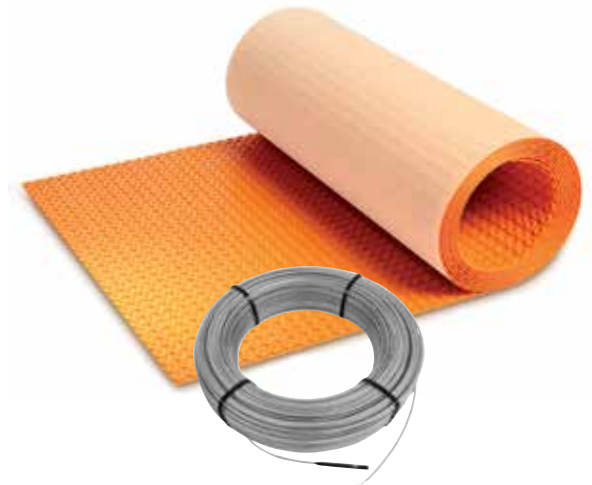
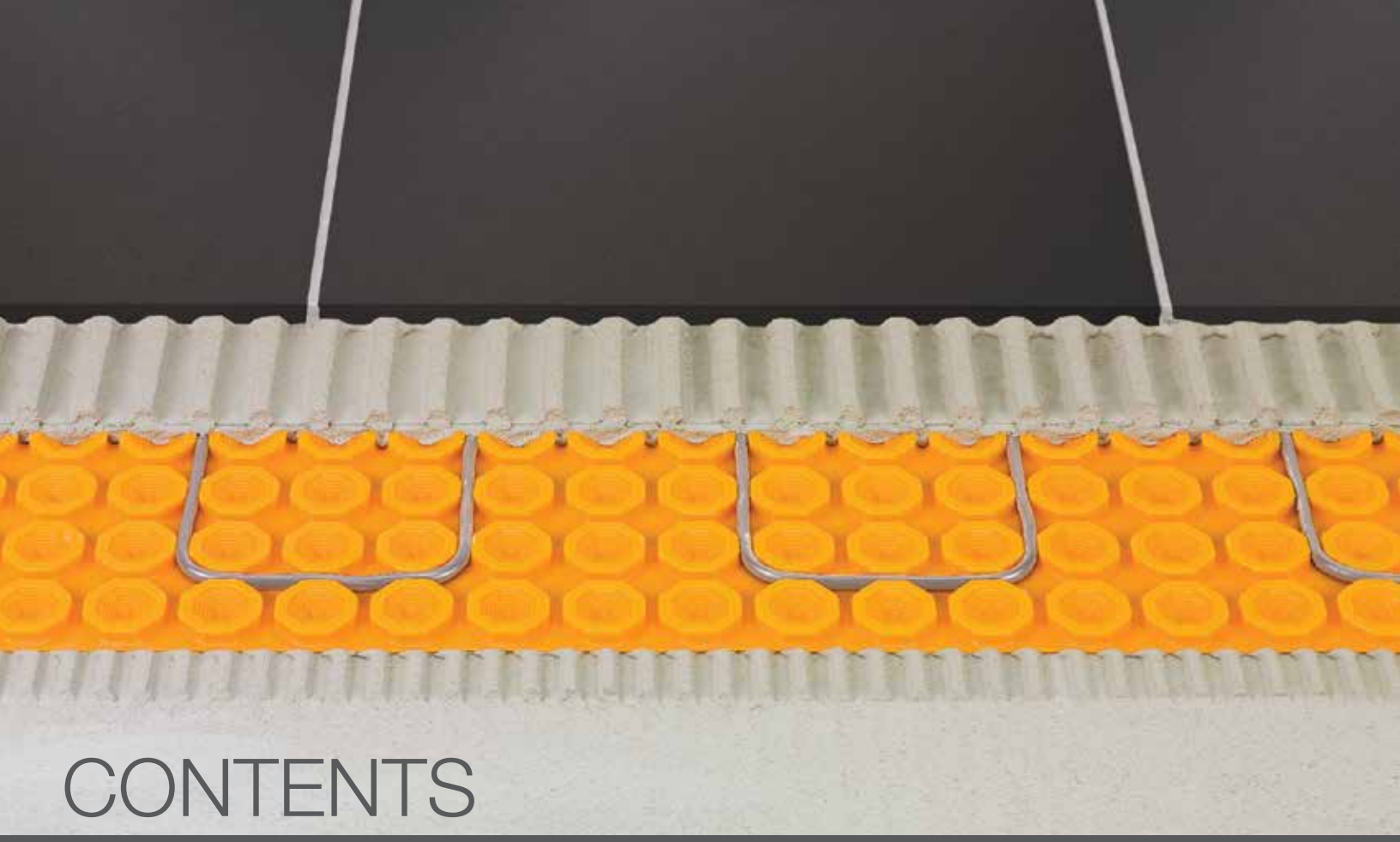




Schluter®-DITRA-HEAT Installation Guide

Esta guía está disponible en español. Para obtener una copia, llame por teléfono a nuestro servicio al cliente o descárguela desde nuestro sitio Internet : www.schluter.com.





CONTENTS

- 3 Details
- 8 Movement Joints
- 9 Wood Underlayment

Installation

- 10 Membrane
- 11 Heating Cables

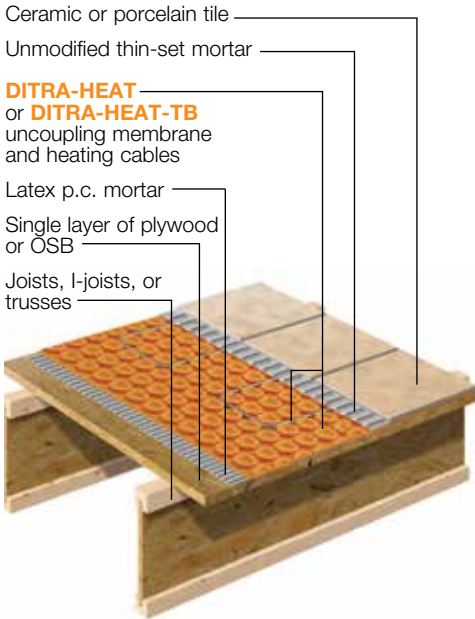
- 16 Thin-set Facts
- 16 Testing & Certifications
- 18 208 V Applications
- 19 Heating Cable Tests Log
- 20 Warranty

Heating cables must be installed by a qualified person in accordance with this handbook and with the National Electric Code (USA) or Canadian Electric Code Part I (CAN) as applicable. All electrical connections must be made by a qualified electrician, according to the electrical and building codes effective in your region.

Schluter®-Systems' written installation instructions shall have precedence over referenced industry standard guidelines and installation procedures insofar as referenced information may contain overlapping or conflicting requirements. Type, thickness, and format of the ceramic or stone tile surface covering must be suitable for the intended application.

16" (406 mm) o.c. joist spacing, single layer OSB or plywood subfloor

DH-W16-T-16



Areas of Application

- ▲ over any even and structurally sound OSB or plywood subfloor with 16" (406 mm) o.c. joist spacing
- ▲ interior dry or wet areas

Limitations

- ▲ minimum 2" x 2" (50 mm x 50 mm) tile
- ▲ for natural stone, see detail DH-W-S (page 4)

Requirements

- ▲ maximum spacing of joists, I-joists, or floor trusses is 16" (406 mm) o.c.
- ▲ minimum subfloor thickness – 19/32", 5/8" nom. (16 mm) tongue-and-groove with 1/8" (3 mm) gap between sheets.

Substrate Preparation

- ▲ verify that subfloor panels are properly fastened to framing members.
- ▲ any leveling of the subfloor must be done prior to installing DITRA-HEAT and DITRA-HEAT-TB.

Movement Joints

- ▲ DITRA-HEAT and DITRA-HEAT-TB do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Movement joints must be installed in accordance with industry standards and norms; see page 8 of this Handbook, TCNA EJ171, and TTMAC 301 MJ.

Setting and Grouting Materials

- ▲ latex portland cement (p.c.) mortar – ANSI A118.11
- ▲ unmodified thin-set mortar – ANSI A118.1
- ▲ grout – ANSI A118.3, A118.6, A118.7, A118.8

Setting and Grouting Specifications

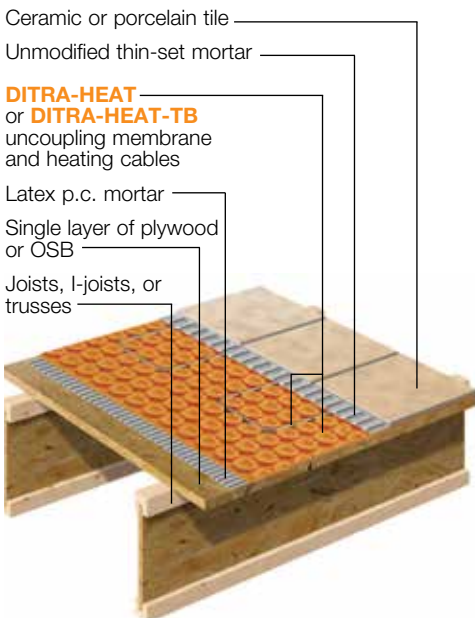
- ▲ tile – ANSI A108.5
- ▲ grout – ANSI A108.6, A108.9, A108.10

Other Considerations

- ▲ tightly butted and/or tented plywood or OSB seams must be addressed prior to installing DITRA-HEAT and DITRA-HEAT-TB.
- ▲ vapor barrier on crawl space floors according to regional building codes.
- ▲ where a waterproof floor is required, all DITRA-HEAT and DITRA-HEAT-TB seams and floor/wall transitions must be sealed with KERDI-BAND using unmodified thin-set mortar; see page 7.

19.2" (488 mm) o.c. joist spacing, single layer OSB or plywood subfloor

DH-W19-T-16



Areas of Application

- ▲ over any even and structurally sound OSB or plywood subfloor with 19.2" (488 mm) o.c. joist spacing
- ▲ interior dry or wet areas

Limitations

- ▲ minimum 2" x 2" (50 mm x 50 mm) tile
- ▲ for natural stone, see detail DH-W-S (page 4)

Requirements

- ▲ maximum spacing of joists, I-joists, or floor trusses is 19.2" (488 mm) o.c.
- ▲ minimum subfloor thickness – 23/32", 3/4" nom. (19 mm) tongue-and-groove with 1/8" (3 mm) gap between sheets.

Substrate Preparation

- ▲ verify that subfloor panels are properly fastened to framing members.
- ▲ any leveling of the subfloor must be done prior to installing DITRA-HEAT and DITRA-HEAT-TB.

