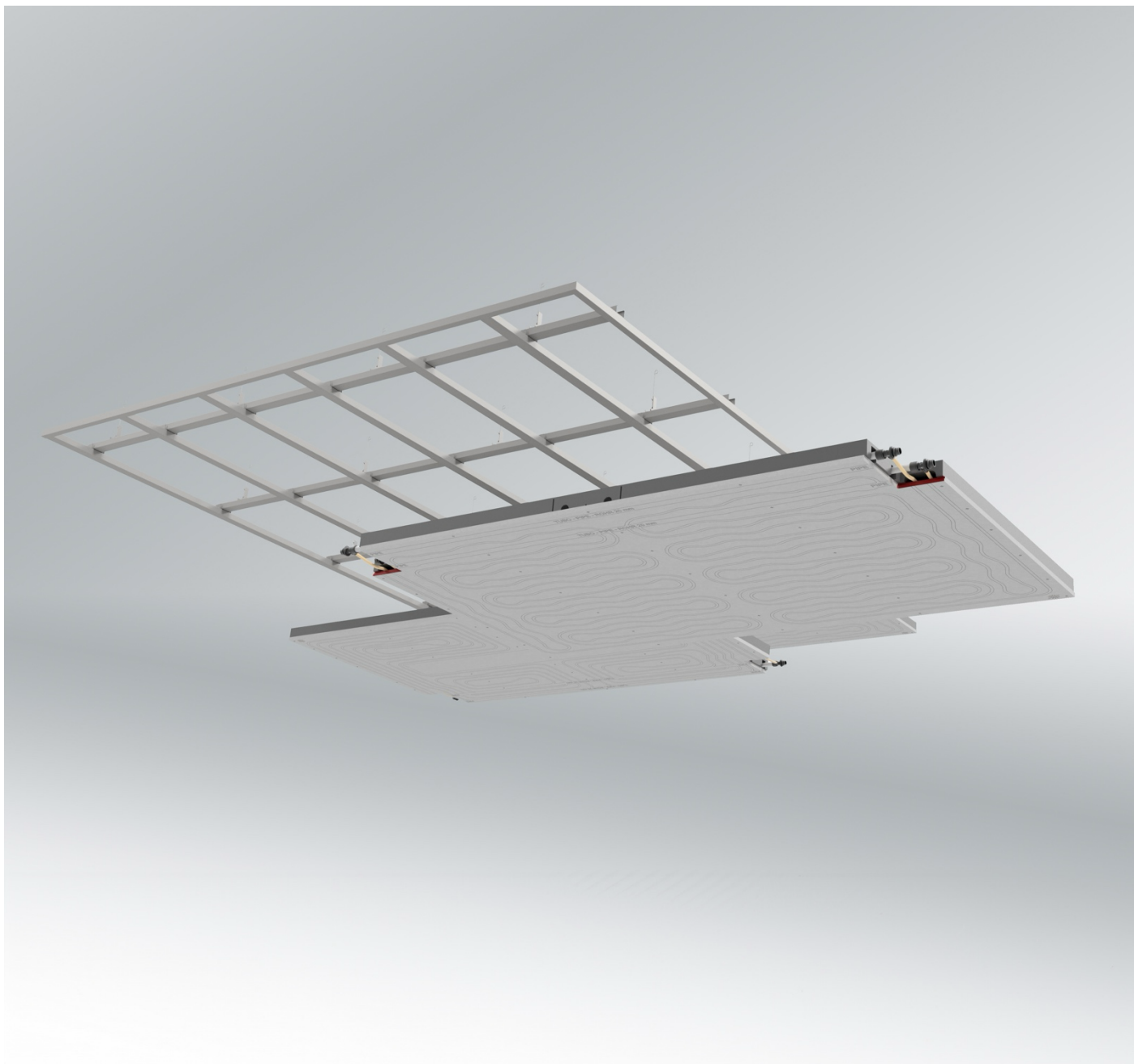




TYCROC CHC RADIANT CEILING SYSTEM INSTALLATION INSTRUCTIONS

Revision Date: 01 December 2025



This work plan is valid only after verifying all elements and systems that may interfere with the installation of the radiant ceiling system (electrical and lighting systems, ventilation and air-treatment systems, plumbing, alarm and fire-fighting systems, architectural elements, etc.). This document does not exempt the installer from complying with applicable standards, prescriptions, and legal regulations.

MATERIAL STORAGE

Panels are delivered on wooden pallets and must be stored on flat, stable surfaces in a dry and covered area. If the panels are stored after unpacking, they must be placed on suitable wooden spacers of equal width to the panels, positioned at right angles to each other, with a minimum height of 10 cm and a minimum centre distance of 50 cm. Vertical storage of the panels is strictly prohibited, as it may cause deformation that could compromise proper installation. In the event of accidental wetting from rain or humidity, contact Tycroc before proceeding; the company must assess the condition of the panels prior to installation.

Handling of pallets on site must be carried out using appropriate equipment. Handling of individual panels must be performed only in the vertical position (during cutting operations). Unloading of pallets from transport vehicles may only be carried out using a site crane or forklift.

RADIANT CEILING SYSTEM

The Tycroc CHC system enables the creation of a radiant ceiling suitable for multiple applications. The system consists of modular plasterboard panels with integrated piping arranged in a serpentine pattern to maximise the heat-exchange surface between the piping and the plasterboard. Each plasterboard panel is supplied pre-bonded to an insulating board to ensure high thermal performance.

1.INSULATION

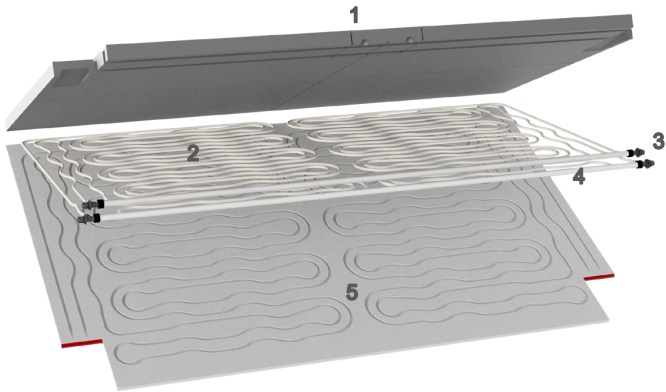
The thickness of the insulation board is increased in accordance with the requirements of UNI EN 1264:2021, ensuring reduced thermal losses and enhanced overall system performance.

2.PIPING

The system incorporates 10 × 1.3 mm piping.

3.FITTINGS

The panels feature pre-assembled compression fittings designed to ensure maximum long-term tightness. Double-gasketed Click&Safe fittings connect the panels, locking onto the calibrated fitting rather than directly onto the pipe.



4.HYDRAULIC BACKBONE

Each panel includes hydraulic piping for connecting the modules in series. The pipework consists of multilayer PE-RT Type II 20 × 2 mm pipe. A special factory-assembled fitting, certified through in-line leak testing, is included.

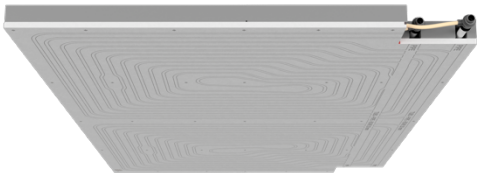
5.PLASTERBOARD WITH LASER MARKING

Laser markings clearly indicate the position of the piping, preventing accidental drilling during installation.

TYCROC CHC 3.5 CEILING PANEL

INSULATION	Sintered EPS with graphite
λ_D	0.031 W/m·K (insulation)
BOARD	15 mm plasterboard
THICKNESS	60 mm (45 mm + 15 mm)
WEIGHT*	~13.6 kg/m ² (1200 x 2000) ~13.3 kg/m ² (1200 x 1000) ~13.8 kg/m ² (600 x 2000) ~13.3 kg/m ² (600 x 1000)
PIPE	10 x 1.3 mm
PIPE SPACING	3.5 cm

*Weight refers to the panel with water inside the piping.



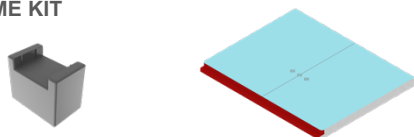
ARTICLE	DIMENSIONS	
CHC-351220	1200 x 2000 mm	
CHC-351210	1200 x 1000 mm	
CHC-350620	600 x 2000 mm	
CHC-350610	600 x 1000 mm	

TYCROC CHC PASSIV PANEL

INSULATION	White EPS
λ_D	0.034 W/m·K (insulation)
BOARD	15 mm plasterboard
THICKNESS	60 mm (45 mm + 15 mm)
WEIGHT	~32 kg/m ² (1200 x 2000)

ARTICLE	DIMENSIONS	
CHC-PA1220	1200 x 2000 mm	

CLOSING FRAME KIT



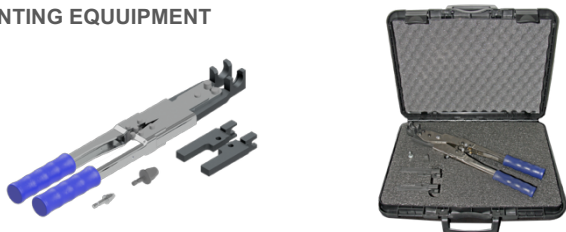
ARTICLE	DIMENSIONS
CHC-CLOKIT	204 x 265 x 15 mm

PRE-INSULATED PIPE



ARTICLE	DIMENSIONS	
CHC-RE20	20 x 2 mm	L 50 m
CHC-BL20	20 x 2 mm	L 50 m

MOUNTING EQUIPMENT



ARTICLE	DESCRIPTION
CHC-202280	Complete ceiling installation set: closing clamps for fittings Ø20 and Ø10, expansion tips for pipes Ø20 and Ø10, and an adapter for T-fittings.

