DELTA-THERM

Installation Instructions

MINERAL INSULATED (MI) RADIANT HEATING CABLE ASSEMBLY

Important: before starting your floor warming project, please review these important do's and don'ts

NEVER DO THE FOLLOWING:

NEVER cut the warming element

NEVER shorten the warming roll

NEVER connect 2 warming rolls together in series

NEVER fold or position the warming element so that it overlaps itself or other wires (this could cause dangerous overheating)

NEVER run a power lead or sensor wire across the warming element

NEVER place built-in cabinets or other furniture with solid bases on top of the heated area of the floor (this could trap heat and cause dangerous overheating)

NEVER when laying the system directly on top of a concrete subfloor, lay the warming element over an expansion joint

NEVER run a warming element in or through a wall

NEVER lay the warming system closer than 2" (25mm) from a wall or another heat source

CABLE LABELING

Delta-Therm Mineral Insulated (MI) Heating Cables are UL listed for embedded applications in concrete, asphalt, gypsum based products, and mortar based products. Each cable has a UL label attached to the THWN cold lead within 3" (76mm) of the metal sleeve. The label states the following information in order: cable type (prefix, number of conductors and cable resistance), cable length, operating voltage, current draw, total wattage, watts per linear foot, and cold lead length. The cable has a standard THWN cold lead length of 10' (3m).

CABLE TESTING

Unpack the cables and test for Insulation Resistance (IR), and Total Resistance (TR). Insulation Resistance should read greater than 10 megohms. Slightly less is acceptable for humid conditions. To test IR, connect one lead of a 500 VDC Insulation Resistance tester to the cold lead conductor and the other lead to the metal cable sheath. Test in accordance with the meter manufacturers instructions. Find the TR by multiplying the length of the cable by the cable resistance. This information is found on the UL label. Compare the calculated TR with a resistance reading using an ohm meter. The reading should be within 10% of the calculated resistance.

CABLE STORAGE

All cables should be stored in a cool, dry location. Cables should be protected from damage.

Test all cables removed from storage and record the readings.

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Warning: Mineral Insulated Cable must be installed by a qualified electrician. All assembly, installation, and test instructions must be followed. Improper installation can result in property damage, serious injury, or death due to electric shock. Please call Delta-Therm Corporation at 1-800-526-7887 with any installation or operating questions.

PREPARING THE SITE

Review installation, engineering, electrical, and or architectural drawings prior to installation. Install conduit from the cable feed points, to an indoor junction box, the power panel, or an outdoor splice box, per drawings. Install appropriate grounding system per prevailing electrical code.

Verify that available voltage is the same as the cable operating voltage indicated on the UL tag.

Provide a system for relief of condensation or moisture in the conduit system.

Install conduit expansion joints anywhere the conduit crosses a planned expansion joint. Be sure the ground is maintained across the expansion joint.

Cap or plug all conduit openings temporarily.

INSTALLATION

1. Uncap conduit and swab if necessary to remove all moisture. Install the .75" (19mm) T type conduit body (TB) so that the opening is face up. Install the pressure connectors into the TB.
2. Unpack and test cables.
3. Inspect the area to be heated. Verify that the cable depth will be between 1" and 3" (25mm and 76mm) below the finished surface. Cables may be fastened to rebar, or reinforcing wire mesh. Cables installed deeper than 3" (76mm) will have a longer warm up time at the surface and potential less heat at the surface.
4. Lay out the heating cable pattern using a chalk line or other means. Refer to the cable layout drawings for the pattern and spacing. If there isn't a layout drawing, lay the zone out in a similar manner as the typical zone plan shown on Detail 2 and calculate spacing.

   To calculate cable spacing, find the square footage (Sq. Ft.) of the area to be heated and divide by the length of cable given on the UL tag. Multiply this number by 12 to get the approximate spacing in inches (mm) on center.

EXAMPLE:

100 Sq. Ft. (30 Sq.m) area

200 Ft. (60m) of cable

100/200 = 0.5

0.5 x 12 = 6" (152mm)

Cable spacing is 6 inches on center. Verify that the proper number of cable runs have been installed.

5. Refer to Detail 1. Feed one cold lead through a pressure connector until the metal termination sleeve is mid-way into the pressure connector. Wrap the UL tag around the cold lead to feed through the connector. Tighten the connector.
6. Wrap the thermal gradient section around the TB as indicated on Detail 1. Roll the cable out carefully and fasten to the substrate using prepunched stainless steel strap, metal clips, or nylon cable ties.
7. Bring the second lead back and wrap around the TB as indicated on Detail 1.
8. Pull the cold lead through the pressure connector until the metal sleeve is mid-way through the connector. Tighten the connector and pull the leads through the conduit to the junction box.
9. Test the cables for insulation resistance and total resistance. Record the readings.
10. Install the duct seal between the TB and the conduit. Fill the TB with Delta-Dry powder and seal with a gasket and cover.