Movement Joints

- ▲ DITRA-HEAT and DITRA-HEAT-TB do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Movement joints must be installed in accordance with industry standards and norms; see page 8 of this Handbook, TCNA EJ171, and TTMAC 301 MJ.

Setting and Grouting Materials

- ▲ latex portland cement (p.c.) mortar – ANSI A118.11
- ▲ unmodified thin-set mortar – ANSI A118.1
- ▲ grout – ANSI A118.3, A118.6, A118.7, A118.8

Setting and Grouting Specifications

- ▲ tile – ANSI A108.5
- ▲ grout – ANSI A108.6, A108.9, A108.10

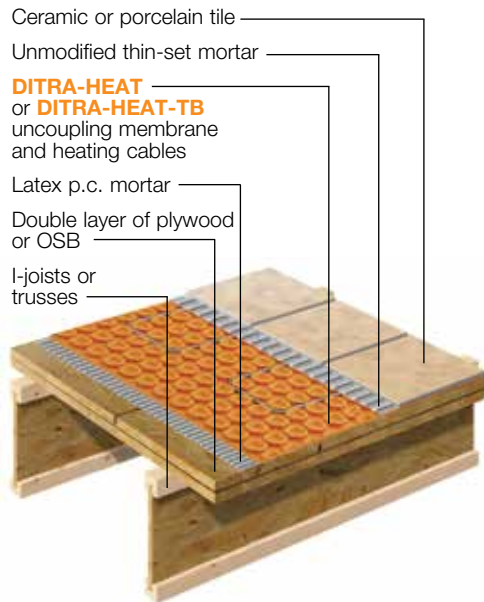
Other Considerations

- ▲ tightly butted and/or tented plywood or OSB seams must be addressed prior to installing DITRA-HEAT and DITRA-HEAT-TB.
- ▲ vapor barrier on crawl space floors according to regional building codes.
- ▲ where a waterproof floor is required, all DITRA-HEAT and DITRA-HEAT-TB seams and floor/wall transitions must be sealed with KERDI-BAND using unmodified thin-set mortar; see page 7.

Floors, Interior - Ceramic or Porcelain Tile

24" (610 mm) o.c. joist spacing, double layer OSB or plywood subfloor

DH-W24-T-16



Areas of Application

- ▲ over any even and structurally sound double layer OSB or plywood floor
- ▲ interior dry or wet areas

Limitations

- ▲ minimum 2" x 2" (50 mm x 50 mm) tile

Requirements

- ▲ maximum spacing of joists, I-joists, or floor trusses is 24" (610 mm) o.c.
- ▲ double layer wood floor consisting of:
 - minimum subfloor thickness – 23/32", 3/4" nom. (19 mm) tongue-and-groove
 - minimum underlayment thickness – 11/32", 3/8" nom. (10 mm)

Substrate preparation

- ▲ verify that subfloor panels are properly fastened to framing members.
- ▲ underlayment – minimum 11/32", 3/8" nom. (10 mm)-thick Exposure 1, plugged-face plywood or OSB with 1/8" (3 mm) gap between sheets; see page 9 for underlayment installation guidelines.
- ▲ any leveling of the subfloor must be done prior to installing DITRA-HEAT and DITRA-HEAT-TB.

Movement Joints

- ▲ DITRA-HEAT and DITRA-HEAT-TB do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Movement joints must be installed in accordance with industry standards and norms; see page 8 of this Handbook, TCNA EJ171, and TTMAC 301 MJ.

Setting and Grouting Materials

- ▲ latex portland cement (p.c.) mortar – ANSI A118.11
- ▲ unmodified thin-set mortar – ANSI A118.1
- ▲ grout – ANSI A118.3, A118.6, A118.7, A118.8

Setting and Grouting Specifications

- ▲ tile – ANSI A108.5
- ▲ grout – ANSI A108.6, A108.9, A108.10

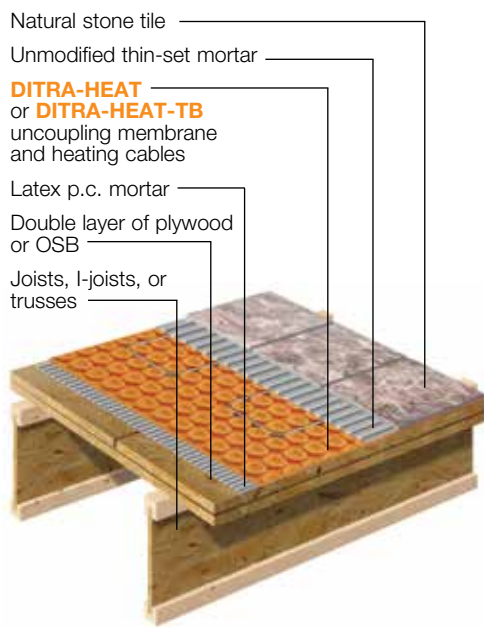
Other Considerations

- ▲ tightly butted and/or tented plywood or OSB seams must be addressed prior to installing DITRA-HEAT and DITRA-HEAT-TB.
- ▲ vapor barrier on crawl space floors according to regional building codes.
- ▲ where a waterproof floor is required, all DITRA-HEAT and DITRA-HEAT-TB seams and floor/wall transitions must be sealed with KERDI-BAND using unmodified thin-set mortar; see page 7.

Floors, Interior - Natural Stone Tile

Double layer of OSB or Plywood subfloor

DH-W-S-16



Areas of Application

- ▲ over any even and structurally sound double layer OSB or plywood floor
- ▲ interior dry or wet areas

Limitations

- ▲ requires double layer wood floor regardless of joist spacing
- ▲ minimum 2" x 2" (50 mm x 50 mm) tile

Requirements

- ▲ maximum spacing of joists, I-joists, or floor trusses is 24" (610 mm) o.c.
- ▲ double layer wood floor consisting of:
 - minimum subfloor thickness – 23/32", 3/4" nom. (19 mm) tongue-and-groove
 - minimum underlayment thickness – 11/32", 3/8" nom. (10 mm)

Substrate Preparation

- ▲ verify that subfloor panels are properly fastened to framing members.
- ▲ underlayment – minimum 11/32", 3/8" nom. (10 mm)-thick Exposure 1, plugged-face plywood or OSB with 1/8" (3 mm) gap between sheets; see page 9 for underlayment installation guidelines.
- ▲ any leveling of the subfloor must be done prior to installing DITRA-HEAT and DITRA-HEAT-TB.

Movement Joints

- ▲ DITRA-HEAT and DITRA-HEAT-TB do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Movement joints must be installed in accordance with industry standards and norms; see page 8 of this Handbook, TCNA EJ171, and TTMAC 301 MJ.

Setting and Grouting Materials

- ▲ latex portland cement (p.c.) mortar – ANSI A118.11
- ▲ unmodified thin-set mortar – ANSI A118.1
- ▲ grout – ANSI A118.3, A118.6, A118.7, A118.8

Setting and Grouting Specifications

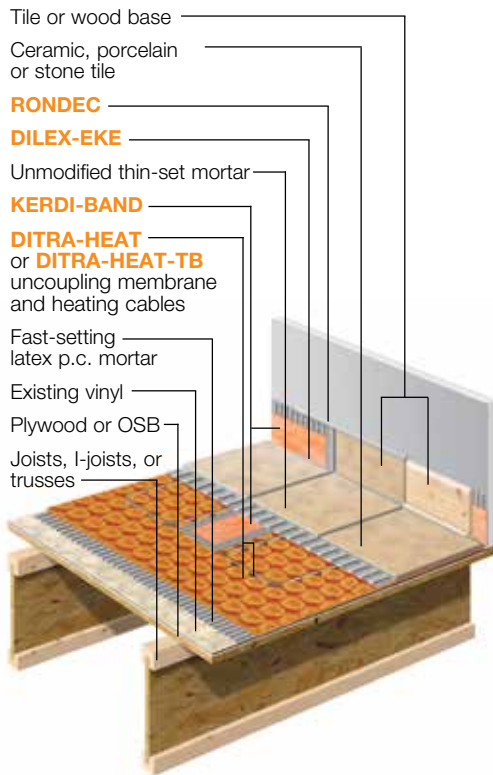
- ▲ tile – ANSI A108.5
- ▲ grout – ANSI A108.6, A108.9, A108.10

Other Considerations

- ▲ certain moisture-sensitive stones, e.g., green marble, or resin-backed tiles may require special setting materials. Consult stone supplier and Schluter®-Systems for more information.
- ▲ tightly butted and/or tented plywood or OSB seams must be addressed prior to installing DITRA-HEAT and DITRA-HEAT-TB.
- ▲ vapor barrier on crawl space floors according to regional building codes.
- ▲ where a waterproof floor is required, all DITRA-HEAT and DITRA-HEAT-TB seams and floor/wall transitions must be sealed with KERDI-BAND using unmodified thin-set mortar; see page 7.

Floors, Interior - Existing Vinyl Floors

DH-V-T-16



Areas of Application

- ▲ over any even and structurally sound substrate with existing vinyl flooring
- ▲ interior dry or wet areas

Limitations

- ▲ minimum 2" x 2" (50 mm x 50 mm) tile
- ▲ cushioned vinyl unacceptable
- ▲ perimeter bonded vinyl flooring unacceptable
- ▲ multiple layers of vinyl unacceptable

Requirements

- ▲ for wood substrates, subfloor/underlayment configuration according to detail DH-W16-T, DH-W19-T, DH-W24-T, or DH-W-S

Substrate Preparation

- ▲ ensure that the structure beneath the vinyl is sound and adequate
- ▲ ensure that vinyl is well adhered
- ▲ remove any wax and clean vinyl
- ▲ for wood substrates, nail off floor with ring shank flooring nails every 4" (102 mm) o.c. – fasteners must pass through entire thickness of assembly with minimal penetration into joists
- ▲ any leveling of the subfloor must be done prior to installing DITRA-HEAT and DITRA-HEAT-TB.

Movement Joints

- ▲ DITRA-HEAT and DITRA-HEAT-TB do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Movement joints must be installed in accordance with industry standards and norms; see page 8 of this Handbook, TCNA EJ171, and TTMAC 301 MJ.