PIPE FITTINGS AND RINGS

FITTINGS - PRECAUTIONS

The pipes and fittings of the system may lose their properties or become damaged if they come into contact with certain chemical agents, particularly when subjected to mechanical or environmental stress (environmental stress cracking).

RECOMMENDATIONS

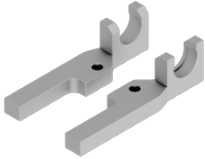
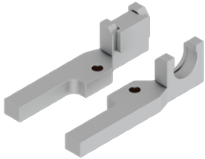
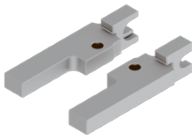
Storage must be carried out in a covered, dry area, strictly avoiding exposure to sunlight, solvents, and chemical reagents that may damage the fittings, as indicated on the packaging. The material must not be brought into contact with strong concentrated acids such as hydrochloric, nitric, or sulphuric acid.

Additionally, reagents and solvents known to cause stress cracking - such as aromatic solvents and oxygenated solvents (including ketones and ethers) - must be avoided.

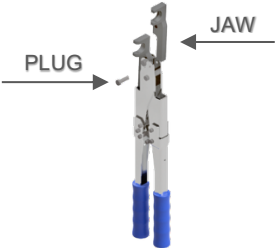
ARTICLE	DESCRIPTION	
CHC-CS2T	FITTING CLICK&SAFE T20 (4 pcs)	
CHC-CS20	FITTING CLICK&SAFE 20 (4 pcs)	
CHC-CS29	FITTING CLICK&SAFE 90° (4 pcs)	
CHC-CSST	FITTING CLICK&SAFE STRAIGHT (4 pcs + 9 clip)	
CHC-CSEN	CLICK&SAFE END CAP (4 pcs + 5 clip)	

ARTICLE	DESCRIPTION	
CHC-FI2T	FITTING T 20-20-20 (4 pcs)	
CHC-FI20	FITTING 20-20 (4 pcs)	
CHC-FI29	FITTING 90° 20-20 (4 pcs)	
CHC-FI10	FITTING 10-10 (4 pcs)	
CHC-RIN2	RING PVDF Ø 20 (8 pcs)	
CHC-RIN1	RING PVDF Ø 10 (8 pcs)	

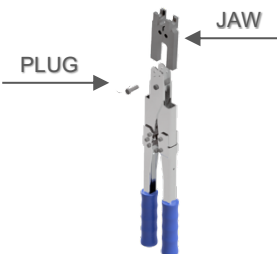
CORRESPONDENCE BETWEEN FITTINGS AND JAWS

2 x kaws for D20 	CHC-CS2T 	CHC-FI20 	CHC-FI2T  *only for the indicated ways
	CHC-CS29 	CHC-CS20 	CHC-FI29 
2 x jaws for D20 + adapter 	CHC-FI2T  *only for the indicated ways		
2 x jaws for D10 	CHC-FI10  *for replacement and repair only		

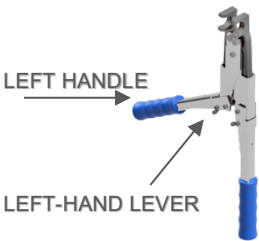
PIPE INSTALLATION PROCEDURE



If necessary, disassemble the jaws by removing the front pin and sliding the jaws out.



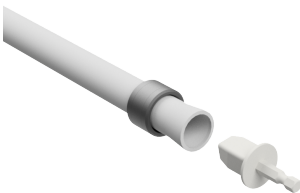
Insert the required jaw and reinsert the pin to secure it firmly in place.



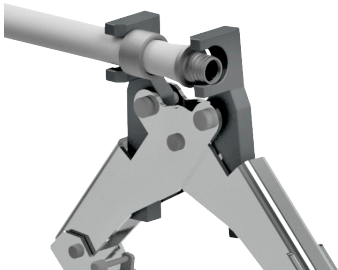
To open the pliers, rotate the left handle fully outward or lower the left lever and pull the handle completely open. Attention: The handle is spring-loaded and will return automatically.



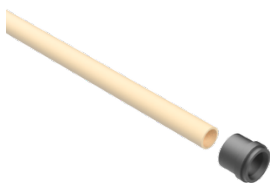
To close the pliers, rotate the left handle to the closed position. Open the handle again and pull it back to its full extension. The right handle also includes a lever, which is used solely to lock the handle in one of the available positions.



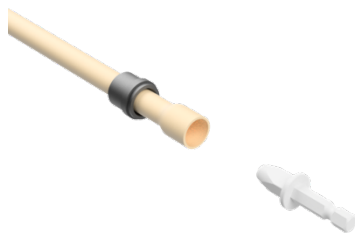
Insert the Ø 20 ring. Expand the Ø20 pipe using the dedicated expansion bit. Mount the expansion bit onto a cordless drill. Position the bit at the edge of the pipe and start rotating at a maximum of 500 rpm. Hold the pipe firmly using a glove and press the bit into the pipe until it reaches its stop position. The bit expands the pipe to the correct depth required for a secure connection.



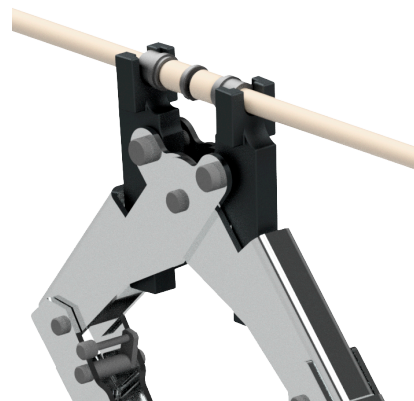
Insert the required fitting into the expanded pipe. Use the pliers with the appropriate jaws to close the ring around the fitting. Rotate the movable handle to apply proper leverage, ensuring a smooth and secure closure with minimal effort.



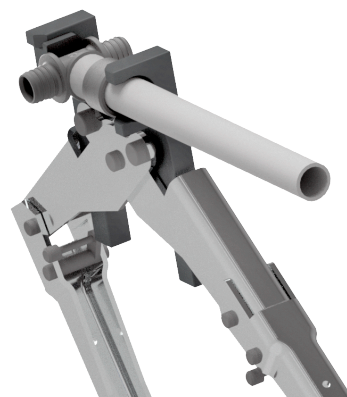
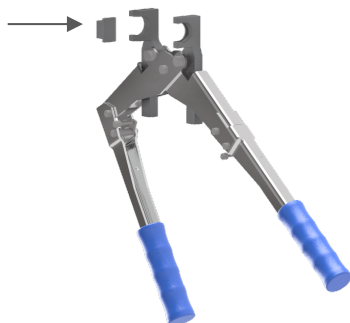
Insert the Ø10 ring, ensuring that the reinforced section is positioned toward the end of the pipe to be expanded.



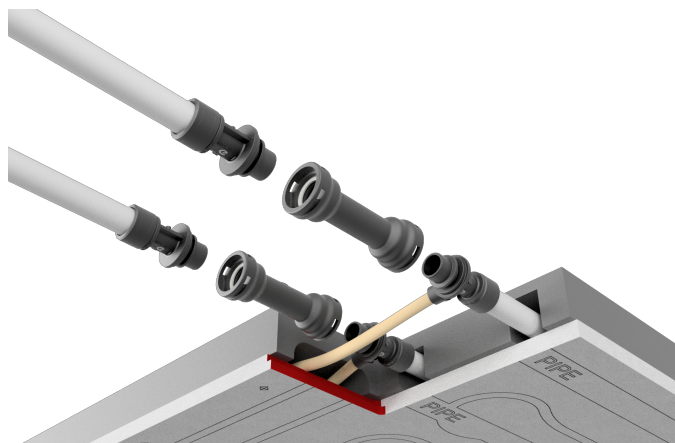
Expand the Ø10 pipe using the dedicated expansion bit. Mount the expansion bit on a cordless drill. Position the bit at the pipe end and begin rotating at a maximum speed of 500 rpm. Hold the pipe firmly with a glove and press the bit into the pipe until it reaches its stop position.



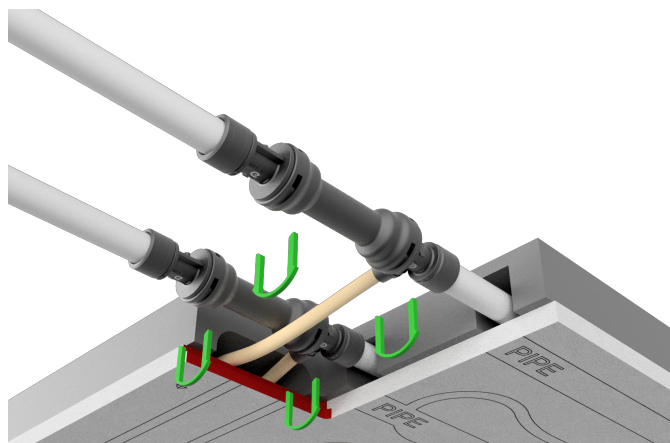
For repairs, insert the Ø10 fitting into the expanded pipe. Use a Ø10 double jaw to close the ring securely around the fitting.



