MINERAL INSULATED SNOW MELTING CABLE INSTALLATION AND OPERATING INSTRUCTIONS

GENERAL INFORMATION

A quality snow melting installation has three basic requirements:
Paving Quality Mineral Insulated snow melting cable is designed to last as long as the material in which it is embedded. Paving that crumbles, settles or separates will most likely damage the heating element. Always insist on quality paving materials and allow for adequate reinforcing steel, expansion joints and proper curing.
Electrical System The electrical system should provide an adequate watt density for the snowfall in your particular area. It should also provide for an adequate number of junction boxes and meet all NEC (National Electrical Code) and local code requirements. All splice connections should be completely waterproof.
Installation Craftsmanship The electrical and paving contractors, working together, must take extra precautions to prevent damage to the heating cables by sharp objects such as tools, wheelbarrow, and footwear. Mineral Insulated cables are rugged, not indestructible.

To assure a long lasting, dependable snow melting system, please adhere to the guidelines and procedures outlined on the following pages.

PAVING GUIDELINES

GENERAL

1. Drainage must be adequate for run off of melted ice or snow. The drain or grate should also be heated.
2. The base for the pavement should be smooth and compact.
3. Paving materials must be of first quality and strength.
4. Tree roots under paved areas represent potential problem areas. Take the proper precautions.
5. Local, State or Federal Codes may govern. If in doubt check with building codes or a consulting engineer.

CONCRETE

1. Paving thickness must be adequate to support a maximum load without crumbling, settling or excessive movement.
2. A minimum thickness of 4" is recommended for pedestrian walkways and 6" for areas supporting motor vehicles. Reinforcing must be supported or lifted to be a minimum 1'/2" from bottom surface of concrete.
3. Reinforcing should be a minimum of 6"x6" mesh of #8 AWG for sidewalks and 6"x6" mesh of #6 AWG for ramps and driveways.
4. Expansion joints must be provided for larger areas and for changes in slab thickness at curbs, walls, columns, steps, hydrants, lighting standards, manholes, etc. Scribed or control joints should be treated as expansion joints. (See Fig. 1.)
5. For additional guidance, consult your local concrete supplier or a professional engineer.

ASPHALT

1. In new construction, a minimum thickness (after compaction) of 4" is recommended for pedestrian walkways and 5" for areas supporting motor vehicles.
2. When capping over an existing pavement, careful preparation of the base slab is necessary. A minimum capping of 3" of asphalt (after compaction) is recommended for either sidewalk or driveway.

TILE, BRICK, TERRAZZO, MARBLE OR GRANITE SLAB

1. Basic guidelines for concrete apply for base course.
2. After positioning cables, a good bonding agent should be applied to the base course.
3. Be careful not to damage cables when setting heavy slabs or brick into position.

PAVERS OVER A SAND BED

1. Basic guidelines for concrete apply for base course.
2. Position cables on top of either the compacted or concrete base and cover with 1-1/2" to 2" of sand.
3. Be careful not to damage cables when setting pavers into position.