Setting and Grouting Materials

- ▲ Fast-setting latex portland cement (p.c.) mortar – ANSI A118.4 or A118.15
- ▲ unmodified thin-set mortar – ANSI A118.1
- ▲ grout – ANSI A118.3, A118.6, A118.7, A118.8

Setting and Grouting Specifications

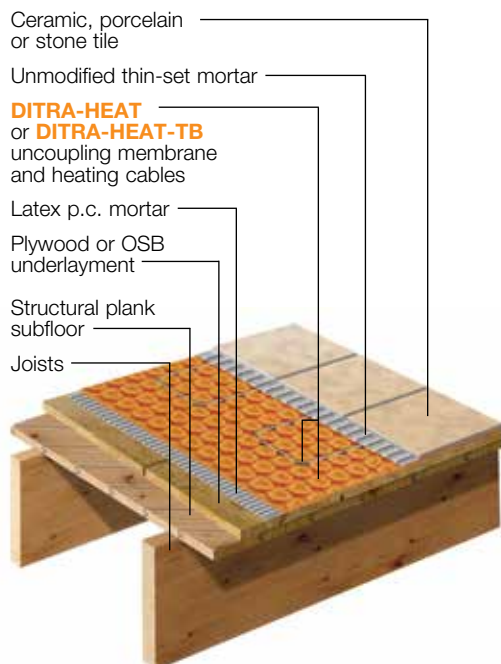
- ▲ tile – ANSI A108.5
- ▲ grout – ANSI A108.6, A108.9, A108.10

Other Considerations

- ▲ DITRA-HEAT and DITRA-HEAT-TB are adhered to the vinyl flooring using a fast-setting latex-portland cement mortar suitable for bonding to vinyl. As an alternative, a suitable cement-based embossing leveler or an appropriate latex-modified thin-set mortar can be used to skim coat the vinyl to provide a bonding surface. When skim coat is cured, DITRA-HEAT and DITRA-HEAT-TB are adhered to the skim coat using an unmodified thin-set mortar. See page 16 for discussion on latex-modified thin-set mortars sandwiched between two impervious layers.
- ▲ seaming DITRA-HEAT and DITRA-HEAT-TB, including floor/wall connections, with KERDI-BAND may be appropriate in cases where a break in the water line of an ice maker or dishwasher can damage pre-existing moisture-sensitive substrates and underlayments. KERDI-BAND floor/wall connections are just as easily concealed with wood base as with tile. KERDI-BAND floor/wall connections in dishwasher alcoves are parged with thin-set mortar; see page 7.
- ▲ vapor barrier on crawl space floors according to regional building codes.
- ▲ certain moisture-sensitive stones, e.g., green marble, or resin-backed tiles may require special setting materials. Consult stone supplier and Schluter®-Systems for more information.

Floors, Interior - Structural Plank Subfloor

DH-SP-TS-16



Areas of Application

- ▲ over structural plank subfloors
- ▲ interior dry or wet areas

Limitations

- ▲ minimum 2" x 2" (50 mm x 50 mm) tile

Requirements

- ▲ maximum spacing of joists is 24" (610 mm) o.c.
- ▲ double layer wood floor consisting of:
 - minimum structural plank subfloor thickness – 3/4" (19 mm)
 - minimum underlayment thickness – 15/32", 1/2" nom. (13 mm)

Substrate Preparation

- ▲ verify that subfloor planks are properly fastened to framing members.
- ▲ underlayment – minimum 15/32", 1/2" nom. (13 mm)-thick Exposure 1, plugged-face plywood or OSB with 1/8" (3 mm) gap between sheets; see page 9 for underlayment installation guidelines.
- ▲ any leveling of the subfloor must be done prior to installing DITRA-HEAT and DITRA-HEAT-TB.

Movement Joints

- ▲ DITRA-HEAT and DITRA-HEAT-TB do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Movement joints must be installed in accordance with industry standards and norms; see page 8 of this Handbook, TCNA EJ171, and TTMAC 301 MJ.

Setting and Grouting Materials

- ▲ latex portland cement (p.c.) mortar – ANSI A118.11
- ▲ unmodified thin-set mortar – ANSI A118.1
- ▲ grout – ANSI A118.3, A118.6, A118.7, A118.8

Setting and Grouting Specifications

- ▲ tile – ANSI A108.5
- ▲ grout – ANSI A108.6, A108.9, A108.10

Other Considerations

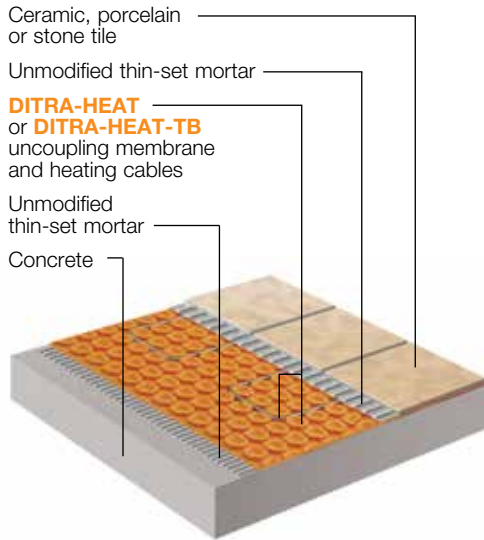
- ▲ vapor barrier on crawl space floors according to regional building codes.
- ▲ where a waterproof floor is required, all DITRA-HEAT and DITRA-HEAT-TB seams and floor/wall transitions must be sealed with KERDI-BAND using unmodified thin-set mortar; see page 7.
- ▲ certain moisture-sensitive stones, e.g., green marble, or resin-backed tiles may require special setting materials. Consult stone supplier and Schluter®-Systems for more information.

CONCRETE

Floors, Interior - Ceramic or Stone Tile

Concrete subfloor

DH-C-TS-16



Areas of Application

- ▲ over any structurally sound and even concrete subfloor
- ▲ young concrete (concrete cured less than 28 days)
- ▲ on or below grade concrete subject to moisture migration
- ▲ post-tensioned or pre-stressed concrete
- ▲ cracked concrete

Limitations

- ▲ minimum 2" x 2" (50 mm x 50 mm) tile
- ▲ concrete slabs subject to moisture migration must have all seams in DITRA-HEAT and DITRA-HEAT-TB sealed with KERDI-BAND using unmodified thin-set mortar.
- ▲ any cracks in concrete subfloor must exhibit in-plane movement only; thin-set tile assemblies, including those incorporating DITRA-HEAT or DITRA-HEAT-TB, cannot accommodate differential vertical displacement.

Requirements

- ▲ slab to be structurally sound
- ▲ slab to be free of waxy or oily films and curing compounds (when present, mechanical scarifying is necessary).
- ▲ the installation of DITRA-HEAT or DITRA-HEAT-TB and tile can begin as soon as the slab can be walked upon.
- ▲ slab to be free of standing water

Substrate Preparation

- ▲ any leveling of the subfloor must be done prior to installing DITRA-HEAT and DITRA-HEAT-TB

Movement Joints

- ▲ DITRA-HEAT and DITRA-HEAT-TB do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Movement joints must be installed in accordance with industry standards and norms; see page 8 of this Handbook, TCNA EJ171, and TTMAC 301 MJ.

Setting and Grouting Materials

- ▲ unmodified thin-set mortar – ANSI A118.1
- ▲ grout – ANSI A118.3, A118.6, A118.7, A118.8

Setting and Grouting Specifications

- ▲ tile – ANSI A108.5
- ▲ grout – ANSI A108.6, A108.9, A108.10

Other Considerations

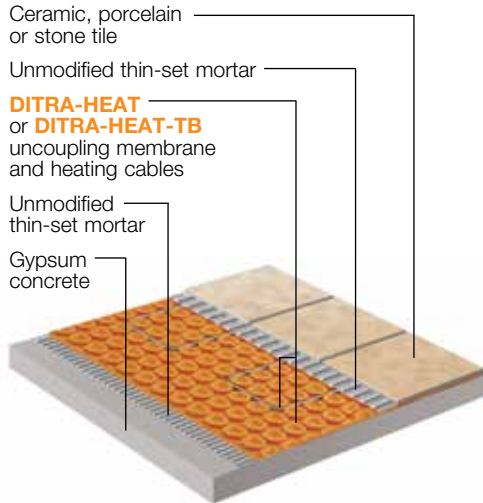
- ▲ where a waterproof floor is required, all DITRA-HEAT and DITRA-HEAT-TB seams and floor/wall transitions must be sealed with KERDI-BAND using unmodified thin-set mortar; see page 7.
- ▲ certain moisture-sensitive stones, e.g., green marble, or resin-backed tiles may require special setting materials. Consult stone supplier and Schluter®-Systems for more information.
- ▲ consider the use of DITRA-HEAT-TB to improve the response time of DITRA-HEAT in applications over concrete.

GYPSUM

Floors, Interior - Ceramic or Stone Tile

Gypsum concrete

DH-G-TS-16



Areas of Application

- ▲ over gypsum concrete underlayment placed over structurally sound wood or concrete subfloors
- ▲ interior dry or wet areas

Limitations

- ▲ minimum 2" x 2" (50 mm x 50 mm) tile
- ▲ DITRA-HEAT-TB not recommended over heated floors

Requirements

- ▲ for wood substrates, subfloor/underlayment configuration according to detail DH-W16-T, DH-W19-T, or DH-W24-T.
- ▲ where radiant heat tubes are laid over the subfloor, gypsum poured to a height that is 3/4" (19 mm) above the tops of the tubes is required before installing DITRA-HEAT and DITRA-HEAT-TB.
- ▲ residual moisture in gypsum screed, 2.0% (percentage by volume) or less before installing DITRA-HEAT and DITRA-HEAT-TB.

Substrate preparation

- ▲ gypsum – follow manufacturer's directions

Movement Joints

- ▲ DITRA-HEAT and DITRA-HEAT-TB do not eliminate the need for movement joints, including perimeter joints, within the tiled surface. Movement joints must be installed in

accordance with industry standards and norms; see page 8 of this Handbook, TCNA EJ171, and TTMAC 301 MJ.

Setting and Grouting Materials

- ▲ unmodified thin-set mortar – ANSI A118.1
- ▲ grout – ANSI A118.3, A118.6, A118.7, A118.8

Installation Specifications

- ▲ gypsum – follow manufacturer's directions
- ▲ tile – ANSI A108.5
- ▲ grout – ANSI A108.6, A108.9, A108.10

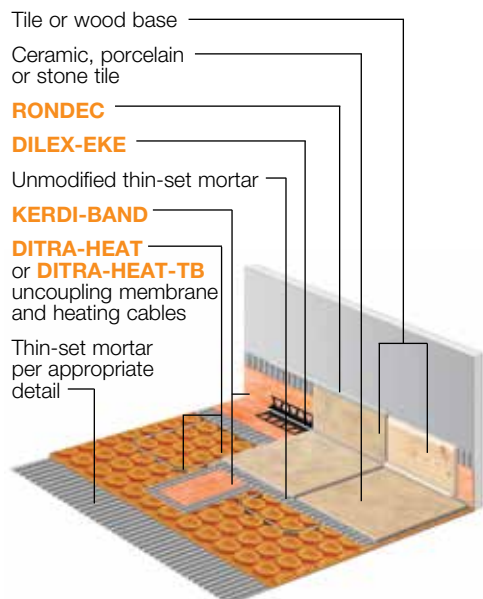
Other Considerations

- ▲ since DITRA-HEAT and DITRA-HEAT-TB must bond to the gypsum concrete, follow gypsum manufacturer's directions regarding primers and/or special surface preparation before installing DITRA-HEAT and DITRA-HEAT-TB.
- ▲ where a waterproof floor is required, all DITRA-HEAT and DITRA-HEAT-TB seams and floor/wall transitions must be sealed with KERDI-BAND using unmodified thin-set mortar; see page 7.
- ▲ certain moisture-sensitive stones, e.g., green marble, or resin-backed tiles may require special setting materials. Consult stone supplier and Schluter®-Systems for more information.
- ▲ vapor barrier on crawl space floors according to regional building codes.