When installing the embedding materials, Delta-Therm recommends that an electrician operate an insulation resistance tester while materials are installed over the cable.

If the meter indicates a fault, stop the installation and locate the fault. The fault should be boxed out for about 3 linear feet (791cm) of cable for repair. Most faults can be visually located prior to the installation. When pouring concrete, it may be necessary to feel for a break in the cable.

The balance of the installation can then be completed. The cable should be repaired after embedding materials have set up. Re-test and pour over repaired section. A final test should be conducted and readings recorded.

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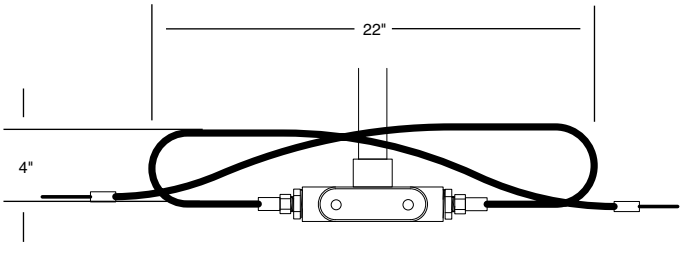
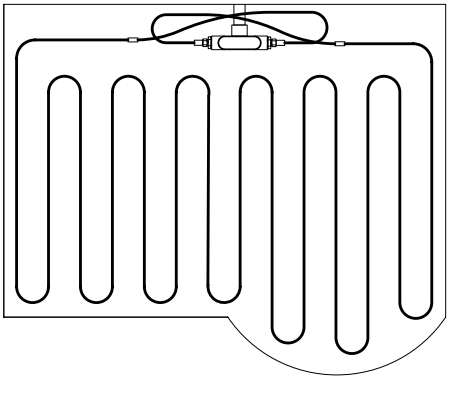
TYPICAL DETAILS AND SECTIONS



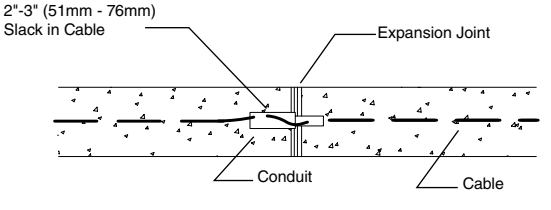
Detail 1. Plan of cable entry into the T type conduit body (TB)

Pull pigtails through conduit, and install duct seal. Fill the conduit body with Delta-Dry, and install gasket and cover.

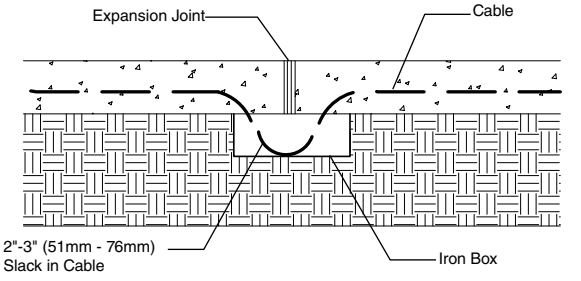
NOTE: The T type conduit body is not a splice box. The TB is embedded in the noncombustible medium.



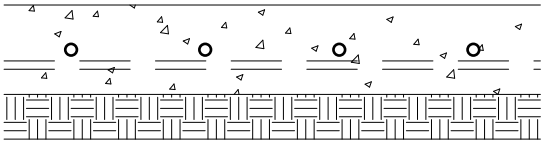
Detail 2. Typical cable layout - radiant heat



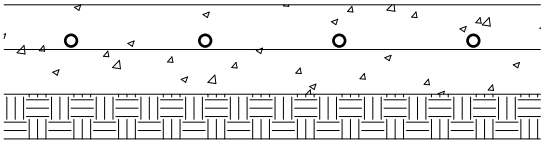
Detail 3. Expansion joint detail using a conduit expansion joint fitting



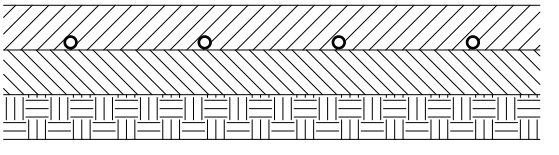
Detail 4. Expansion joint detail using a malleable iron box under the slab. Box to be filled with sand.



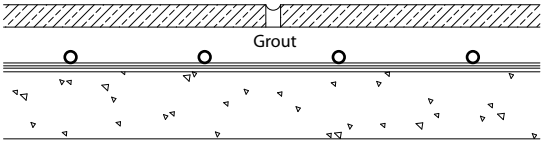
Detail 5. Cables attached to rebar in a single pour concrete system



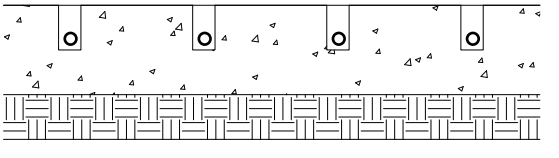
Detail 6. Cables covered in a concrete cap over concrete.