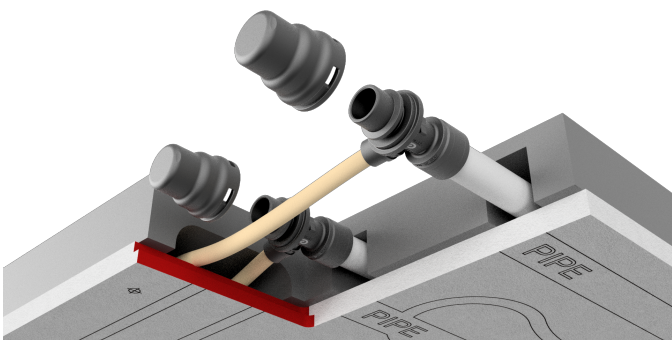
Only for article CHC-FI2T - To assemble the fitting T 20–20–20, remove the insert mounted in the clamp handle. Mount this insert onto the jaw, ensuring that the curved portion faces inward. The insert functions as a flat support surface for the fitting during closure.



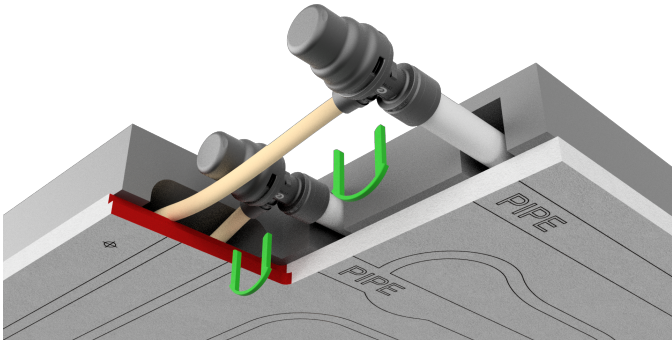
Insert the straight connection fitting (art. CHC-CSST) fully onto the pre-assembled fitting on the Tycroc CHC panel. Ensure it is pushed on completely to achieve correct sealing.



Insert the green locking clip into the designated slots on the straight fitting to secure it in place.



Insert the end cap (art. CHC-CSEN) fully onto the pre-assembled fitting of the CHC panel, ensuring it is inserted completely.



Insert the green clip into the designated slot of the end cap to lock it securely in place.

TYPES OF PANEL CONNECTIONS

CHC-CSEN		
CHC-CSST		
CHC-CSST + CHC-CS2T + 2 x CHC-RIN2		
CHC-CSST + CHC-CS20 + CHC-RIN2		
CHC-CSST + CHC-CS29 + CHC-RIN2		

CHECKS BEFORE START OF STRUCTURE ASSEMBLY

- Verification of the height and usable space between the floor and the finished ceiling, according to the dimensional requirements of each room.
- Verification of ceiling height reductions in corridors and bathrooms.
- Completion of the lighting design, including luminaire types and photometries.
- Identification and positioning of manifolds / distribution boxes.
- Positioning of air-handling units and inspection openings.
- Definition and installation planning of the electrical system.
- Definition and installation planning of the plumbing system.
- Definition and installation planning of the air distribution system (ducts and vents).
- Identification of any additional building services to be integrated into the radiant ceiling (e.g., smoke detectors, presence sensors, etc.).

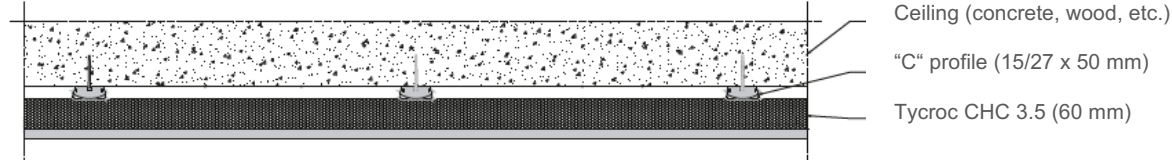
- Definition of ceiling tiles or finishing elements.
- Planning of intermediate expansion joints.
- Compliance with earthquake-resistant structural requirements (where applicable).
- Allocation of space and structural reinforcement for curtain housing.

DEFINITION OF PERIMETER FINISH:

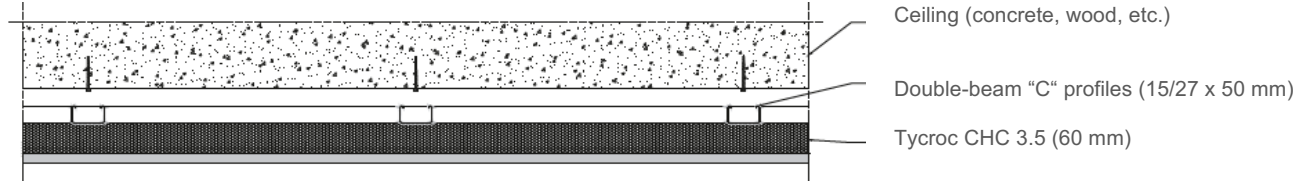
- **SILICONE:** finishing of the ceiling panel joint to vertical walls.
- **HATCHET/BEZEL:** advisable in the perimeter in the presence of concrete or masonry structures and/or structural elements desolidarising them from the plasterboard ceiling as finishing with silicone does not generally guarantee stability over time to cracks.

USEFUL PANEL/STRUCTURE THICKNESSES

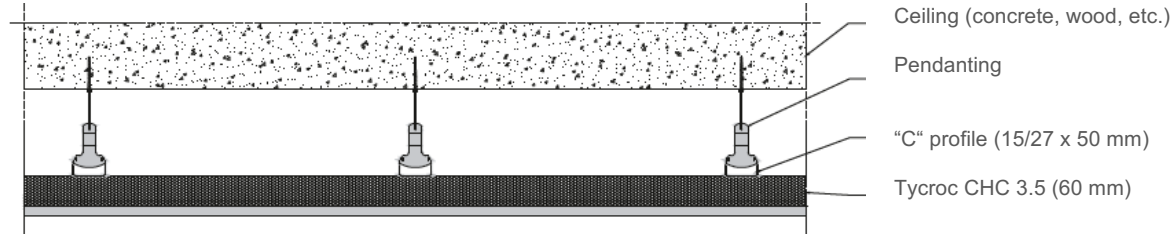
CEILING INSTALLATION WITH SINGLE FRAME IN ADHERENCE TO THE CEILING



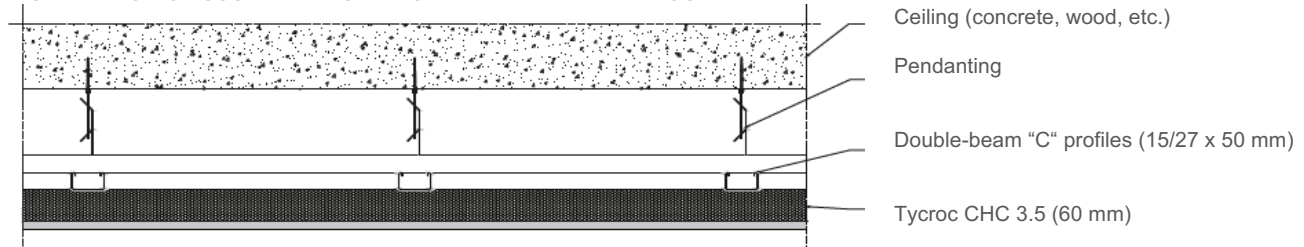
FALSE CEILING INSTALLATION WITH DOUBLE FRAME IN ADHERENCE TO SLAB



CEILING INSTALLATION WITH PENDANT AND SINGLE BEAM



INSTALLATION OF SUSPENDED CEILING WITH PENDANT AND DOUBLE BEAM

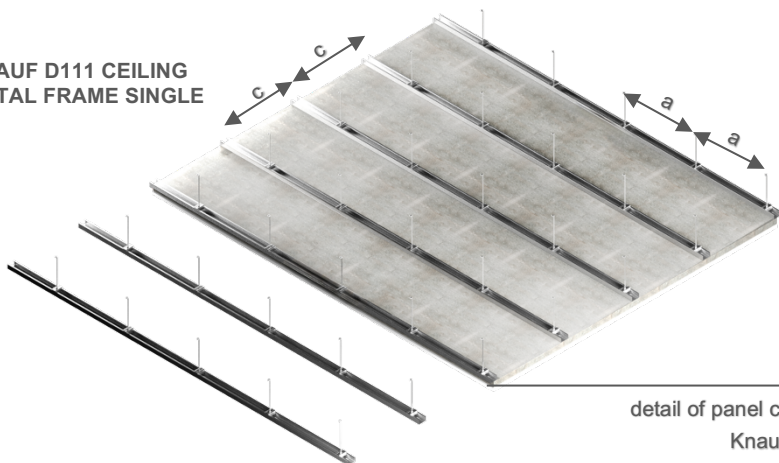


WIRE FRAME DIMENSIONING

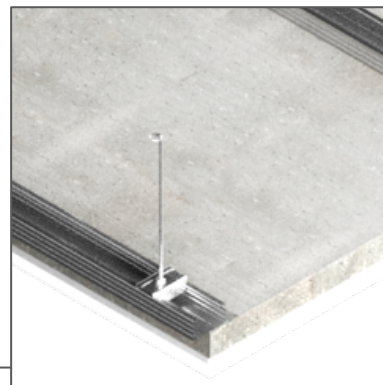
The correct dimensioning of the metal frame must be carried out based on the following assumptions and in accordance with the prescriptions provided in the Knauf D11 data sheets, supplemented by Tycroc's specific requirements for CHC panels. Reference may also be made to the prescriptions of other manufacturers of metal framing systems for continuous ceilings.