WATERPROOFING

Floors, Interior - Ceramic or Stone Tile

DH-WP-16



Areas of Application

- ▲ over any even and structurally sound substrate where waterproofing is desired

Limitations

- ▲ minimum 2" x 2" (50 mm x 50 mm) tile

Requirements

- ▲ all seams in DITRA-HEAT and DITRA-HEAT-TB matting and floor/wall transitions must be sealed with KERDI-BAND using unmodified thin-set mortar. **Note:** KERDI-BAND must lap DITRA-HEAT at seams and at floor/wall transitions by a minimum of 2" (50 mm) in order to maintain waterproof integrity

Other Considerations

- ▲ seaming DITRA-HEAT and DITRA-HEAT-TB, including floor/wall connections, with KERDI-BAND may be appropriate in cases where a break in the water line of an ice maker or dishwasher can damage pre-existing moisture-sensitive substrates and underlayments. KERDI-BAND floor/wall connections are just as easily concealed with wood base as with tile. KERDI-BAND floor/wall connections in dishwasher alcoves are parged with thin-set mortar.

- ▲ in some applications the vertical section of the floor/wall transition will not accept a bond to unmodified thin-set mortar. Connections to such elements can be achieved using KERDI-FIX or suitable trowel-applied waterproofing materials, such as those that require atmospheric moisture to cure (e.g., urethane sealant).
- ▲ KERDI-DRAIN or KERDI-LINE may be used to provide drainage in DITRA-HEAT and DITRA-HEAT-TB applications. DITRA-HEAT/DITRA-HEAT-TB is sealed to the fleece-laminated KERDI-DRAIN bonding flange with a section of KERDI membrane using unmodified thin-set mortar. KERDI-FIX is used to seal the section of KERDI to the stainless steel KERDI-DRAIN bonding flange. DITRA-HEAT and DITRA-HEAT-TB is sealed to the KERDI waterproofing collar on KERDI-LINE using unmodified thin-set mortar.



MOVEMENT JOINTS

Guidelines for the placement of movement joints

- ▲ Applications without heating cables: 16' - 20' (4.9 m - 6.1 m) in each direction
- ▲ Applications with heating cables or exposed to direct sunlight or moisture: 12' - 16' (3.7 m - 4.9 m) in each direction
- ▲ Place around the perimeter of any size floor and/or against all restraining surfaces
- ▲ Fields should be as square as possible. The ratio between length and width should not exceed 1:1.5.

Typical movement joint applications

Perimeter Joints

Perimeter joints are provided at the outer edges of any tile installation to accommodate movements attributable to changes in moisture, temperature, and loading.

Surface Joints

Surface joints must be placed within the tiled surface regardless of substrate conditions. They provide for stress relief from movements in the tile field due to thermal and moisture expansion/contraction and loading.

Expansion Joints

Expansion joints must be continued through the tile covering. The DITRA-HEAT membrane is separated at expansion joints and the joint is continued through the tile covering using DILEX movement joint profiles. The DITRA-HEAT-E-HK heating cables must not cross expansion joints. When DITRA-HEAT is used as waterproofing, the abutted sections must be covered with Schluter®-KERDI-FLEX or Schluter®-KERDI-BAND.

Cold Joints

Cold joints are treated in the same manner as expansion joints. See above.

Control/Contraction Joints

DITRA-HEAT is not separated at control/contraction joints; however, surface movement joints must be provided in the tile covering in accordance with the aforementioned guidelines. See also Surface Joints.

Structural or Seismic Joints

Regarding structural and seismic expansion joints, please contact Schluter®-Systems at **1-800-472-4588 (USA)** or **1-800-667-8746 (Canada)** for proper installation guidelines.

WOOD UNDERLAYMENT

Plywood/OSB underlayment installation guidelines

Discussion

In some applications referenced in this Handbook, adding a layer of plywood or OSB before installing Schluter®-DITRA-HEAT and the ceramic or stone tile covering is required to reduce deflection and curvature of the sheathing between the joists.

Installation Guide

Place underlayment panels (Exposure 1, plugged-face plywood or OSB of minimum 3/8" (10 mm) thickness) with long dimension perpendicular to floor joists such that the following conditions are met:

1. Abut all underlayment end joints at quarter points between joists.

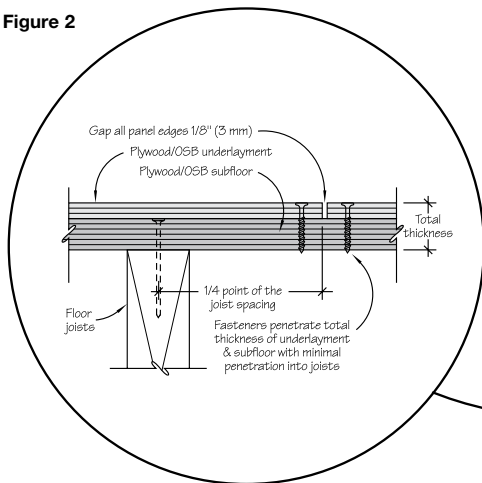
Example: Abut underlayment panels on either side of the joist centerline at: 4" (102 mm) for 16" (406 mm) o.c. joists, 5" (127 mm) for 19.2" (488 mm) o.c. joists, or 6" (152 mm) for 24" (610 mm) o.c. joists (see figures 1 & 2).

Note: Underlayment end joints should be placed as far away from subfloor end joints as possible.

2. Underlayment to overlap edge joints of subfloor by 1/2 of the width of the subfloor panel (24" - 610 mm). At restraining surfaces, overlap may be less than 24" (610 mm) when the subfloor panel is less than 48" (1.2 m)-wide (see figure 1).
3. Gap underlayment panels 1/8" (3 mm) on all ends and edges, and 1/4" (6 mm) at perimeter walls, cabinetry, or other restraining surfaces.

Figures 1 & 2 – Typical Subfloor/Underlayment Detail (Not to Scale)

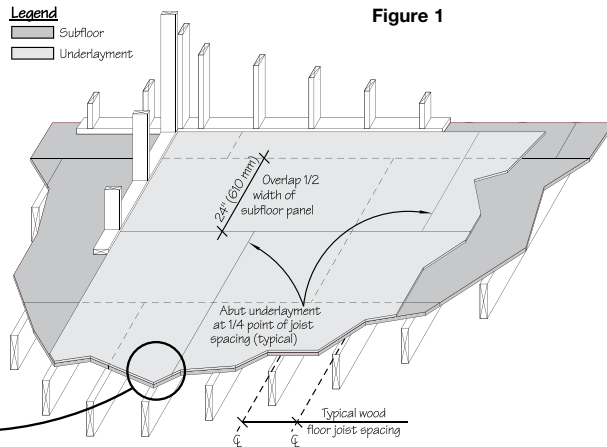
Figure 2



Legend

Subfloor
Underlayment

Figure 1



Plywood/OSB Type and Fastener Schedule Guidelines			
Plywood/OSB Grades	Plywood/OSB Thickness - in (mm)	Maximum On-Center Fastener Spacing - in (mm)	
		Panel Edges	Field
Exposure 1, plugged-face plywood or OSB	3/8 (10)	4 (102)	6 (152)
	1/2 (13)	4 (102)	6 (152)
	Greater than 1/2 (13)	6 (152)	6 (152)

The following guidelines must be followed when fastening underlayment panels:

1. Use ring shank nails (no staples) or wood screws (no drywall screws).
2. Fasteners must pass through entire thickness of underlayment and subfloor panels with minimal penetration into joists (see figure 2).

Final Word

As stated previously, Schluter-Systems requires that any underlayment panel must have a minimum thickness of 3/8" (10 mm). When in doubt, increase underlayment thickness.

INSTALLATION

Schluter®-DITRA-HEAT membrane and heating cables

Planning

For access to the DITRA-HEAT Calculation Sheet and DITRA-HEAT Online Calculator, see www.schluter.com.

- Select DITRA-HEAT and DITRA-HEAT-TB membrane according to the size of the area to be tiled.
- Select DITRA-HEAT-E-HK heating cable according to the size of the area to be heated. Be sure to measure accurately. The heating cable CANNOT be cut to fit. The allowable heated area is limited by the minimum required spacing from fixed elements such as:
 - Walls = 3" (75 mm)
 - Fixed cabinets = 2" (50 mm)
 - Heat sources (baseboard heaters, fireplaces, forced air heating ducts, etc.) = 8" (200 mm)
 - Floor drains = 6" (150 mm)
- It is helpful to plan the location of a buffer zone, as it is not possible to predict exactly where the heating cable will end. The buffer zone is an area where floor warming is not essential and heating cable installation is not planned (e.g., behind a toilet or adjacent to a door opening). This area allows for placement of excess heating cable. Heating cables may also be installed 6" (150 mm) from the wall to create a buffer zone.
- For more information on installing DITRA-HEAT-E-HK heating cables on 208 V circuits, please see page 18.
- Two DITRA-HEAT-E-HK heating cables can be connected and controlled by a single DITRA-HEAT-E-RT/-RSD/-R thermostat if the total current is less than 15 amps. The heating cable leads must be wired in parallel according to applicable electrical and building codes.
- Multiple DITRA-HEAT-E-HK heating cables over 15 amps cannot be connected to a single DITRA-HEAT-E-RT/-RSD/-R thermostat. Additional DITRA-HEAT-E-RT/-RSD/-R thermostats must be used or the DITRA-HEAT-E-RT thermostat may be combined with the DITRA-HEAT-E-RR power modules.