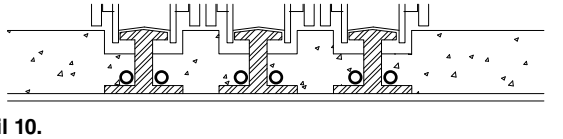
Detail 7. Cables covered in asphalt cap, over asphalt.



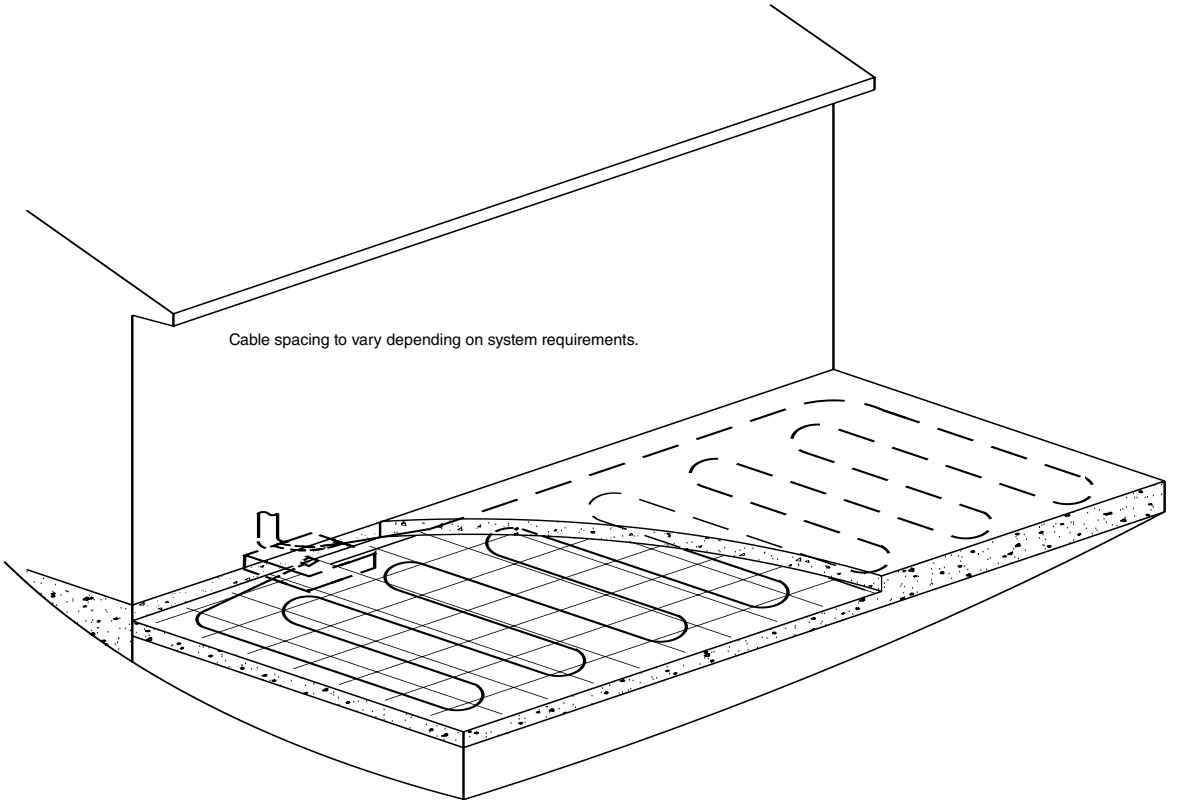
Detail 8. Cables in grout bed under pavers.



Detail 9. Cables inserted into sawcut groove in concrete, and filled with a sand mix cement.



Detail 10.



Detail 11. Typical embedded mineral insulated cable, single pour system.

TOOLS REQUIRED
500 VDC insulation resistance tester.

Digital Multimeter

Adjustable Wrench

Flat Head Screwdriver

Fish Tape

Fastening System (as required):

- Nylon Cable Ties
- Jiffy Clips
- Pre-Punched Stainless Steel Strap
- Metal Ties

TROUBLE SHOOTING
Consult Delta-Therm Mineral Insulated Trouble Shooting Guide.

CONTROLS
F15A Electronic Floor Warming Thermostat

PANELS
Enclosed Contactor
GFPE Power Relay Panel
LNR Panel
Monitor Panel

TECHNICAL SUPPORT
Consult Delta-Therm for field repair instructions. If you have any questions or comments about these instructions, or your installation please call Delta-Therm at 1-800-526-7887.