According to Knauf documentation, for example, once the ceiling type has been selected, the load class p of the ceiling is $15 < p < 30 \text{ kg/m}^2$.

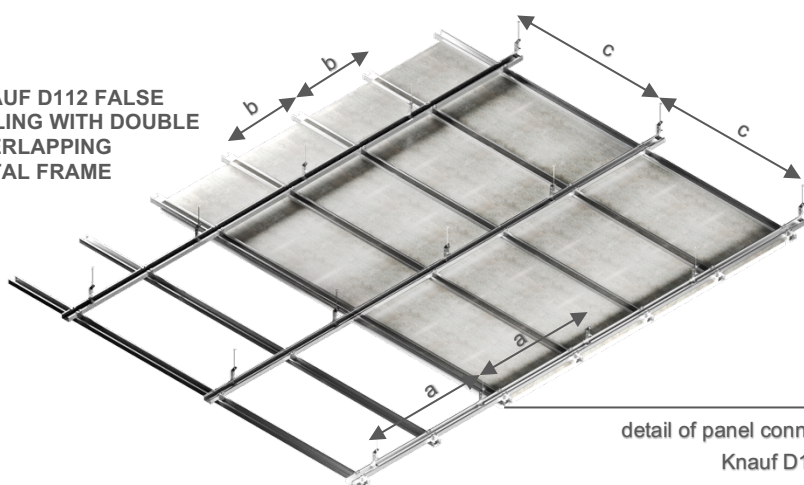
KNAUF D111 CEILING METAL FRAME SINGLE



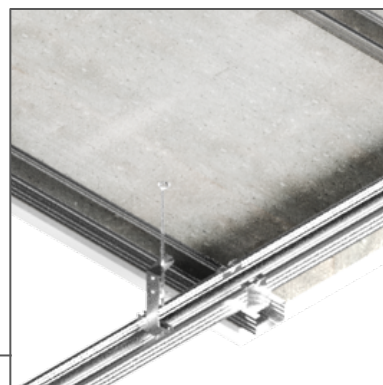
detail of panel connection with
Knauf D111 system



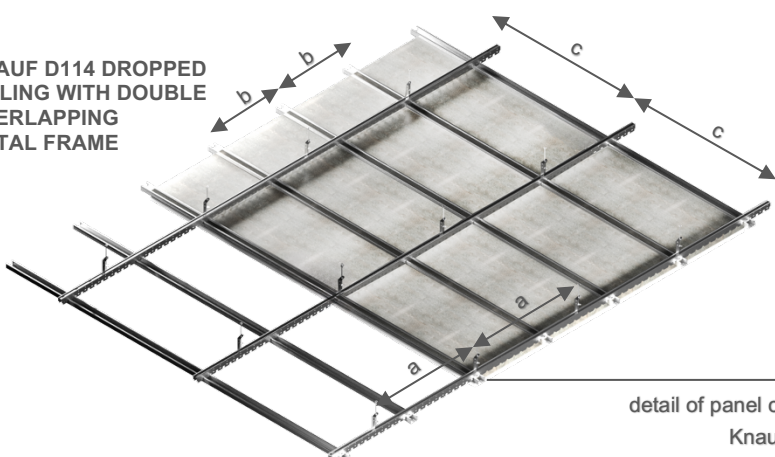
KNAUF D112 FALSE CEILING WITH DOUBLE OVERLAPPING METAL FRAME



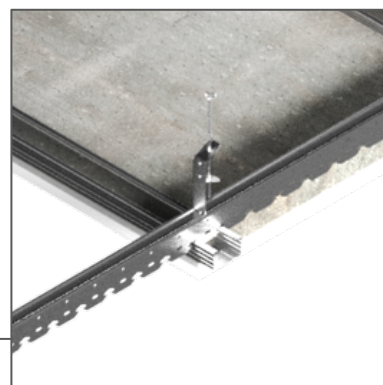
detail of panel connection with
Knauf D112 system



KNAUF D114 DROPPED CEILING WITH DOUBLE OVERLAPPING METAL FRAME



detail of panel connection with
Knauf D114 system



CALCULATION PROCEDURE

The following parameters must be determined:
 → the distance a of the suspension points
 → the centre distance c of the primary frame
 → the centre distance b of the secondary frame

According to the table below (based on Knauf D11 ceilings in load class 15<p<30 from N/m²):

Type	a (cm)	b (cm)	c (cm)
D111	50.0		50.0*
D112	75.0	50.0**	100.00
D114	75.0	50.0**	100.00

NOTES:

*) The CHC 3.5 panel filled with water weighs approximately 13.3–13.8 kg/m². Any additional loads must be added according to the Knauf D11 data sheet.

**) Installation is permitted only transversely (secondary frame orthogonal to the long side of the panel).

METAL FRAME SPECIFICATIONS

The metal framework must be constructed from galvanised steel „C“ profiles with 1st grade classification, in compliance with UNI EN 10346:2009, with the following dimensions:

- 30 × 27 × 30 mm “U” rails, insulated from perimeter structures with a 3.5 mm separation layer.
- “C Plus” studs, 27 × 50 × 27 mm, thickness 0.6 mm, or equivalent, for both primary and secondary frames (In the case of the D114 suspended ceiling, the primary frame must be made using 40/28/40 mm snap-in U-profiles, thickness 0.7 mm).
- For standard and fire-resistant systems, the use of 60 mm wide profiles is recommended (e.g., “C Plus” 25 × 60 × 25 mm, thickness 0.6 mm, or “C 27/60”, thickness 0.6 mm, for the secondary frame).

All profiles must bear CE marking in accordance with EN 14195 - Metal framing components for gypsum plasterboard systems: Definitions, requirements and test methods, and must comply with fire reaction class A1.

TIPS FOR EASY INSTALLATION

For ease of installation, a minimum available height of 15 cm from the finished floor slab is recommended.

In reduced-clearance situations where a Type D111 structure is used, the minimum allowable height is 12–13 cm from the finished floor slab.

In specific cases requiring compliance with the Decree of 26 June 2015 – “Application of the methodologies for calculating energy performance and definition of the prescriptions and minimum requirements for buildings”, a derogation of 10 cm from the minimum room heights may apply for renovated or redeveloped buildings.

Installation may be carried out using an individual Type D111 suspension frame, fixed directly to the floor slab (see diagram on page 7), with a minimum height of 10 cm.

TYPE OF SUSPENSION

The type of suspension is selected based on the maximum available height and the load-bearing requirements of the structure, as illustrated in the table below:

Type	Hook (simple)	Hook (spring)	Straight hook	Profile*	Suspension + frame	Cladding**	Total (mm)
D111	5			27	32	60	92
D112		100		54	154	60	214
			40	54	94	60	154
			40	27	67	60	127
D114		100		62	162	60	222
			40	62	102	60	162

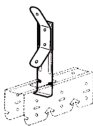
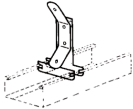
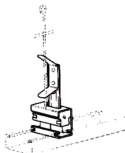
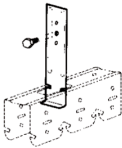
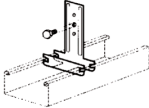
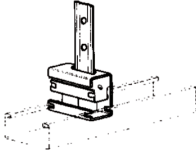
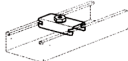
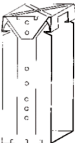
NOTES:

*) The profiles used correspond to the Knauf “C Plus” 50 × 27 mm profiles for the primary and secondary frames.

For Type D114, the primary frame must use snap-in “U” profiles 40 × 28 × 0.7 mm.

**) Cladding considered: 60 mm thick ceiling panel.

SUSPENSION ELEMENTS (load class accordingly to DIN 18168-2)

LOADING CAPACITY UP TO 25 KG (Hook with spring)			
	Hanger Ø 4 for spring hook		Spring hook for U-profile 40 x 28 x 0.7
	Spring hook for C Plus profiles 50 x 15 and 50 x 27		Silent spring hook for C Plus profiles 50 x 15 and 50 x 27
	Adjusting spring for double hangers		
LOADING CAPACITY UP TO 40 KG (Straight hook)			
	Slotted rail for straight hook		Straight hook for U-profile 40 x 28 x 0.7
	Straight hook for C Plus profiles 50 x 15 and 50 x 27		Silent straight hook for C Plus profiles 50 x 15 and 50 x 27
LOADING CAPACITY UP TO 40 KG (Simple hook)			
	Connecting screw for single hook		Simple hook spaced 5 mm hole Ø 6 for profiles C Plus 50 x 15 and 50 x 27
	Single hook with hex adjustment nut Ø 6 MA for C Plus 50 x 15 and 50 x 27 profiles		Simple spaced hook for C Plus profiles 50 x 15 and 50 x 27
	Universal spacer 0-12 mm		Hanging system for large spans

MOUNTING THE METAL STRUCTURE

1. TRACING THE POSITION OF THE PERIMETER RAIL

After determining the lowering of the ceiling, mark the position of the perimeter rail on the first wall (Figure 1).

Transfer this reference line to the remaining walls using a laser level (Figures 2 and 3).

2. INSTALLING THE HOOKS

Once the U-shaped perimeter rails have been fixed, install the suspension hooks at the predetermined centres, using suitable certified metal anchors (Figure 4)..