Preparation

- The substrate must be clean, even, and load bearing. Any leveling of the subfloor must be done prior to installing DITRA-HEAT and DITRA-HEAT-TB.
- For wood substrates, verify that panels are properly fastened. Tightly butted and/or tented plywood or OSB seams must be addressed prior to installing DITRA-HEAT and DITRA-HEAT-TB. If a plywood/OSB underlayment is to be installed, follow the Wood Underlayment guidelines on page 9.
- For vinyl substrates, ensure that the structure beneath is sound and adequate and that the vinyl is well adhered. Remove any wax and clean the surface. For vinyl over wood structures, nail off floor with ring shank flooring nails every 4" (102 mm) o.c. - fasteners must pass through entire thickness of assembly with minimal penetration into joists.
- For concrete substrates, remove any waxy or oily films and curing compounds (if present) by mechanical scarification. When bonding DITRA-HEAT and DITRA-HEAT-TB to particularly dry, porous concrete, the slab should be moistened to saturate the concrete and help prevent premature drying or skinning of the bond coat. Excess or standing surface water must be removed prior to installation.
- For gypsum substrates, residual moisture in gypsum screed must be 2.0% or less before installing DITRA-HEAT and DITRA-HEAT-TB. Follow gypsum manufacturer's directions for additional substrate preparation.

Membrane



- 1 Using a thin-set mortar that is suitable for the substrate, apply the thin-set mortar (mixed to a fairly fluid consistency, but still able to hold a notch) using a 1/4" x 1/4" (6 mm x 6 mm) square-notched trowel.



- 2 Apply DITRA-HEAT or DITRA-HEAT-TB to the floor, fleece side down. Solidly embed the matting into the mortar using a float, screed trowel, or DITRA-ROLLER, making sure to observe the open time of the bonding mortar. If the mortar skins over prior to matting installation, remove and reapply. **Note:** It may be helpful to back roll the end of the matting before installation, or place boxes of tile on top of the matting after installation, to avoid curling.



When using the DITRA-ROLLER, place a weight (e.g., bags of mortar/grout or box of tile) not to exceed 75 lbs on the DITRA-ROLLER shelf. Slowly move the roller from one end of the matting to the other, slightly overlapping successive passes.



- 3 Lift up a corner of the matting to check coverage. Proper installation results in full contact between the fleece webbing and the thin-set mortar. **Note:** Coverage may vary with mortar consistency, angle at which the trowel is held, substrate flatness, etc. If full coverage is not achieved, remove and reapply, making sure to verify proper mortar consistency and application.



- 4 Abut end and side sections of adjacent sheets. **Note:** Aligning the studs on the top of the matting during installation can help make subsequent heating cable installation easier.

ESTIMATED THIN-SET COVERAGE

To bond DITRA-HEAT to the substrate:

Use one 50 lb. (22.68 kg) bag of mortar per 100 ft² (9.3 m²).

To bond the tile to the DITRA-HEAT, using a 1/4" x 3/8" (6 mm x 10 mm) square- or U-notched trowel: Use one 50 lb (22.68 kg) bag of mortar per 40 - 50 ft² (3.7 - 4.6 m²).

To bond the tile to the DITRA-HEAT, using a 1/2" x 1/2" (13 mm x 13 mm) square- or U-notched trowel: Use one 50 lb (22.68 kg) bag of mortar per 30 - 40 ft² (2.8 - 3.7 m²).

Heating Cables

Warning

- Before installing and operating this product, the user and/or installer must read, understand and follow these instructions and keep them handy for future reference. If you have a question, please contact Customer Service by phone 800-472-4588 (USA) or 800-667-8746 (Canada) or from our website at www.schluter.com.
- If these instructions are not followed, the warranty will be considered null and void and the manufacturer deems no further responsibility for this product.
- The following instructions must be adhered to in order to avoid personal injuries or property damages, serious injuries and potentially fatal electric shocks.
- This product must be installed by a qualified person in accordance with this installation handbook and with the Canadian Electric Code Part I (Canada) or the National Electric Code (U.S.) as applicable. All electric connections must be made by a qualified electrician, according to the electrical and building codes effective in your region.
- A dedicated circuit is required for each application.
- A ground fault circuit interrupter (GFCI) is required for each circuit. The DITRA-HEAT-E-RT/-RSD/-R thermostats include a GFCI, thus a GFCI circuit breaker is not required when using these thermostats.
- NEVER install a cable designed for a 120 V power source on a 240/208 V power source.
- This cable must be grounded. Connect the heating cable ground to the ground wire from the electrical panel.
- Mark the circuit breaker in the electrical panel that is dedicated to the DITRA-HEAT floor warming system using the identification sticker provided. Additional stickers provided may be placed on the electrical panel door.
- De-energize all power circuits before installation and servicing.
- Very important: **Never CUT or modify the heating cable in any way.** This would change the cable resistance, will cause damage to the cable, and could cause cable overheating.
- Heating cables shall not be altered in the field. If the installer or the user modifies the unit, he will be held responsible for any damage resulting from this modification, and the warranty and the product certification will be void.
- The heating section of the cable must be entirely installed under the floor covering. The installation is characterized as a Type C (Embedded Floor Warming) application. In order to prevent a fire hazard, do not install it anywhere else (e.g. in a wall).
- Do not run the heating cable under a wall, from one room to another; an individual cable must not heat more than one room.
- NEVER install the heating cable under vanities, bathtub platforms, kitchen cabinets or any other fixtures or in closets. Excessive heat will build up in these confined spaces and may cause cable overheating.
- NEVER use the heating cable for any purpose other than heating a floor INSIDE a building.
- Always keep a 3 stud (3-1/2" – 9 cm) spacing between cable runs. A narrower spacing may cause a fire or damage the floor covering. A wider spacing (e.g., 4 studs) may not provide sufficient power to warm the floor to the desired temperature. Exception: a two stud spacing is used when connecting the 240 V cable to a 208 V power supply. See page 18 for more information.
- Heating cables may not touch, cross over, or overlap one another.
- Minimum spacing from walls is 3" (75 mm).
- Minimum spacing from fixed cabinets is 2" (50 mm).
- Minimum spacing from other heat sources (baseboard heaters, fireplaces, forced air heating ducts, etc.) is 8" (200 mm).
- Minimum spacing from any plumbing drain is 6" (150 mm).
- It is helpful to plan the location of a buffer zone, as it is not possible to predict where the heating cable will end. The buffer zone is an area where heating is not essential and heating cable installation is not planned (e.g., behind a toilet or adjacent to a door opening). This area allows for placement of excess heating cable. Heating cables may also be installed 6" (150 mm) from the wall to create a buffer zone.
- NEVER install the factory splice (i.e., black plastic junction between the cold lead and gray heating cable) in the wall. This will cause overheating, system failure, and could cause a fire. This splice must be installed entirely under the floor covering, as shown in the heating cable installation instructions.
- Heating cable testing is required while the heating cable is on the spool and at two subsequent steps during installation to ensure cable quality and for warranty purposes.
- If a break or damage is detected during the heating cable testing, return the cable to the original place of purchase. Do not proceed with heating cable installation into the DITRA-HEAT or DITRA-HEAT-TB matting or with the tile covering installation.
- NEVER energize the cable while it is on the spool. This would lead to overheating that could damage the cable and may cause a fire.
- Keep ends of heating devices and kit components dry before and during installation.
- The minimum temperature at which the cable should be installed is 32° F (0° C).
- Avoid folding the heating cable on itself, a radius of curvature less than 0.0625 inch (1.6 mm) could damage its sheath.
- The minimum installed bending radius of the heating cable is 0.5 inches (12.7 mm).

To avoid damaging the DITRA-HEAT-E-HK heating cable spool due to handling, we recommend turning the box over to remove the spool from the packaging box. Then pick up the spool from underneath the heating cable coil, but not by the cardboard washers.

Heating Cable Tests

To qualify for resolution for failure of the Schluter®-DITRA-HEAT-E-HK heating cables within the Schluter®-DITRA-HEAT & Schluter®-DITRA-HEAT-TB Limited System Warranty for ten (10) years, complete the following tests:

- Test 1: Conductor Resistance
- Test 2: Conductor and Ground Braid Continuity
- Floor Temperature Sensor Test

(Test 3: Insulation Resistance is recommended, but not required)

To extend the term for resolution for failure of the Schluter®-DITRA-HEAT-E-HK heating cables within the Schluter®-DITRA-HEAT & Schluter®-DITRA-HEAT-TB Limited System Warranty from ten (10) years to fifteen (15) years, complete all tests as follows:

- Test 1: Conductor Resistance
- Test 2: Conductor and Ground Braid Continuity
- Test 3: Insulation Resistance
- Floor Temperature Sensor Test

Please refer to the Heating Cable Tests Log on page 19 of this Handbook and Warranty on page 20 of this Handbook for further information.



Test 1: Conductor resistance (required)

In order to perform the resistance test, you must set your multimeter for resistance measurement and take an ohms reading between the two power leads. If the ohms reading taken on the two power leads varies significantly (10% or more) from the value printed on the spool, it either means that the cable has been damaged, or that the measuring instrument is not set properly, or that it is simply out of calibration. The ohms measurement must be recorded in your heating cable tests log (page 19).



Test 2: Conductor and ground braid continuity (required)

The heating cable is protected by a ground braid. An electrical insulator prevents any contact between the braid and the two conductors. To make sure there is no contact between the braid and the two conductors, you must perform a continuity test. Using the continuity test (buzzer logo) function of your multimeter, test your cable between the braid and one of the two power leads. If there is no continuity (if the test is successful), the multimeter will display, depending on the instrument used, either "OL" for "over load" or "1" for "infinity". Otherwise, if the test fails, neither "OL", nor "1" will be displayed and a warning tone will be heard. The test result must be recorded in your heating cable tests log (page 19).



Test 3: Insulation resistance (recommended)

This test is meant to detect very small breaks throughout the cable insulation. These breaks often remain undetected during the continuity test since they are not necessarily short circuits between the conductor and the ground braid. Even though they are small, these breaks are likely to cause a current leakage to ground. Such a leakage is usually detected by the mandatory ground-fault circuit interrupter "GFCI" (thermostat with integrated GFCI or panel mount GFCI). When a current leakage is detected, the GFCI trips the circuit, thus disabling the floor heating system. In order to perform the insulation resistance test, you must, using a megohmmeter (Mohm logo), take an insulation measurement between the braid and one of the two power leads. Make sure the megohmmeter range is set at 1000 V. The insulation resistance measurement must be equal to or greater than 1 Gigaohms (1 Gigaohms = 1 G ohms = 1000 M ohms = 1000 Mega ohms). The insulation resistance measurement must be recorded in your heating cable tests log (page 19).



