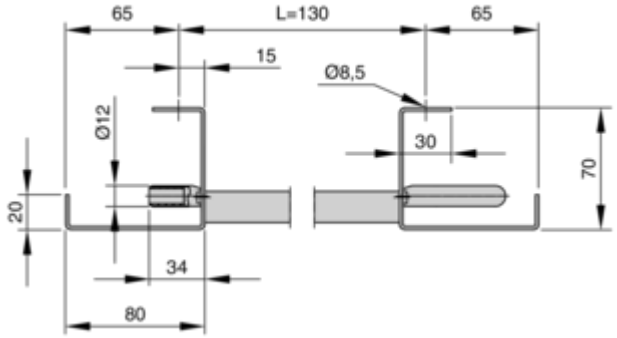

Fig. 7: WK-D-WF fixing brackets, length < 2500 mm

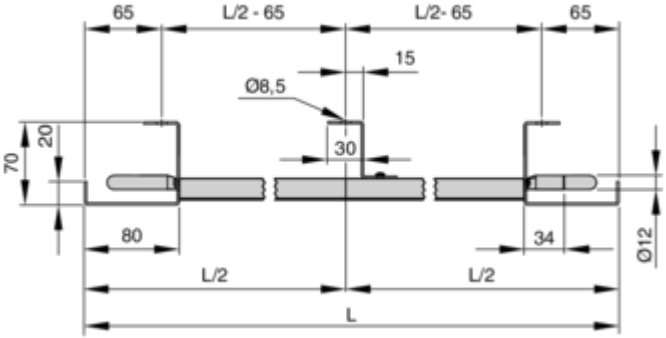

Fig. 8: WK-D-WF fixing brackets, length ≥ 2500 mm

WK-D-WF suspension

- Distribute the weight evenly.
- Use preferably threaded rods M8 for suspension.
- Use all fixing brackets.
- Minimum distance from fixing bracket (top edge) to the raw ceiling: ≥ 80mm.

Dimensions and weights

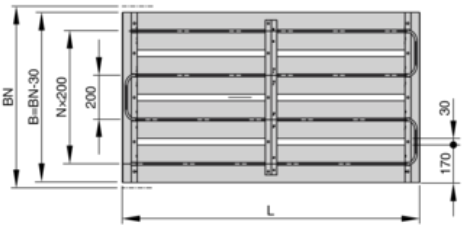

Fig. 9: WK-D-WF with Z-bracket in the middle (L > 2500 mm)

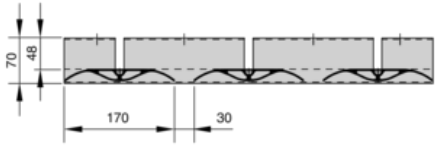

Fig. 10: WK-D-WF cross section

Length	**1000, 1500, 2000, 2500, 3000, 3500, 4000**
Height	**70**
Width	400, 600, 800, 1000, 1200, 1400

Weights [kg]

①	2	3	4	5	6	7
②	**400**	**600**	**800**	**1000**	**1200**	**1400**
1000	7	10.5	14	17.5	21	24.5
1500	9.5	14	18.5	23	28	33
2000	11.5	17	23	28.5	34.5	40
2500	14.5	22	29	36.5	43.5	51
3000	17	25	33.5	42	50	58.5
3500	19	28.5	38	47.5	57	66.5
4000	21	32	42.5	53	63.5	74

① Number of special profile blades
② L/BN [mm]
Weight incl. water filling: approx. 14 to 18 kg/m²
Combinations of cooling panel dimensions depend on the water-side pressure drop of the panels.

General information

Before you start commissioning:

- Check that the cooling panels are correctly seated.
- Remove protective foils, if any.
- Check that the water connections have been professionally made.
- Ensure that all cooling panels are clean and free from residues and foreign matter.
- Ensure that the water system has been filled and vented.
- Carry out hydraulic balancing of the control zones.

For commissioning, see also VDI 6022, Sheet 1 - Hygienic requirements for ventilation and air-conditioning systems.

Rinsing/Flushing

Rinsing removes unwanted dirt particles from the water circuit. To ensure that the system is clean and free from any contamination, flush it with increased quantities of water again as part of commissioning. Make sure that the system is completely emptied after the flushing process and then filled with suitable filling water.

Filling the system

After flushing out dirt particles, fill the system with filling and supplemental water or water-glycol mixture (max. 30% glycol). Manufacturers' information for all installed components must be observed. Particular attention must be paid here to comply with the filling and make-up water quality in accordance with VDI 2035 Sheet 1. During the water filling of the system, as well as during the necessary pressing or draining processes, it is recommended that these are permanently monitored.

Ventilation

Ensure complete ventilation to avoid problems in the system and to ensure full performance of the chilled ceilings. Since a continuously rising conduit to a venting point is usually impossible, thorough flushing is recommended until the system is air-free. Upstream installations must also be air-free so that no air is introduced into the ceiling system via supply lines.

Pressure testing

A leak test with air or water in accordance with the general rules of technology must be carried out and recorded. The test pressure of the water should be at least 4 bar and not more than 6 bar (see DIN EN 1264). The test pressure for air is a maximum of 3 bar (Pressure Vessel Directive, BTGA 3.003)

Maintenance and cleaning

Maintenance

Check the water quality regularly in order to prevent corrosion.

Cleaning

Please note:

- Clean surfaces with a damp cloth.
- Use only common household cleaners, do not use any aggressive cleaning agents.
- Do not use cleaning agents that contain chlorine.
- Do not use equipment for removing stubborn contamination, e.g. scrubbing sponges or scouring cream, as it may damage the surfaces.

Disposal

ENVIRONMENT!

Risk of harm to the environment due to incorrect disposal!

Incorrect disposal can harm the environment.

– Be sure to comply with the relevant national guidelines and regulations.
– In case of doubt, contact your local authorities or a specialist disposal company.

Note: The cooling element has to be disassembled for disposal.
If no disposal agreement with TROX GmbH is in place, we recommend disposing of the various materials as follows:

Fig. 11: Schematic illustration of WK-D-WF

Position	Component	Material/ waste disposal code	Type of disposal
1	Special profile blade	Aluminium EWC 170402	Scrap and metal recycling
2	Copper meander	Copper EWC 170401	
3	Fixing bracket, Z-bracket	Sheet steel EWC 17 04 05	

EWC European Waste Catalogue