3. INSTALLING THE METAL FRAME

a. D111 ceiling

Cut the "C Plus" studs to a length equal to the distance between the perimeter rails minus 15 mm, to allow for easier insertion. If the required length does not allow continuous profiles between opposite walls, create a connection using the appropriate linear joint, positioned with staggered offsets between adjacent profiles (Figure 5).

Insert the studs into the perimeter rails and connect them to the selected suspension system.

The frame must have a slight upward concavity at the centre of the room.

Verify flatness using a 2.00 m straightedge (irregularities must be less than 5 mm) and check horizontality (maximum deviation from the reference plane: 3 mm/m) (Figure 6).

b. D112 ceiling

The double frame consists of a primary and secondary frame, rigidly connected using suitable orthogonal connectors.

Suspension spacing and primary/secondary centre distances must be determined as described in the previous section.

Position the primary "C" profiles along the perimeter and connect them to the adopted suspension system. Adjust the hangers or slotted bars to achieve the desired installation height.

Insert the secondary profiles into the perimeter rails and fasten them to the primary profiles using the orthogonal connection hooks (Figure 7).

As with D111, the frame must be slightly concave upwards at the centre.

Check flatness with a 2.00 m straightedge (irregularities < 5 mm) and verify horizontality (deviation < 3 mm/m) (Figure 6).

c. D114 ceiling

The double frame consists of a primary and secondary frame similar to D112; however, in this configuration the primary frame uses snap-on "U" profiles equipped with shaped hooks that allow direct connection to the secondary profiles (Figure 8). Suspension spacing and primary/secondary centre distances remain the same as previously specified.

Cut the "C Plus" studs for both primary and secondary frames to a length equal to the distance between the rails minus 15 mm. If continuous lengths cannot be achieved, create a connecting joint and offset it between adjacent profiles.

Snap the primary U-profiles into the perimeter rails and connect them to the chosen suspension system. Adjust the hangers or slotted bars to the correct height.

Insert the secondary profiles into the shaped hooks of the snap-on primary profiles. Ensure the frame has a slight upward concavity at the centre of the room.

Check flatness with a 2.00 m straightedge (irregularities < 5 mm) and verify horizontality (deviation < 3 mm/m) (Figure 6).



Figure 1

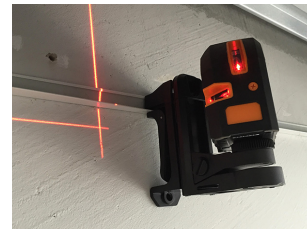


Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8

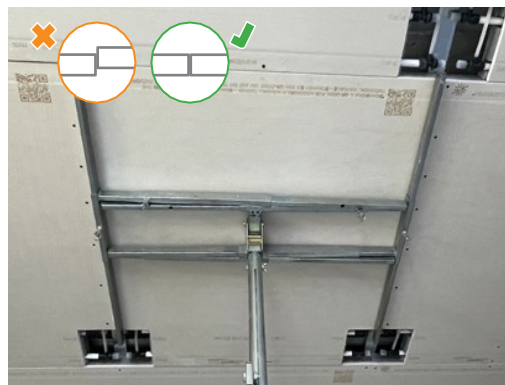
WORK AND PANEL INSTALLATION

The correct dimensioning of the metal frame is essential for proper panel installation and must comply with the best-practice requirements specified by the panel manufacturer.



For the installation of ceiling panels, it is advisable to use a mechanical hoist to ensure perfect coplanarity between the panel and the supporting structure.

The panels must be installed perpendicularly to the frame to which they are attached. Fixing must begin from the centre or from one edge of the panel in order to prevent compression-related deformation.



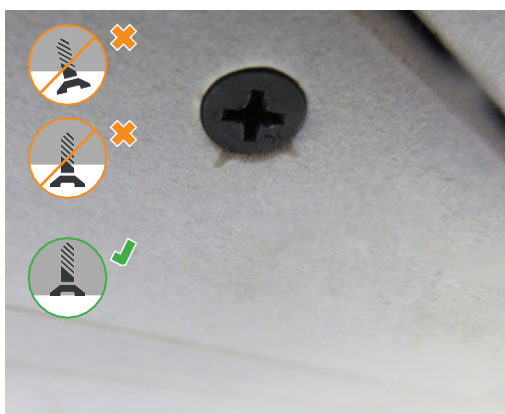
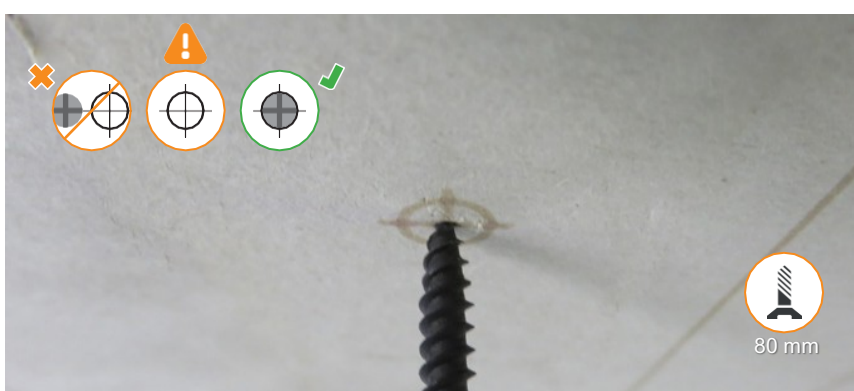
Active panels must be installed with the plasterboard side facing downward so that the laser markings remain visible.

Only phosphate-coated, quick-fixing screws, 80 mm long with wide-pitch threads in accordance with DIN 18182, may be used for fastening the panels. Screws must be placed strictly according to the laser-marked fixing points.

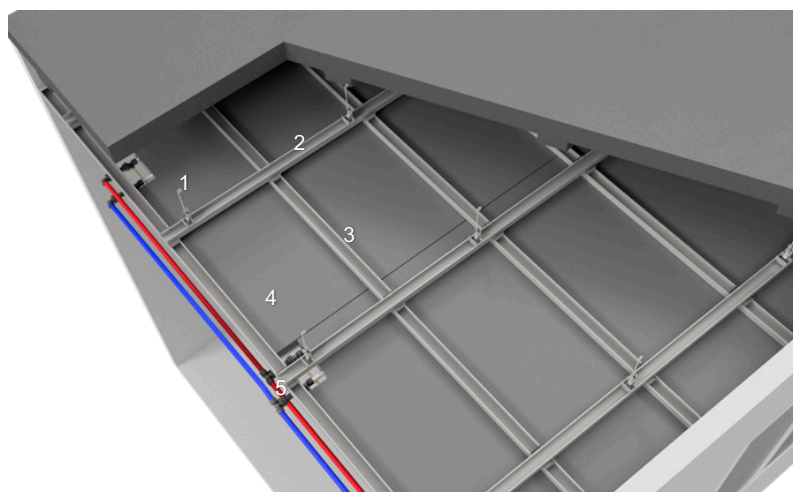
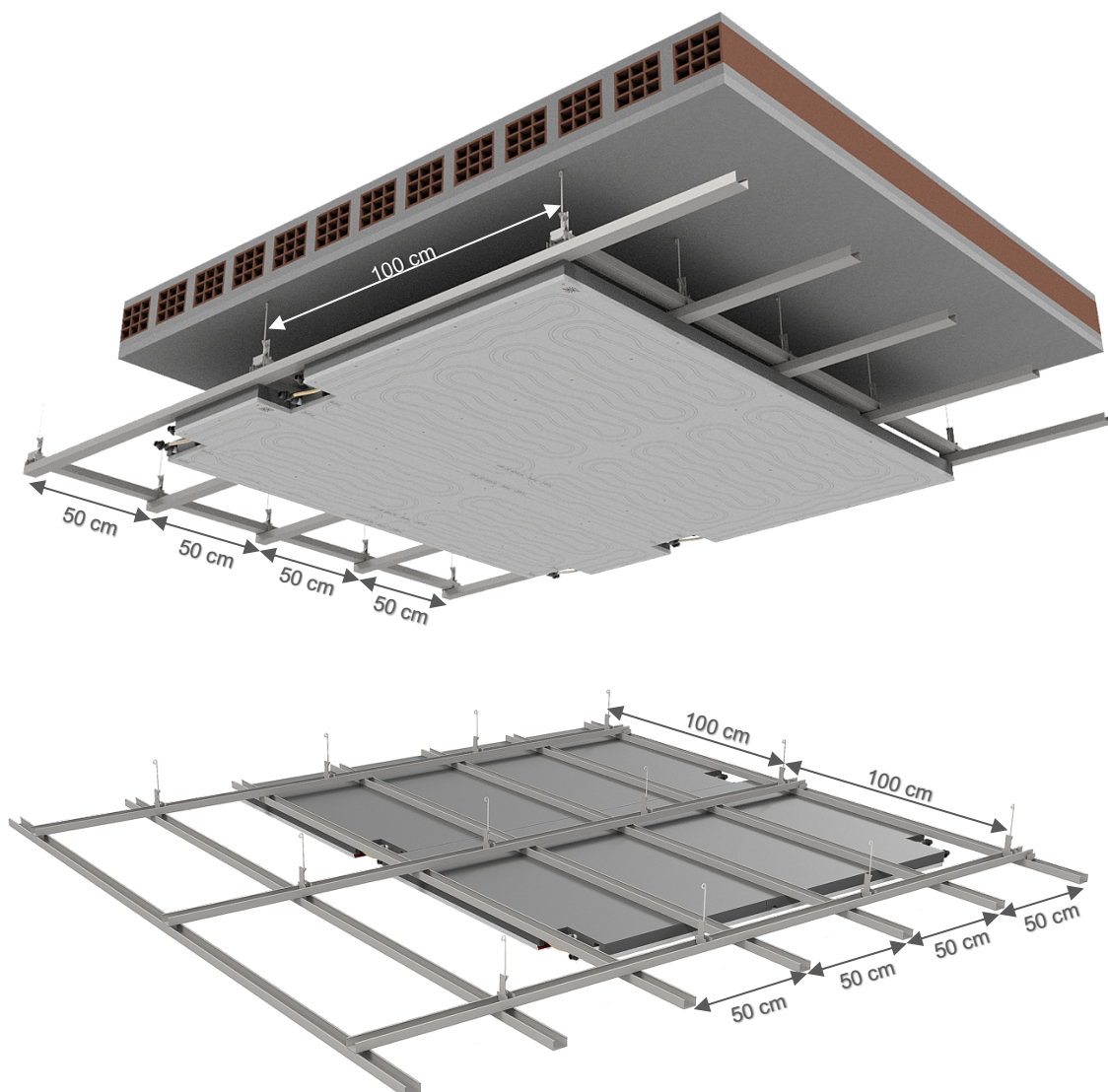
It is recommended to equip the screwdriver with a depth stop to prevent the countersunk screw head from tearing the plasterboard surface. Any screws that are misaligned or not flush with the surface must be removed and replaced.