DITRA-HEAT Thermostat Floor Temperature Sensor Test (required)

Test the floor temperature sensors using a multimeter to verify accuracy of the sensors. Set the multimeter for resistance at $10K \Omega \pm 2$ (at room temperature) and take a reading between the sensor leads. The resistance will vary according to the temperature (i.e., the colder the sensor, the higher the resistance). Compare the measured values with the table of expected values and record in the heating cable tests log on page 19.

Installation

Check to ensure the heating cable(s) purchased match the power supply (i.e., 120 V with 120 V or 240 V with 240 V, or 240 V with 208 V). Check to ensure you are not exceeding the 15 amp limit of the thermostat. Compare the purchased cable area to the floor area to be heated. Important: The cable area purchased should be as close to the heated area as possible, without going over. The heating cable CANNOT be trimmed or shortened to fit.

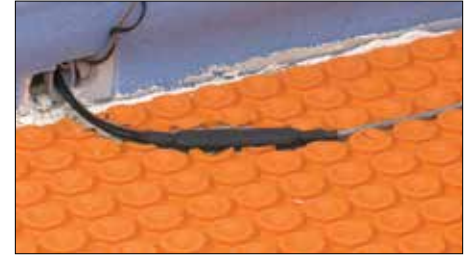
It is recommended that the installation of the DITRA-HEAT system is photographed (e.g., heating cable layout, floor temperature sensor placements, transition splice location, end splice location, and wide view of the room) for reference with future renovation work and troubleshooting. The homeowner/end user should retain these photos for their records.



1 Before the heating cable is removed from the spool, conduct the first set of required tests and record values in the heating cable tests log (page 19). If a break or damage is detected during the tests, return the heating cable to the original place of purchase.



2 Thread the heating cable cold lead through a conduit (where required by code) from the base of the wall to the thermostat electrical box. Floor temperature sensors may not be threaded through the same conduit as the cold lead.



3 Mark where the cold/hot splice will be placed, cut the DITRA-HEAT or DITRA-HEAT-TB matting, and insert the splice. It may be necessary to temporarily secure the splice to the floor with thin-set mortar or adhesive (e.g., KERDI-FIX or hot glue).
Once the heating cable cold lead and remote sensors are threaded to the thermostat electrical box, install a metal protection plate at the base of the wall. This will help prevent any damage from fasteners (e.g., nails, screws, etc.) in the future.



4 Embed the heating cables between studs, at a spacing of 3 studs (3-1/2" – 9 cm). Closer spacing may result in overheating and damage to building structures. A wider spacing (e.g., 4 studs) will not provide sufficient power to warm the floor to the desired temperature. Exception: a two-stud spacing is used when connecting the 240 V cable to a 208 V power supply. See page 18 for more information.



5 Use care not to damage the cables during installation, particularly before the cables are embedded in the matting.



The maximum allowable length of a single run is 10 ft (3 m); the cable must be turned out a u-shaped "jog" created at this point (see image above).

Notes:

- Make sure to leave space for inserting the floor temperature sensor(s).
- Heating cables may not touch, cross over, or overlap one another.
- Minimum spacing from:
 - Walls is 3" (75 mm)
 - Fixed cabinets is 2" (50 mm)
 - Plumbing drains is 6" (150 mm)
 - Other heat sources (baseboard heaters, fireplaces, forced air heating ducts, etc.) is 8" (200 mm)



6 Install the thermostat sensors evenly spaced between two cable runs, at a distance of at least 24" (610 mm) from the wall. Mark the sensor location on the DITRA-HEAT and cut the matting to recess the sensor. It is recommended to temporarily remove the heating cable from the area while cutting the matting. It may be necessary to temporarily secure the sensor to the floor with thin-set mortar or adhesive (e.g., KERDI-FIX or hot glue). Embed the sensor wire in the matting without overlapping or crossing the heating cable.



7 Once the heating cable and floor temperature sensor installation is complete, retest and record values in the heating cable tests log (page 19).

Extending the heating cable cold lead

The cold lead is made up of two 14 AWG conductors with a copper braided shield, that is used as the grounding conductor. The extension must be made with building wire that is suitable for this application and complies with applicable building and electrical codes. The cold lead itself is not made of building wire and therefore cannot pass through studs unless run through a conduit. Extension of the cold lead requires the addition of a "code compliant" junction box that must be accessible at all times. The maximum length for extending the cold lead is 75 ft (23 m).

Extending the floor temperature sensor

The floor temperature sensor can be extended using an 18 AWG, 2-wire cable. The sensor wire itself is not made of building wire and therefore cannot pass through studs unless run through a conduit. We recommend twisting and soldering the wires and using electrical tape to insulate them. There is no maximum length that is recommended, however the longer the extension the greater the possibility that the quality of the signal (and resulting temperature sensing) will be skewed. Regardless of the method used, the resulting splice must comply with applicable building and electrical codes. A loose connection between the extension and the sensor will result in a false reading or an error code.

Waterproofing

The following steps are required for waterproofing only:

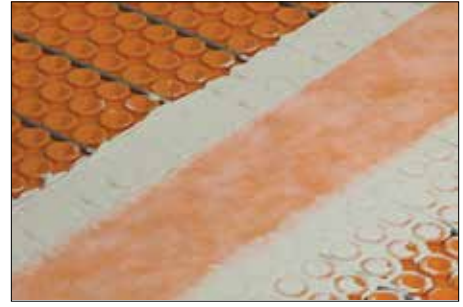
Note: While the heating cable is protected by the DITRA-HEAT and DITRA-HEAT-TB matting, be careful when applying the mortar to not damage the cable with the notched trowel.



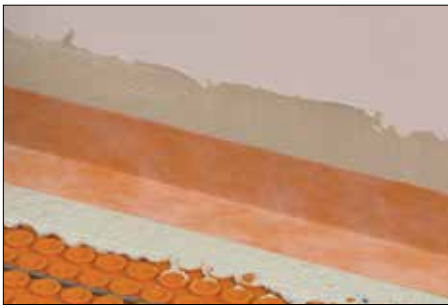
- 1 At the joints, fill the matting with unmodified thin-set mortar, approximately 8" (203 mm) wide, centered over the joint.



- 2 Comb additional unmodified thin-set mortar over the joint using a 1/4" x 3/16" (6 mm x 5 mm) V-notched trowel or the KERDI-TROWEL, which features a 1/8" x 1/8" (3 mm x 3 mm) square-notched design.



- 3 Apply 5" (127 mm)-wide KERDI-BAND, centered over the joint. Using the flat side of the trowel, firmly press the banding into the mortar to ensure 100% coverage and to remove excess mortar and air pockets.



- 4 At all wall junctions, apply KERDI-BAND as described in steps 1-3, centered where the wall and floor meet. In some applications the vertical section of the floor/wall transition will not accept a bond to unmodified thin-set mortar. Connections to such elements can be achieved using KERDI-FIX sealant and bonding compound or suitable trowel-applied waterproofing materials, such as those that require atmospheric moisture to cure (e.g., urethane sealant).

Note: KERDI-BAND must lap DITRA-HEAT and DITRA-HEAT-TB at seams and at floor/wall transitions by a minimum of 2" (50 mm) in order to maintain waterproof integrity.

Tiles

Note: While the heating cable is protected by the DITRA-HEAT and DITRA-HEAT-TB matting, be careful when applying the mortar to not damage the cable with the notched trowel.



- 1 Tile can be installed over DITRA-HEAT and DITRA-HEAT-TB immediately; no need to wait for the mortar to cure. Fill the matting with unmodified thin-set mortar and comb additional mortar over the matting using a trowel that is appropriate for the size of the tile.



- 2 Solidly embed the tiles in the setting material, making sure to observe the open time of the bonding mortar. If the mortar skins over prior to tile installation, remove and reapply.



- 3 Periodically remove and check a tile to ensure that full coverage is being attained.

Note: Coverage may vary with mortar consistency, angle at which the trowel is held, substrate flatness, etc. If full coverage is not achieved, remove and reapply, making sure to verify proper mortar consistency and application. For large-format tiles, e.g., 12" x 12" (305 mm x 305 mm) and larger, back-buttering the tiles with a skim coat of thin-set mortar is a useful way to help ensure proper coverage. The skim coat can fill in the concave area on the back of the tile (ceramic tiles are not perfectly flat) and improve contact with the mortar combed on the substrate.



- 4 Once the tile installation is complete, retest the heating cable and record values in the heating cable tests log (page 19).

Allow the assembly to cure for 7 days after grouting before putting the floor warming into service.

ESTIMATED THIN-SET COVERAGE

To bond DITRA-HEAT to the substrate:

Use one 50 lb. (22.68 kg) bag of mortar per 100 ft² (9.3 m²).

To bond the tile to the DITRA-HEAT, using a 1/4" x 3/8" (6 mm x 10 mm) square- or U-notched trowel:

Use one 50 lb (22.68 kg) bag of mortar per 40 - 50 ft² (3.7 - 4.6 m²).

To bond the tile to the DITRA-HEAT, using a 1/2" x 1/2" (13 mm x 13 mm) square- or U-notched trowel:

Use one 50 lb (22.68 kg) bag of mortar per 30 - 40 ft² (2.8 - 3.7 m²).

Operating Tips

- Do not place furniture or mats over the floor temperature sensor. They can act as insulation and raise the floor temperature reading at the thermostat. This may cause the heating to turn off before the remainder of the floor reaches the desired temperature.
- Area rugs are not recommended over the DITRA-HEAT system.
- Futons, mattresses, floor-level furniture, pillows, etc. must not be placed directly onto the heated floor. Placement of items directly onto the heated floor will prevent heat diffusion (i.e., air circulation) and could result in damage.

THIN-SET FACTS

Discussion of thin-set mortars and Schluter®-DITRA-HEAT installations

Schluter®-Systems recommends the use of unmodified thin-set mortar to set ceramic tile, including porcelain tile, over DITRA-HEAT. Portland cement-based unmodified thin-set mortars are dependent upon the presence of moisture for hydration in order to gain strength. Since DITRA-HEAT is impervious, it does not deprive the mortar of its moisture. This allows the cement to properly hydrate, resulting in a strong, dense bond coat. We do not recommend latex-modified thin-set mortar to set ceramic tile, including porcelain tile, over DITRA-HEAT because latex-modified mortars must air dry for the polymers to coalesce and form a hard film in order to gain strength. When sandwiched between two impervious materials such as DITRA-HEAT and ceramic tile, including porcelain tile, drying takes place very slowly through the open joints in the tile covering and the results could be unpredictable if extended cure times were not observed.