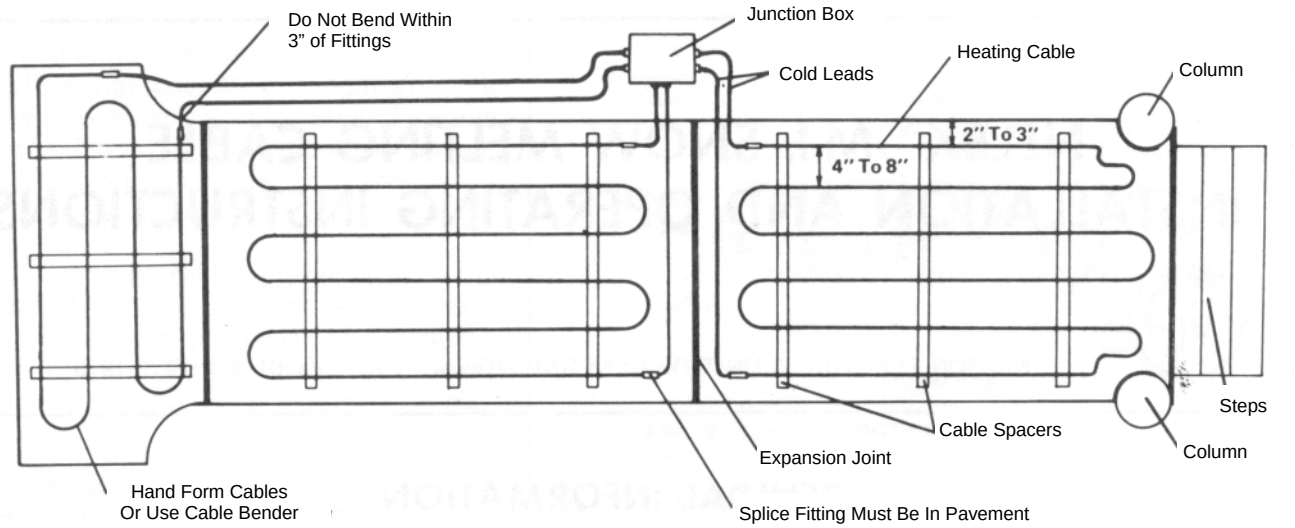

FIG. 1 TYPICAL SNOW MELTING SYSTEM

ELECTRICAL SYSTEM GUIDELINES

1. The branch circuit wiring must meet all applicable provisions of the National Electric Code and local codes.
2. Provide switches, circuit breakers, or contactors to break both sides of the line on ungrounded circuits.
3. If manual control is used, an indicating light is recommended to be sure heaters are turned off when not needed.
4. For automatic control use Nelson SMMC-3, Automatic Snow Controller and sensors.
5. Junction boxes and conduit system.
   (Note: MI heating units with cold leads of any length are available from the factory to reach preferred junction box location.)
   a. Preferred junction box location is indoors with three feet of cable accessible (See Fig. 1-C)
   b. Outdoor junction boxes should be at least 3' above grade. Box must be weatherproof with gasketed cover and drain hole. (See Fig. 1-D)
   c. Avoid junction boxes at grade level. If unavoidable, see Fig. 1-E for special treatment.
   d. Avoid using PVC or PVC based conduit and fittings in installations that may experience elevated temperatures. High amperage cables and multiple cold sections installed in a single conduit run are common examples of these installations.
6. A maximum of 15 watts per linear foot of heater cable is recommended for asphalt installations.

NOTICE
Crossing expansion joint is NOT recommended.
If joint must be crossed, see below.

