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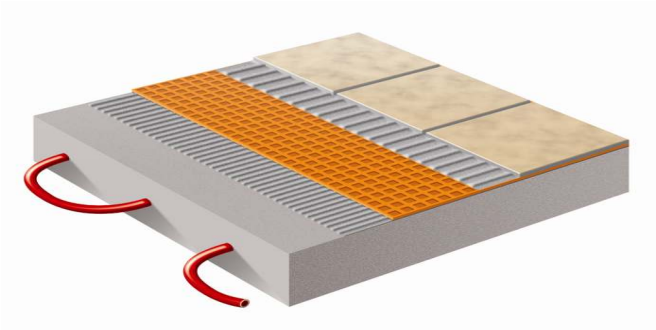
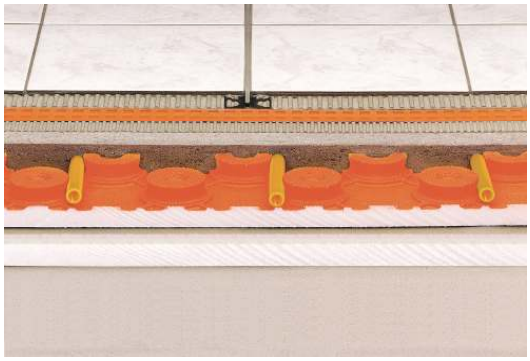
Product Application Guide: Schlüter®-DITRA 25 with Underfloor Heating

Underfloor heating has become popular with the installation of ceramic and natural stone floor tiles. The low thermal resistivity of ceramic and stone tiles allows them to be used with undertile heating without sacrificing the energy efficiency of the system. However, there are inherent challenges in combining rigid surface coatings with heating systems. A viable installation system must address the magnitude of fluctuations in temperature that contribute to increased shear stresses between the heated assembly and tile covering. The system must also limit thermal loss by promoting even heat distribution and protect the assembly from moisture ingress in wet areas.

Differential movement stresses are magnified in radiant heated floor applications due to the significant temperature gradients. Schlüter®-DITRA 25's uncoupling function protects the ceramic or stone tile covering by neutralising the differential shear stress movement between the heated assembly and the tile, thus eliminating the major cause of cracking and delaminating of the tile surface. The air channels on the underside of Schlüter®-DITRA 25 allow for a quick and even distribution of heat below the tile covering, therefore Schlüter®-DITRA 25 does not act as an insulation layer.



We recommend the unique and full warranted underfloor heating assembly Schlüter®-BEKOTEC-THERM, which is suitable for both new build and renovation projects. The system is quickly constructed, thin, none buckling and tension free, eliminating all the problems associated with traditional screed systems where rigid tile coverings are used.



Areas of Application:

- Over cementitious and gypsum screed substrates that are even and structurally sound.
- Interior dry or wet areas.
- Further underfloor heated assemblies are highlighted in the Alternative Underfloor Heating Assemblies section of this guide.

Limitations:

- Minimum tile format 50 mm x 50 mm
- Tile thickness of less than 6 mm.
- Check compatibility of resin agglomerate tiles with supplier.
- Heating system can usually be turned on 7 days following the grouting process, starting with a water temperature of 25°C this is increased by 5°C each day up to a maximum of 40°C water temperature.
- The adhesive layer over Schlüter®-DITRA 25 should not exceed 10 mm.

Requirements:

- Screed substrates should be installed in accordance with the relevant parts of BS 8204.
- Ensure all tiles are solidly bedded and no voids are present.
- Where possible it is recommended that the heating system is commissioned in accordance with industry guidelines and the underfloor heating supplier. This process must be documented and a copy provided to the tile installer.

Substrate Preparation:

- Any levelling of the assembly must be carried out prior to installing Schlüter®-DITRA 25.
- The screed surface should be prepared to achieve SR1 (Surface Regularity 1 – Maximum permissible departure from the underside of a 2 metre straightedge resting in contact with the floor is 3 mm).

Gypsum based screeds (anhydrite): According to applicable building standards, the residual moisture of a gypsum screed should not exceed 0.5% (percentage by volume) prior to the installation of tiles. Using Schlüter®-DITRA 25, the tile covering can be installed where the residual moisture content is below 2%.

- The gypsum screed will need to be sanded and appropriately primed in accordance with industry standards and suppliers requirements.
- Where hydronic underfloor heating pipes are present within the gypsum screed it may possible to accelerate the drying times using the heating system, please consult the screed supplier for advice and correct methodology.

Movement Joints:

To comply with industry requirements, we recommend Schlüter®-DILEX movement joint profiles are used for the intermediate, perimeter and connection joints within the surface covering.