TESTING & CERTIFICATIONS

Uncoupling and Support/Load Distribution

The method used to establish the overall performance of a tile assembly under loading is the ASTM C627 “Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson Type Floor Tester.” The assembly is tested in cycles using a loaded, revolving carriage. Load, wheel hardness, and number of revolutions vary with each cycle. Once a specified level of damage is exceeded, the test is stopped. The TCNA Handbook for Ceramic, Glass, and Stone Tile Installation assigns performance levels to an assembly based on the number of cycles successfully completed. The ratings include residential, light, moderate, heavy, and extra heavy, in order of improving performance.

Report Number	Substrate	Joist Spacing	Tile	Rating
Schluter®-DITRA-HEAT				
TCNA-415-13	OSB	19.2" o.c.	12" x 12" porcelain	Extra Heavy
TCNA-415-13	OSB	24" o.c.	12" x 12" carrara marble	Light
TTMAC-UFT09-2013	Concrete	N/A	12" x 12" porcelain	Moderate
TCNA-415-13	Concrete	N/A	2" x 2" porcelain	Light
Schluter®-DITRA-HEAT-TB				
TCNA-455-15 (1)	Concrete	N/A	12" x 12" porcelain	Light
TCNA-455-15 (2)	Concrete	N/A	2" x 2" porcelain	Light
TNCA-455-15 (3)	Concrete	N/A	12" x 12" marble	Residential
TCNA-455-15 (4)	Plywood	19.2" o.c.	12" x 12" porcelain	Light

Assembly Notes:

1. All plywood and OSB subfloors were 23/32" (3/4" nom.) -thick; 11/32" (3/8" nom.) -thick OSB underlayment added for carrara marble test
2. Modified thin-set mortar (ANSI A118.11) to bond membrane to plywood and OSB
3. Unmodified thin-set mortar (ANSI A118.1) to bond membrane to concrete
4. Unmodified thin-set mortar (ANSI A118.1) to bond tile to membrane
5. High Performance Cement Grout (ANSI A118.7)

The test results above demonstrate that DITRA-HEAT performs extremely well under load while at the same time providing flexibility within the shear plane. DITRA-HEAT-TB was found to be suitable for residential and light commercial traffic, depending on the substrate and tile chosen.

Waterproofing

DITRA-HEAT and DITRA-HEAT-TB provide reliable waterproofing in interior applications. The products have been found to meet or exceed the requirements of the American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-set Ceramic Tile and Stone Installation A118.10.

Vapor Management

The free space under the DITRA-HEAT and DITRA-HEAT-TB mattings allow the substrate to breathe, while the material composition provides for a very low water vapor permeance, which prevents any significant vapor intrusion in the tile assembly from below.

Product	Test Method	Performance
Schluter®-DITRA-HEAT	ASTM E96*	0.21 perms
Schluter®-DITRA-HEAT-TB		0.48 perms

*Using the water method at 73°F (23°C) and 50% RH

The result is the DITRA-HEAT and DITRA-HEAT-TB effectively manage vapor and prevent damage to the tile covering as a result.

TESTING & CERTIFICATIONS

Certifications

Heating cables

The DITRA-HEAT-E-HK heating cables sets are certified or listed to the following standards and usage:

- CAN/CSA-C22.2 No. 130-03 "Requirements for Electrical Resistance Heating Cables and Heating Device Sets" under usage markings GXW for general use (G) with a wet rating (W), but specifically (X) for embedded indoor floor warming applications.
- UL 1673 "Electric Space Heating Cables" for installation in poured masonry floors within enclosed structures.
- ANSI/IEEE 515.1-2005 "IEEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Heat Tracing for Commercial Applications" for installation Type C embedded floor warming within enclosed structures.

Thermostat

The DITRA-HEAT-E-RSD digital thermostat is:

- Certified to CSA C22.2 No. 24-93 (Reaffirmed 2003) "Temperature-Indicating and Regulating Equipment".
- Listed to UL 873 "Temperature-Indicating and Regulating Equipment" 11th Edition, containing revisions through and including April 18th, 2006.

The DITRA-HEAT-E-RT/-R digital thermostats are UL listed according to the following standards:

- UL 60730-1 "Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements"
- UL 60730-2-9 "Automatic Electrical Controls for Household and Similar Use – Part 2-9: Particular Requirements for Temperature Sensing Controls"
- CSA E60730-1:13 "Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements"
- CSA E60730-2-9 "Automatic Electrical Controls for Household and Similar Use – Part 2-9: Particular Requirements for Temperature Sensing Controls"
- UL 943 4th ed. "Ground-Fault Circuit Interrupters"
- CSA C22.2 No. 144.1-06 "Ground-Fault Circuit Interrupters"

Certifications and listings may be accessed via our website at www.schluter.com

Membrane

DITRA-HEAT:

- ICC-ES Report No. ESR-2467
- ICC-ES PMG Report No. PMG-1204
- U.S. Pat. No. 8,950,141, and U.S. DES. PAT. No. D706459
Canada (C) Schluter Systems L.P. and other patents pending

DITRA-HEAT-TB:

- ICC-ES Report No. ESR-2467
- ICC-ES PMG Report No. PMG-1204
- Patent pending

Green Building

DITRA-HEAT has been independently tested for VOC emissions per California Specification 01350: "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers".

Property	Test Method	Performance
VOC emissions	CA 01350 and ASTM D5116	0.003 mg/m ³

DITRA-HEAT was found to emit 0.03 mg/m³ total VOCs. Thus, DITRA-HEAT complies with tolerable levels outlined in CA 01350. Products in compliance with the tolerable levels outlined in this specification are specified by many green building standards and rating systems, including:

- LEED v4, IEQ Credit: Low-Emitting Materials
- NAHB National Green Building Standard (ICC 700), 901.7, 901.8: Pollutant Source Control - Hard-Surface flooring, Wall coverings
- Green Globes for New Construction 2014 (v1.3), 3.7.1: Volatile Organic Compounds
- International Green Construction Code (IgCC), 806.4, 806.5: Flooring, Wall Systems
- Standard for the Design of High Performance Green Buildings (ASHRAE 189.1), 8.4.2.3, 8.4.2.6: Floor Covering Materials, Wall Systems
- California Green Building Standards Code (CALGreen), 4.504.2 (Res), 5.504.4 (Non-Res): Finish Material Pollutant Control
- CHPS, EQ2.2: Low-Emitting Materials

208 V APPLICATIONS

Discussion of Schluter®-DITRA-HEAT-E-HK Heating Cables in 208 V Applications

Schluter®-DITRA-HEAT offers complete flexibility when creating warm floors in any application. Schluter®-DITRA-HEAT-E-HK heating cables are designed for use with common 120 V and 240 V power sources. 208 V power sources are used in some cases to handle larger loads (e.g., HVAC equipment, motors, etc.) or to improve energy efficiency.

Schluter®-Systems recommends using the DITRA-HEAT-E-HK 240 V heating cables when a 208 V power source is present. However, this will reduce the heating power by 25% to 9.5 W/ft² at the standard 3-stud cable spacing, which may not be sufficient power to warm the floor in these applications. To offset the effect of the lower voltage, we recommend installing the heating cable at a 2-stud spacing in these applications. This results in an increased heating power of 14.2 W/ft², which will ensure adequate performance.

The heating cable will cover 33% less area when spaced at 2 studs compared to 3 studs. Therefore, a longer heating cable must be selected to cover a given area in these applications. Coverage for each 240 V heating cable spaced at 2 studs can be found in the table below.

DITRA-HEAT-E-HK 240 V Heating Cables in 208 V Applications at 2 Stud Spacing

Item No.	Length (ft - m)	Area (ft ² - m ²)	Power (W)	Average Power (W/ft ² - W/m ²)	Current (A)
DHE HK 240 11	35.3 – 10.8	7.1 – 0.7	101	14.2 - 152.8	0.5
DHE HK 240 16	53.1 – 16.2	10.7 – 1.0	152	14.2 - 152.8	0.7
DHE HK 240 21	70.5 – 21.5	14.2 – 1.3	203	14.2 - 152.8	1.0
DHE HK 240 27	88.2 – 26.9	17.8 – 1.7	254	14.2 - 152.8	1.2
DHE HK 240 32	105.8 – 32.2	21.3 – 2.0	304	14.2 - 152.8	1.5
DHE HK 240 38	124.1 – 37.8	25.0 – 2.3	356	14.2 - 152.8	1.7
DHE HK 240 43	141 – 43.0	28.4 – 2.6	405	14.2 - 152.8	1.9
DHE HK 240 53	176.3 – 53.7	35.5 – 3.3	506	14.2 - 152.8	2.4
DHE HK 240 64	211.6 – 64.5	42.7 – 4.0	608	14.2 - 152.8	2.9
DHE HK 240 75	248.2 – 75.7	50.0 – 4.7	713	14.2 - 152.8	3.4
DHE HK 240 85	282.1 – 86.0	56.9 – 5.3	810	14.2 - 152.8	3.9
DHE HK 240 103	339.4 – 103.4	68.4 – 6.4	975	14.2 - 152.8	4.7
DHE HK 240 129	425.8 – 129.8	85.8 – 8.0	1223	14.2 - 152.8	5.9
DHE HK 240 145	480.5 – 146.5	96.9 – 9.0	1380	14.2 - 152.8	6.6
DHE HK 240 167	551 – 167.9	111.1 – 10.3	1583	14.2 - 152.8	7.6
DHE HK 240 183	605.9 – 184.7	122.1 – 11.4	1740	14.2 - 152.8	8.4
DHE HK 240 204	673.8 – 205.4	135.8 – 12.6	1935	14.2 - 152.8	9.3
DHE HK 240 225	744.4 – 226.9	150.1 – 13.9	2138	14.2 - 152.8	10.3
DHE HK 240 269	888 – 270.7	179.0 – 16.6	2550	14.2 - 152.8	12.3

We recommend consulting with a qualified electrician for design and installation of your DITRA-HEAT system on a 208 V power source. Keep in mind during design of the system that the DITRA-HEAT-E-RT/-RSD/-R thermostats have an electrical current limit of 15 A.

HEATING CABLE TESTS LOG

Validation for warranty coverage

Each heating cable is subject to factory quality control. However, damage to the cables may happen after the product leaves the factory. In order to ensure that the cable quality remains unchanged throughout the installation process and for warranty purposes, tests must be conducted while the cable is still on the spool and during two specific subsequent steps. Measurements must be recorded in the table below and compared to initial measurements taken when the cable was on the spool in order to enable you to detect any changes related to the electrical property of the cable. Any installation-related cable damages are not covered by the warranty. See page 12 in this DITRA-HEAT Installation Handbook for complete heating cable testing instructions.