Correct screw installation ensures proper anchorage and optimal coverage with joint filler.

Attention: Screws positioned outside the marked fixing points may damage the pipe embedded in the plasterboard.



The most commonly used and recommended solution is the adoption of a double metal frame, which, for simplicity, is defined as primary (15×50 mm or 27×50 mm) and secondary. The primary frame is positioned closest to the floor slab and is constructed using "C" or linear profiles measuring 18×50 mm or 27×50 mm, typically installed at 100 cm centres, parallel to the long side of the panel. The secondary frame is created using the same profiles, fixed to the primary frame with a maximum centre distance of 50 cm, arranged orthogonally to the long side of the panel. Suspension is achieved using standard hangers, spring hooks, or "CAV" systems commonly available on the market.



- 1 Pendants
- 2 Primary frame
- 3 Secondary frame
- 4 Tycroc CHC panel
- 5 Panel connections

EXPANSION JOINTS

The type of expansion joint and its method of connection must be defined during the design phase and must comply with the following conditions:

- The materials used must be suitable for absorbing the expansion and movement of the radiant ceiling.
- The metal frame in the vicinity of the joint must be interrupted.
- The intermediate joint serves the specific purpose of providing structural separation between supports or components of different nature or behaviour (e.g., beams with differing load-bearing capacities).
- For large continuous ceilings, expansion elements must be incorporated to divide the surface into sections no larger than 12 × 9.6 m (115.20 m²), with a joint width of 5–10 mm, in accordance with DIN 18181.
- Expansion joints may be either exposed or concealed. Commercially available expansion-joint profiles may be used (see drawing below), ensuring that the panels are installed with the correct spacing.

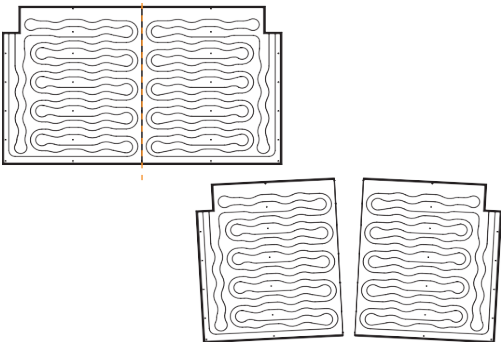
The expansion joint—whether structural or fractioning - must allow differential movement and must be provided:

- At the expansion joints of the building's load-bearing structure.
- Wherever supports of different nature or behaviour meet.
- In large ceiling areas, at intervals of 10–12 m of ceiling span.

KNAUF STRUCTURAL CONNECTORS KG® 48	
	KG® 48/12.5 single-slab system with 12.5 mm boards
	KG® 48/15 single-slab system with 15 mm boards
	KG® 48/25 double-slab system with 12.5 mm boards or single-slab system with 25 mm boards
KNAUF ALUMINIUM BUTT JOINTS KG® 11	
	KG® 11/12.5 single-slab system with 12.5 mm boards
	KG® 11/15 single-slab system with 15 mm boards
	KG® 11/25 12.5 mm double-slab system or 25 mm single-slab system
KNAUF PVC PARTITION JOINTS KG® 9.5	
	KG® 9.5/12.5 single-slab system with 12.5 mm boards
	KG® 9.5/15 single-slab system with 15 mm boards
	KG® 9.5 /25 double-slab system with 12.5 mm boards or single-slab system with 25 mm boards

PANEL SEPARATION

Panels with dimensions 1200 x 2000 x 60 mm and 600 x 2000 x 60 mm can be split in half. After cutting with suitable plasterboard equipment, the FITTING 20 CLICK&SAFE (art. CHC-CS20) on both ridges.

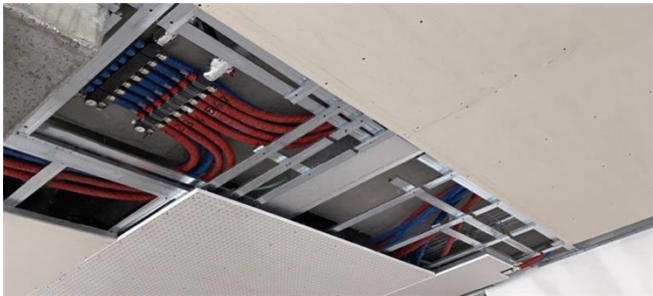


TYCROC TSL MANIFOLD

The manifold must be positioned as defined during the design phase and must remain accessible through an appropriately sized inspection hatch. The installation height must allow the operator to carry out all required manoeuvres safely and comfortably.

The supply lines from the heating plant and the connections from the radiant ceiling circuits to the panels must be connected to the manifold using the insulated multilayer pipe included in the system supply.

All fittings must be properly insulated according to the requirements of both cooling (summer) and heating (winter) operation. It is recommended to clearly identify the connections corresponding to the various rooms directly on the manifold.



HYDRAULIC CIRCUIT CONNECTIONS TO RADIANT PANELS WITH 20 X 2 MM INSULATED MULTILAYER PIPE

CASE 1 – SUSPENDED STRUCTURE:

Laying of multilayer pipe from the manifold to the various rooms before or after installing the metal frame and before or after positioning the radiant panels.

CASE 2 – ADHERED STRUCTURE:

Laying of multilayer pipe from the manifold to the various rooms after positioning the radiant panels.



INSTALLATION OF THE DEWS POINT SENSOR (ART.SENS-F)

Before closing the ceiling, the temperature sensor used for dew-point calculation must be fastened with cable ties directly to the cooling pipe at the coldest point of the medium, which is always the supply line. Proper thermal contact between the sensor and the cooling pipe must be ensured.

To ensure accurate temperature measurement, it is recommended to install standard pipe insulation (installed on site) over the sensor head. The installation must be carried out so that the sensor remains accessible and can be replaced if required (e.g., via an inspection opening or ceiling access).

The sensor cable may be extended using a two-core cable approved for mains voltage (minimum cross-section 1.5 mm²) up to a maximum length of 50 m.

Tight parallel routing with other power cables (e.g., inside the same cable duct) must be avoided.



MAXIMUM NUMBER OF PANELS THAT CAN BE CONNECTED PER SINGLE LINE

System	Panels	Rings	Surfaces
Tycroc CHC 3.5	4 pcs 1200 x 2000 mm + 1 pc 1200 x 1000 mm	9	10.8 m²

LEAK TEST

WATER PRESSURE TEST PROCEDURE

PRESSURISATION PROTOCOL FOR HYDRONIC RADIANT SYSTEMS (standard references: UNI EN 1264-4 and UNI EN ISO 11855-5 for integrated radiant systems).

As with any heating system, radiant ceilings require a precise pressure-tightness test once the connections from the radiant panel circuits to the distribution manifolds have been completed. After finishing all hydraulic connections, the pressure test may be performed—using either air or water - as specified in UNI EN 1264-4:2021.

AIR PRESSURE TEST PROCEDURE

- Pressurise the system with air at 2–3 bar. Ensure that all circuits are fully open (verify the lockshields on the manifolds) and close the automatic air vents. The test must be conducted circuit by circuit.
- The maximum pressure drop permitted by the standard is 0.2 bar/h. Although no minimum test duration is specified, a minimum of 24 hours is recommended.
- If the test is successful, verified with a pressure gauge, it is advisable to keep the system pressurised until it is subsequently filled with water.
- The test report must include photographs showing the manifold numbering and the installed pressure gauge.
- In the event of a localised leak, isolate each circuit to locate the point of failure. After correcting the issue, repeat the procedure until the test is passed successfully.