- Schlüter®-DITRA 25 does not eliminate the need for movement joints, these should installed in accordance with BS 5385, BS 1264 and industry guidelines.
- Movement joints should extend through the tile covering, bedding and screed layer.
- Structural and existing joints must be carried through the floor assembly to the surface covering.
- Movement joints should be installed at tiling perimeters and where tiling meets restraining surfaces, e.g. walls, columns, steps/plinths, etc.
- Where the floor incorporates underfloor heating, the floor should be divided into bays up to 40 square metres with a maximum length of 8 metres. Where agglomerate tiles are used the tile bays should be divided into bays of no more than 25 square metres.
- Incorporate movement joints where stresses will be concentrated e.g. door openings and between heated and unheated areas.

Setting and Grouting Materials:

- Appropriate cementitious tile adhesive conforming to BS EN 12004: 2007.
- Appropriate cementitious grout conforming to BS EN 13888: 2002
- Where large format tiles are used the 'floating and buttering' technique is advised. This requires the back of the tiles to be skimmed with adhesive to give an even surface, then immediately installed into a fresh ribbed adhesive bed, ensuring that as far as practically possible, no voids remain under the tiles.
- Certain moisture sensitive tiles will need special consideration – see Other Considerations.

Other Considerations:

- Where a waterproof floor is required, all Schlüter®-DITRA 25 joints and perimeter connections be sealed with Schlüter®-KERDI-KEBA and Schlüter®-KERDI-COLL, as per our standard recommendations.
- Certain moisture sensitive stones, e.g. agglomerate stone or resin backed tiles, may require special setting materials, please consult the stone supplier and Schlüter-Systems for more information.

Alternative Underfloor Heating Assemblies:

With the introduction of alternative heating systems and assemblies to meet both demand and building regulations, some assemblies need careful consideration prior to considering a ceramic or stone tile covering. It must be noted that rigid coverings suffer where the substrate experiences vertical movement. As previously stated Schlüter®-DITRA 25 neutralises shear movement it is not designed to absorb vertical movement within an assembly.

Joisted timber floor applications (pipes suspended in void or on insulation or spreader plates):

- Generally these are considered unsuitable for tiling as the timber floor cannot be constructed in line with BS 5385 as the construction precludes the additional supports necessary to ensure the floor is rigid, stable and load bearing.
- Double layer board construction is sometimes used to try and strengthen the floor; this is usually a minimum of 15 mm external grade plywood or a cementitious proprietary construction board.
- Where Schlüter®-DITRA 25 is used over these assemblies it will minimise the risk to the tile covering but a potential risk will still remain.

Pre-grooved gypsum panels:

- These types of underfloor heating assembly are relatively new systems on the market, at present we do not have sufficient long term practical experience to provide our standard Schlüter®-DITRA warranty for the tile covering over these systems, therefore we can only advise that using the mat will minimise any potential risks to the tile covering.
- The base substrate should pre-smoothed with a suitable self levelling compound (SLC) e.g. Arditex NA, to provide a smooth flat floor. The gypsum based grooved panels can then be installed over the floor, these need to be adhered and then mechanically fixed with screws to the base substrate to achieve a solid, rigid floor assembly. The maximum spacing of the fixings should be no more than 300 mm.

- It is not advised for Schlüter®-DITRA 25 to be fixed directly to the gypsum grooved panels. A layer of self levelling compound (5-10 mm) should be applied all over the floor once the pipes have been installed, which must be pressurised during this process. As the grooved panels are gypsum based in is probably likely that the panels will need to be primed prior to using the SLC. Mesh reinforcement of the SLC may prove necessary for some
- Once a flat stable floor has been achieved, Schlüter®-DITRA can be applied over the surface using a C2F adhesive (as defined in BS EN 12004). Seal the mat joints and perimeters in accordance with our recommendations if the area is deemed to be wet, e.g. wet rooms, shower areas.
- Tiles can be applied over the Schlüter®-DITRA using an appropriate cementitious tile adhesive, usually a C2 type adhesive can be used over heated substrates, e.g. Ardex X7R. Grout material is advised to be CG2. Grout joints should be a minimum of 3 mm wide as defined in BS 5385-3.
- Movement joints should be included as advised within the movement joint section of this document.
- Where Schlüter®-DITRA 25 is used over these assemblies it will minimise the risk to the tile covering but a potential risk will still remain.

Floating diffuser panels:

Typically these assemblies consist of an insulation panel, which is pre-grooved to accept hydronic heating pipes. Depending on the system being used the insulation panels are then either covered in screed, gypsum panel or engineered timber floor panel(s).

- It is vital that the subfloor is levelled to give a flat even surface for the insulation panels to be installed over.
- The covering screed/panels must be of sufficient thickness and density to carry the necessary dead and dynamic loading of the floor without compression/deflection.
- Where Schlüter®-DITRA 25 is used over these assemblies it will minimise the risk to the tile covering but a potential risk will still remain.

Additional Resources:

- BS 5385-3,BS5385-4 & BS 5385-5
- The Tile Association publication – Tiling to Heated Floors
- The Tile association publication – Movement Joints in Internal Tiling
- Stone Federation Great Britain – Natural Stone Flooring
- BS 8000-11 Workmanship on building sites.

For project specific guidance and recommendations please consult our Technical Department:

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