The homeowner/end user must submit a copy of the completed heating cable tests log, including "Test 1: Conductor Resistance," "Test 2: Conductor and Ground Braid Continuity," and "Floor Temperature Sensors Test", with the warranty registration card within 14 days of installing the product to qualify for resolution for failure of the Schluter®-DITRA-HEAT-E-HK heating cables within the Schluter®-DITRA-HEAT & Schluter®-DITRA-HEAT-TB Limited System Warranty for ten (10) years. Completion of "Test 3: Insulation Resistance," in addition to those listed above, will extend the term for resolution for failure of the Schluter®-DITRA-HEAT-E-HK heating cables within the Schluter®-DITRA-HEAT & Schluter®-DITRA-HEAT-TB Limited System Warranty from ten (10) years to fifteen (15) years. **Registration can be completed by mail or online at www.schluter.com/registerwarranty.**

Completion of warranty registration qualifies customers for the system warranty, in which Schluter®-Systems shall a) reinstall or replace the failed portion of the floor covering assembly or b) pay an amount not to exceed the original square foot cost of the installation of the floor covering assembly verified to be defective.

Failure to complete this warranty registration will result in a twenty-five (25) year Limited Product Warranty that the Schluter®-DITRA-HEAT-E-HK heating cable purchased shall be free from defects in material and workmanship effective on the date of purchase by or for the original purchaser. The maximum liability of the company, in this case is limited to the cost of the original cable multiplied by the percentage of the warranty period remaining.

Homeowner/end user must retain this heating cable tests log for warranty purposes.

Heating Cable Tests Log

Location/Homeowner: _____ Date of installation: _____

Certified electrician: _____ Date put into service*: _____

Identification	Factory Value	Before Installation	After Cable Installation	After Tile Installation
Test 1: Conductor Resistance Test				
Readings must fall within 10% of the factory value printed on the silver heating cable identification tag.				
Test 2: Conductor and Ground Braid Continuity Test				
	Infinity (I) or Overload (OL)			
Test 3: Insulation Resistance Test				
	Equal to or greater than 1 Gigaohms**			
Floor Temperature Sensors Test				
	Temperature		Resistance	
	°C	°F		
	10	50	18.1	
	15	59	14.8	
	20	68	12.1	
	25	77	10.0	
	30	86	8.3	

* Allow the assembly to cure for 7 days after grouting before putting the floor warming into service.

**1 Gigaohms = 1 G ohms = 1000 M ohms = 1000 Mega ohms

WARRANTY

Schluter®-DITRA-HEAT and Schluter®-DITRA-HEAT-TB 10-Year Limited System Warranty

COVERAGE AND CONDITIONS: Subject to the conditions and limitations as stated hereinafter, **Schluter®-Systems*** warrants that the **Schluter®-DITRA-HEAT system** (the "Products")** will meet all composition and performance criteria for a period of ten (10) years from the date of purchase only when the Products are used and installed in accordance with the terms and conditions of the Schluter®-DITRA-HEAT Installation Handbook and industry standard guidelines that are not in conflict with the Handbook in effect at the time of installation. Further, efflorescence is considered to be a natural occurrence with cementitious materials and is therefore not considered to be a defective condition and is not covered by this warranty. It is the responsibility of the owner/builder/ installer to ensure the suitability of all building materials and all associated building materials for the owner's intended use. It is recommended that the owner consult with an experienced and professional installer. **This warranty is conditioned and will be considered null and void and Schluter®-Systems will have the right to refuse any claims if:** (a) the Products have been improperly stored or installed, (b) any Schluter product comprising the system has been altered or otherwise modified in any way without the prior written authorization of Schluter®-Systems, (c) the Products are subject to abusive or abnormal use, lack of maintenance, or use other than that for which the Products were manufactured, and (d) the nameplate numbers have been removed or modified from any applicable parts (wire), and **(e) the homeowner/end user fails to return a copy of the completed heating cable tests log with the warranty registration card. Homeowner/end user(s) is responsible to return the warranty registration card with the logs, which may be by mail or www.schluter.com/registerwarranty. (It is AN INSTALLATION REQUIREMENT THAT the heating cable tests log be completed by the installer at time of installation and a copy returned with the registration card. We recommend the original logs be retained by homeowner/end users.)**

RESOLUTION: Upon return of the registration card with the heating cable logs*** and compliance with all the aforementioned conditions, if the Products fail to meet this warranty, then the owner's exclusive remedy and the sole obligation of Schluter®-Systems, at its election, shall be to a) reinstall or replace the failed portion of the floor covering assembly or b) pay an amount not to exceed the original square foot cost of the installation of the floor covering assembly verified to be defective. Floor covering assembly is defined to include all DITRA-HEAT materials (e.g., matting and heating cables), non-reusable flooring surfaces, and the appropriate setting and grouting materials. Further, due to conditions beyond the control of Schluter®-Systems (e.g., color and shade availability, discontinuation, normal wear and tear), Schluter®-Systems cannot guarantee or warrant an exact match to the specific tile, stone, or other flooring materials used in the installation. In such events, substantially similar materials may be substituted. This warranty does not cover scratches, dents, corrosion or discoloration caused by excessive heat, chemical cleaning products and abrasive agents. This warranty does not cover the cost of disconnection or installation.

In the event that the registration card and or heating cable tests log is not completed and returned then the Schluter®-DITRA-HEAT-E-HK heating cable shall be subject to a twenty-five (25) year Limited Product Warranty that each Schluter Heating Cable purchased shall be free from defects in material and workmanship effective on the date of the purchase by or for the original purchaser. The maximum liability of the company is limited to the cost of the original Cable multiplied by the percentage of the warranty period remaining.

DISCLAIMER: THERE ARE NO WARRANTIES BEYOND THIS EXPRESSED WARRANTY AS STATED ABOVE. ALL OTHER WARRANTIES, REPRESENTATIONS OR CONDITIONS, EXPRESSED OR IMPLIED, ARE DISCLAIMED AND EXCLUDED, INCLUDING WARRANTIES, REPRESENTATIONS OR CONDITIONS OF **MERCHANTABILITY** OR FITNESS FOR A PARTICULAR PURPOSE ARISING BY STATUTE OR OTHERWISE BY LAW OR FROM A COURSE OF DEALING OR USAGE OF TRADE. SCHLUTER-SYSTEMS EXCLUDES AND IN NO EVENT SHALL HAVE ANY LIABILITY FOR LOST PROFITS OR ANY OTHER INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL DAMAGES, ARISING OUT OF OR OTHERWISE CONNECTED TO FAILURE OF THE PRODUCTS OR FLOORING SYSTEM OF WHICH THEY ARE PART, NOR MISUSE OF THE PRODUCTS OR FLOORING SYSTEM, REGARDLESS OF ANY STRICT LIABILITY, ACTIVE OR PASSIVE NEGLIGENCE OF SCHLUTER SYSTEMS, AND REGARDLESS OF THE LEGAL THEORY (CONTRACT OR TORT OR EXTRA-CONTRACTUAL OR OTHER), NOR FROM ACTS OF WAR, TERRORISM, OVERVOLTAGE, FAULTY AND NEGLIGENT PENETRATION OF THE SYSTEM, FIRES, EXPLOSIONS, ACTS OF GOD, INTENTIONAL ACTS OF DESTRUCTION OR ANY LOSSES DUE TO STRUCTURAL FAILURE OR OTHER CAUSES UNRELATED TO THE PRODUCTS OR DELAYS, OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. THIS WARRANTY IS GIVEN IN LIEU OF ANY OTHER WARRANTY EXPRESSED OR IMPLIED. THE REMEDIES CONTAINED HEREIN ARE THE ONLY REMEDIES AVAILABLE FOR BREACH OF THIS WARRANTY. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS; SOME STATES AND PROVINCES DO NOT ALLOW DISCLAIMERS OR OTHER RESTRICTIONS OF IMPLIED WARRANTIES, SO SOME OF THE ABOVE DISCLAIMERS MAY NOT APPLY TO YOU.

TRANSFERABILITY: This Limited Warranty extends ONLY to the original end user (defined as original intended owner and user of the property/unit in which the installation is incorporated - herein referred to as "Owner") and is not transferable or assignable, unless approved in writing by the Technical Director or an Officer of Schluter®-Systems or otherwise prohibited by specific state or provincial law.

MODIFICATIONS TO WARRANTY: No changes or modification of any terms or conditions of this warranty are allowed unless authorized by written agreement and signed by the Technical Director or an Officer of Schluter®-Systems.

EFFECTIVE DATE: This warranty shall supersede and replace any and all prior oral or written warranties, agreements, or other such representations made by or on behalf of Schluter®-Systems relative to the Products or the application of the Products and shall apply to any installation occurring on or after March 1, 2016.

CLAIMS ON THIS LIMITED WARRANTY: To make a claim under this Limited Warranty, the Owner must provide Schluter®-Systems with written notice within 30 days of any alleged defect in the Products covered by this Limited Warranty, together with date and proof of purchase of the Products, proof of the costs of the original installation and name and address of all installers and completed heating cable tests log, failing which this Limited Warranty shall be of no legal effect. Schluter®-Systems reserves the right at its election and as a condition of this Limited Warranty to inspect the alleged failed and defective condition.

All U.S. Claims shall be sent to:

Schluter Systems L.P.
Attn: Warranty Claims Dept.
194 Pleasant Ridge Road
Plattsburgh, NY 12901

All Canadian Claims shall be sent to:

Schluter Systems (Canada), Inc.
Attn: Warranty Claims Dept.
21100 chemin Ste-Marie
Ste-Anne-de-Bellevue, QC H9X 3Y8

*For the purpose of this warranty **Schluter Systems, L.P.** shall provide the warranty for end users located in the United States, and **Schluter Systems (Canada) Inc.** shall provide the warranty for end users located in Canada. This warranty is limited to sales of the Products made in and intended for use in the United States and Canada.

**Schluter®-DITRA-HEAT System ("the Products"): The products are defined to include Schluter®-DITRA-HEAT and DITRA-HEAT-TB matting and DITRA-HEAT heating cables.

***To qualify for resolution for failure of the Schluter®-DITRA-HEAT-E-HK heating cables within the Schluter®-DITRA-HEAT & Schluter®-DITRA-HEAT-TB Limited System Warranty for ten (10) years, complete "Test 1: Conductor Resistance," "Test 2: Conductor and Ground Braid Continuity," and "Floor Temperature Sensors Test". Completion of "Test 3: Insulation Resistance," in addition to those listed above, will extend the term for resolution for failure of the Schluter®-DITRA-HEAT-E-HK heating cables within the Schluter®-DITRA-HEAT & Schluter®-DITRA-HEAT-TB Limited System Warranty from ten (10) years to fifteen (15) years.