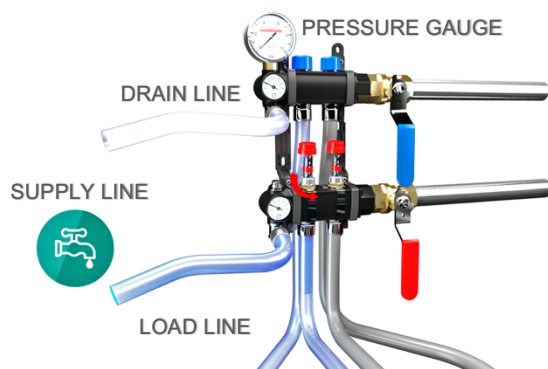


Figure 1

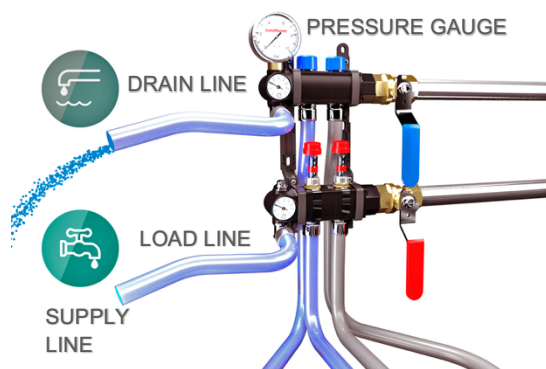


Figure 2

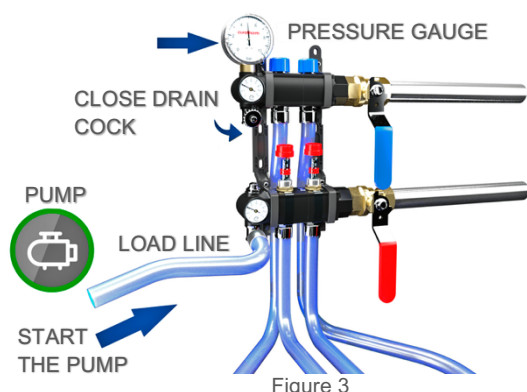


Figure 3

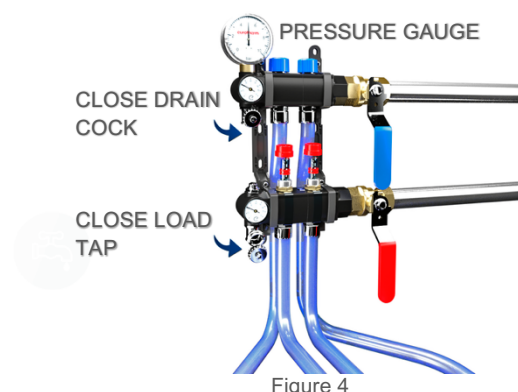


Figure 4

The water pressure test consists of supplying the circuits with water as follows:

1. Close all circuits at the manifolds.
2. Connect the water supply to the filling and draining taps on the manifold (Figure 1).
3. Fill and load each circuit individually with pressurised water, ensuring the complete removal of air. The drain must discharge fully, allowing the expelled water to flow into a collection basin (Figures 2).
4. Once all air has been purged, pressurise all circuits using the pump to 4–6 bar (Figures 3).
5. Maintain the pressure for 24 hours, ensuring that the maximum leakage does not exceed 0.2 bar/hour.
6. Complete the test documentation with photos showing the manifold numbering and the installed pressure gauge.

If leakage values exceed the permitted limits, identify the cause, rectify the issue, and repeat the entire procedure.

PRESSURE TIGHTNESS TEST WITH HEATED WATER

Maintain the system at operating pressure with heated water while the circulators are running.

Increase the fluid temperature by 5 °C per day, starting from ambient temperature and reaching the maximum operating temperature of 40 °C, allowing the system to operate continuously for 48 hours.

Then gradually reduce the temperature by cooling the fluid at a rate of 3 °C per day until ambient temperature is reached. During and after this procedure, verify that no cracks have formed at the panel joints or along the perimeter areas.

PRESSURE TIGHTNESS TEST WITH CHILLED WATER

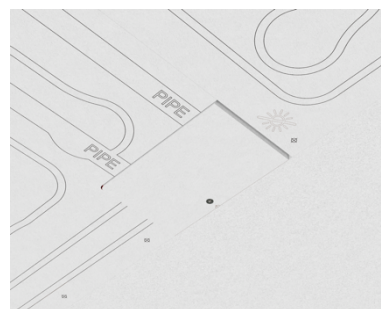
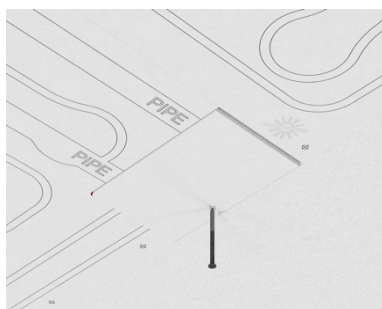
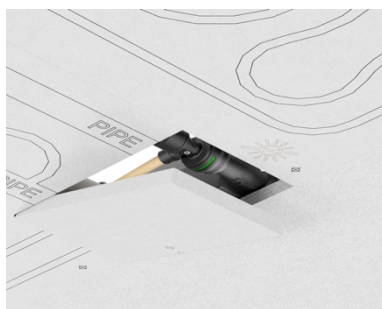
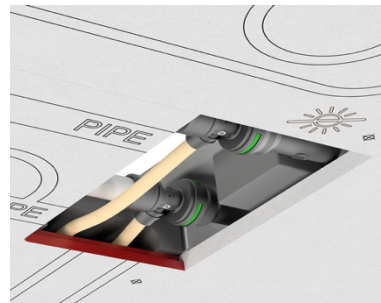
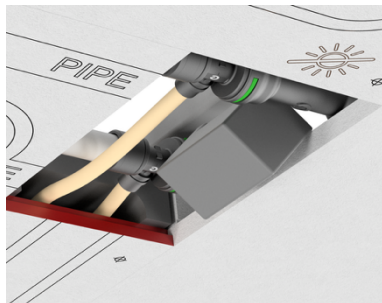
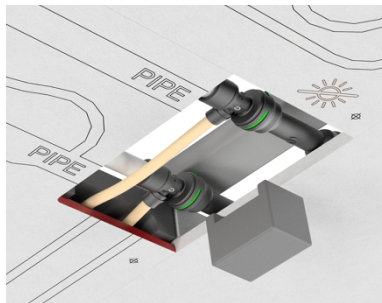
The system must be capable of measuring the temperature and humidity in each room and adjusting the water supply temperature to the panels based on the calculated room dew point.

Pressurise the system to its operating pressure, keep the circulation pumps running. The system must maintain indoor temperatures of 25–26 °C with a relative humidity of 55% for at least 48 hours. Throughout the entire test period, ensure that no openings to the outside (doors, windows, etc.) are left open.

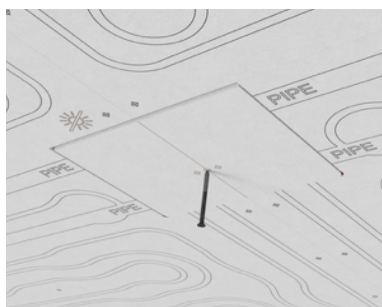
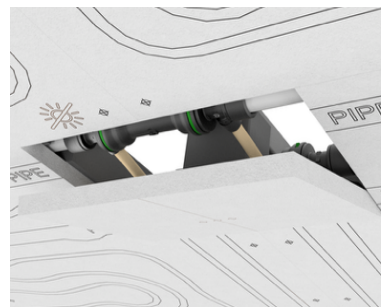
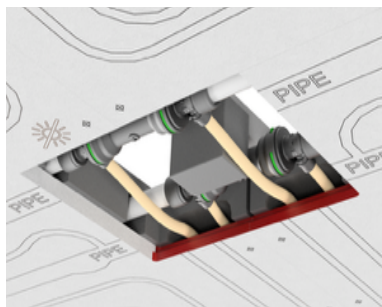
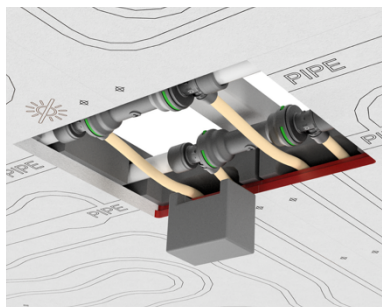
MOUNTING OF CLOSING FRAMES

Secure the EPS spacer to the frame using the dedicated grooves or by positioning it against the inner straight connecting piece of the slab. When installing a single panel at the beginning or end of a row, cut the closing board in half along the marked line. Insert the panel stop into the red groove between the gypsum plasterboard and the insulation board, then position it firmly in place. Finally, fasten the closing board to the frame by screwing into the designated track.

Half manhole cover



Whole manhole cover



The UNI 11424:2015 standard, “Non-load-bearing construction systems of coated gypsum plasterboards on metal frames,” applies to the installation of drywall systems and defines the relevant criteria and rules. This standard identifies four quality and finishing levels for gypsum plasterboard surfaces.

The required quality level depends on the room type and its lighting conditions—whether the light is critical or non-critical, or whether it is grazing or diffuse (natural or artificial). Prior to this standard, surface quality criteria were not formally regulated.

UNI 11424 clarifies the meaning of each quality level and provides recommendations and criteria for assessing the final result. To ensure correct execution of the project, it is essential to determine the final finish or coating during the planning stage, so that the necessary surface quality can be specified in advance.

The designer must define the required quality level by considering both the chosen final finish and the lighting conditions, according to the table below.

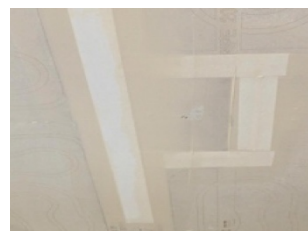
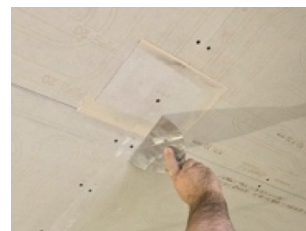
Criteria	Quality Level 1	Quality Level 2	Quality Level 3	Quality Level 4
Surface finish and conformity	Suitable only for functional purposes such as stability, fire resistance, and sound insulation. Example: joint filling of the first layer of boards, or surfaces that will be covered by thick tiles or plaster.	Medium-smooth or rough wall coverings. Opaque or medium to rough finish coatings / paints with particle size > 1 mm.	Fine-grained coatings. Matt or fine-grained coatings / paints. Finish coatings with particle size < 1 mm.	Smooth or glossy coatings, such as metal or vinyl-based wallpaper. Medium-gloss sponges, varnishes, or fine finishing coats. Special coatings such as spatulated stucco, marmorino, or similar.
Level of finish	Joint treatment only.	Homogeneous surface meeting basic requirements.	Smooth surface suitable for higher visual demands.	Homogeneous surface meeting high finishing requirements.
Aesthetic specifications	None.	Basic.	High. Only minimal traces and marks visible under direct light. Some shading may appear under grazing light.	Very high. Almost no visible traces or marks. Shading under grazing light on large surfaces is largely eliminated.
Application specifications	Joints filled using the appropriate tape.	Joints filled and finished to achieve a flat, continuous surface flush with the board; sanding if necessary.	All requirements of Level 2, plus full board skim using a quick squeegee to close the board pores.	All requirements of Level 2, plus full skimming of the board with a minimum thickness of 1 mm.

Attention: All instructions and recommendations provided in the following sections on joint treatment and surface finishing are based on the UNI 11424:2015 standard and the manufacturer's test results. In accordance with local construction practices, standards, and the materials available on the market, the use of alternative finishing products and solutions is permitted, provided they are at least equivalent in performance.

Reinforce the joints with micro-perforated paper tape to ensure optimal strength. Apply a generous, even layer of Knauf Uniflott gypsum plaster filler (or an equivalent product) along the board edges, levelling it to the surface of the boards. The filler must be prepared with sufficient fluidity and smoothness to allow proper embedding and spreading of the paper tape.



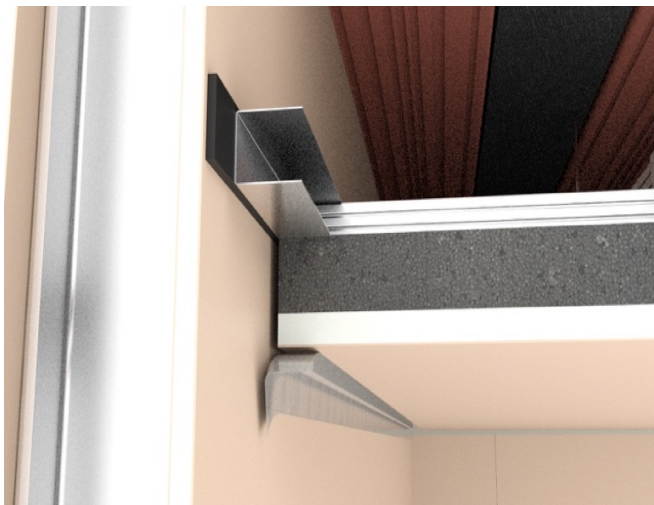
Then apply the micro-perforated reinforcing tape—with the rough side facing the board—centred along the joint. Press it firmly with a squeegee to remove excess filler beneath and beside the tape, ensuring that no air bubbles remain.



Before applying the second and third coats, ensure that the previous coat has set and is completely dry, so that any shrinkage has fully stabilised. Once dry, check that the joint is free of imperfections or small irregularities. To do this, run the spatula across the joint, positioned perpendicular to its axis, and remove any rough areas using the spatula or a sanding pad. Then apply the second coat of filler, levelling the joint surface with the surrounding plasterboard surface.

Finishing internal corners - such as the ceiling-to-wall junction - is one of the most critical stages of the work, as it involves connecting materials subject to different stresses. For this reason, it is important to distinguish between the two possible situations:

PLASTERBOARD CEILING AGAINST PLASTERBOARD WALL



PLASTERBOARD CEILING AGAINST PLASTERED MASONRY WALL

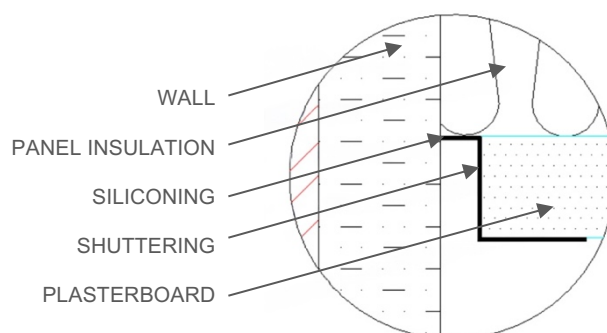
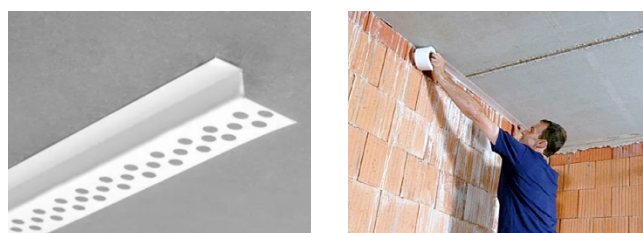
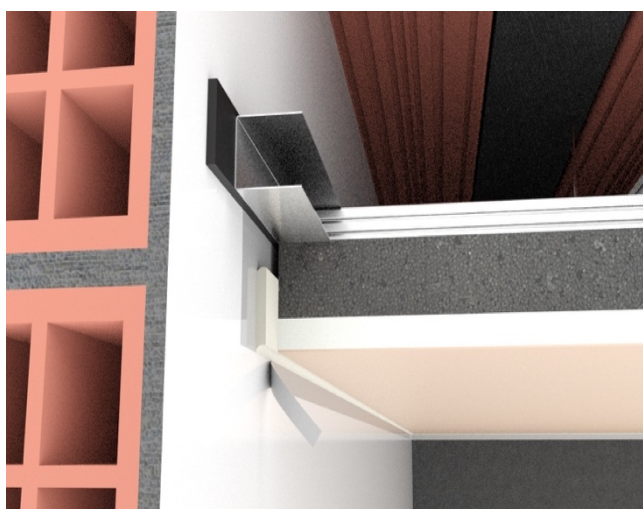
Because of the material incompatibility between masonry and plasterboard, it is recommended to create a separation (shutter) joint, as shown in the adjacent image.

The "hatchet/bezel" is a Z-shaped profile made of white pre-painted galvanised steel or plastic-coated sheet metal. Its specific geometry ensures a clean, linear, and uniform gap between the ceiling and the wall, maintaining the desired shadow-line aesthetic along the perimeter.

One side of the profile accommodates the plasterboard panel, while the opposite side is inserted into the wall. The profile is typically supplied in 3–4 metre lengths and must be cut to the required dimensions.

At the contact line between the shutter profile and the masonry wall, a white, paintable acrylic sealant is applied, providing the elasticity needed to absorb minor movements. Alternatively, Knauf Trennfix® tape may be used. This half-adhesive tape is applied to the masonry surface—on the adhesive side—prior to installing the board, positioned next to the perimeter profile. After completing the grouting of the plasterboard adjacent to the tape, trim and remove the excess (non-adhesive) portion. This creates a perfectly straight perimeter micro-joint, offering an architectural and aesthetic solution that prevents the formation of irregular cracks and crazing.

Attention: Finishing the plasterboard directly against the masonry wall does not ensure long-term crack resistance.



PERIMETER SHUTTER OR FRAME

To minimise the risk of perimeter cracking—which cannot be guaranteed under any circumstances—it is recommended to install a plastic or metal profile around the perimeter, functioning as a shutter or expansion joint. Various profile dimensions are available on the market, allowing the gap between the panel and the wall to be adjusted as needed. However, before installing the shutter profile, it is essential to verify that the walls are perfectly straight.



PREPARING SURFACES FOR PAINTING

At least 24 hours after applying the final coat of grout—and once the treated surfaces have been sanded—under normal temperature and humidity conditions (20 °C and 60% R.H.), the grout will be completely dry and the surfaces ready for final painting. To ensure proper adhesion of coatings, the surface must be clean, free of dust, grease, and any other contaminants that could interfere with the finishing process.

For optimal results in all environmental conditions, and to prevent colour differences between the grouted areas and the plasterboard facing after painting, a preliminary primer treatment is required. Apply a suitable white, pigmented primer that serves as an ideal base for the final coat of breathable paint. The use of enamel paints should be avoided.

Attention!

The installation instructions provided above constitute general guidelines for the proper installation of the Tycroc CHC radiant ceiling system and for preparing suitable ceiling substrates. For any additional ceiling materials, coverings, integrated building systems, or components used in conjunction with the Tycroc CHC radiant ceiling system, the installation and technical instructions issued by the respective product manufacturer shall always take precedence. In the event of any discrepancies between instructions, the manufacturer's directives must be followed without exception.

Tycroc OÜ assumes no responsibility or liability where applicable building regulations are not observed, where these installation instructions are disregarded, or where the instructions of other material or system manufacturers are not followed. To ensure compliant execution, safety, and long-term system performance, the installation of ceiling systems must be carried out exclusively by qualified and competent professionals.