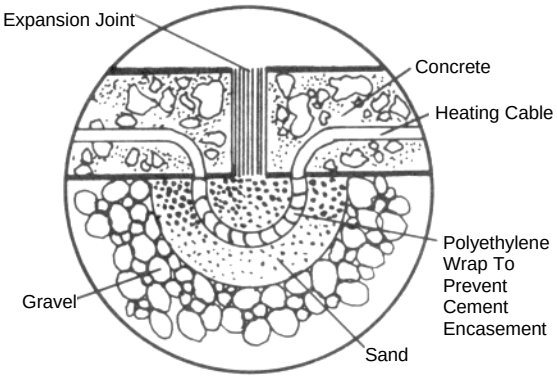

FIG. 1-A METHOD OF CROSSING EXPANSION JOINT

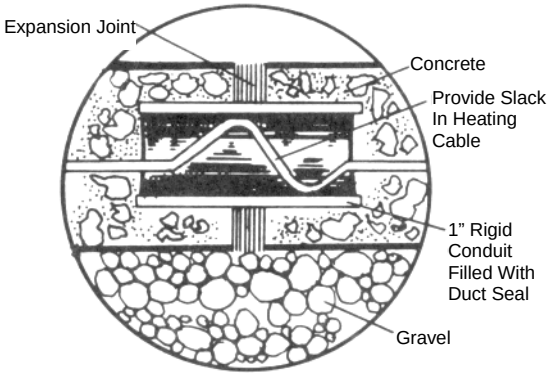

FIG. 1-B METHOD OF CROSSING EXPANSION JOINT

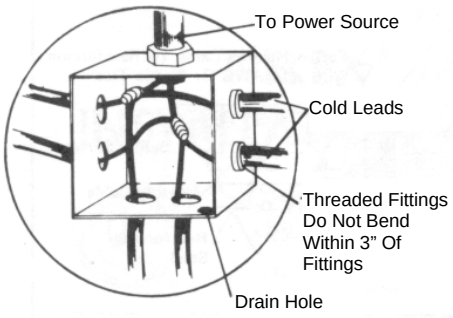

FIG. 1-C INDOOR PREFERRED JUNCTION BOX LOCATION

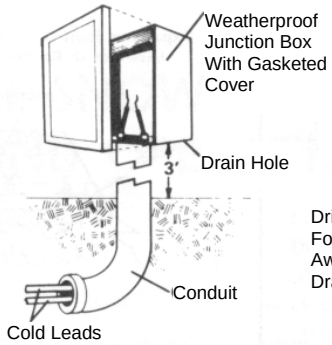

FIG. 1-D OUTDOOR ABOVE GRADE JUNCTION BOX MOUNTING

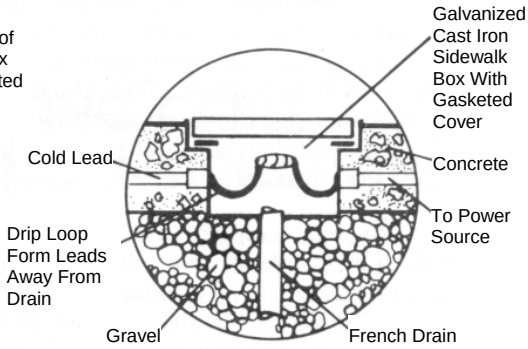

FIG. 1-E SIDEWALK JUNCTION BOX ARRANGEMENT AT GRADE LEVEL

INSTALLATION PROCEDURES

GENERAL

1. Heating cable systems must be installed in conformity with the National Electric Code. Note particularly Article 426 of the 2005 NEC requires inspection of every heating cable before installation.
2. Check insulation resistance before installing. The conductor to sheath resistance should be 20 megohms when measured with a 500 Volt DC megger. See warranty.
3. Unroll the cables along a smooth flat surface to avoid kinking.
4. Do not bend cable to less than 2" radius.
5. Do not bend the cable within 3" of any splice or fitting.
6. Do not install heating cable where exposure to PVC or PVC based installation materials is possible.
7. Secure heaters to reinforcing or base as shown in the illustrations. Do not install heating cable where exposure to PVC or PVC based installation materials is possible.
8. Avoid crossing expansion joints or control joints with heating units. (If joints must be crossed, see Figs. 1-A and 1-B for recommended methods.)
9. Heater depth should be 2" to 3" below final surface. Too shallow may leave strips of ice. Too deep will require a longer heat up time.
10. Heater spacing shall agree with specifications and drawings. In general, spacing will be from 4" to 8" to provide 40 to 60 watts per square foot of pavement surface. This will depend on the rate of snow melting desired.

IN CONCRETE

1. Check each heater cable with a 500 Volt DC megger for insulation resistance to ground. Minimum resistance should be 20 megohms.
2. Locate junction boxes per plans or specs. Install any necessary conduit from panelboard to junction boxes for power cable.
3. Install reinforcing rods or mats at correct distance from final surface by use of concrete spacers, bricks, wire "chairs" or any suitable method to insure proper placement of reinforcing material. (See Fig. 2)
4. Lay out cable on top of rods or mesh but do not fasten until layout has been checked.
5. When location of all runs and bends is correct, fasten the cable to the rods or to the mesh with plastic straps or wire ties. If wire ties are used be sure they are not so tight that they nick or otherwise damage the cable.
6. Megger the cable one more time.
7. Pour the concrete carefully. Be sure that the chute is high enough and the speed of delivery is slow enough to drop the concrete in place without dislodging the cables.
8. During the pouring operation an electrician should be on hand to monitor the continuity of the cable with an ohmmeter or other test device and to stop the work if a cable is dislodged or damaged
9. Do not energize the cable until concrete has completely cured.

IN ASPHALT

Lay a 1" to 2" base course of asphalt over a compact sub-base and roll smooth. See Fig. 3. After spacing and anchoring cables into position, a small amount of asphalt should be put over the cables by hand and tamped to protect them from damage by tools or paving equipment during the laying of the finish course. The cables should be monitored

with an ohmmeter throughout the installation of paving material - moving from cable to cable as work progresses. Should a cable be damaged in installation, replace it immediately. Asphalt rollers will not harm cables when properly covered.

NOTE: Asphalt capping over an existing concrete or asphalt base is not recommended unless such base is in very sound condition. Even then, be sure to position cables so as not to cross any existing expansion joints.

TILE, BRICK, TERRAZZO, MARBLE OR GRANITE SLAB

Use basic procedures for concrete installation (See Fig. 4)

PAVERS OVER A SAND BED

After spacing and anchoring cables into position, cover cables with sand. Cables should have a minimum of 1" sand cover for protection during paver installation. The cables should be monitored with an ohmmeter throughout the installation of pavers. Should a cable be damaged in installation, replace it immediately.

IN STEPS

While it is possible to make up forms for embedding heater cables in steps in a single pour, the added expense of the forms usually dictate that a two-pour construction be used. The first pour should be stopped about 2" below the planned finished surface level. After the first pour, the cables are placed on the steps using two passes per step with the pass nearest the edge of the step being 1½" to 2" from the edge and the next pass spaced about 6" back from the first. The corners of the front edge of the base pour should be broken to permit a 2" radius to be used in bending the cable between steps. No passes are required in the risers - only in the treads.

WARRANTY

Nelson Heat Tracing Systems products are supplied with a limited warranty. Complete Terms and Conditions may be found on Nelson's website at www.nelsonheaters.com.

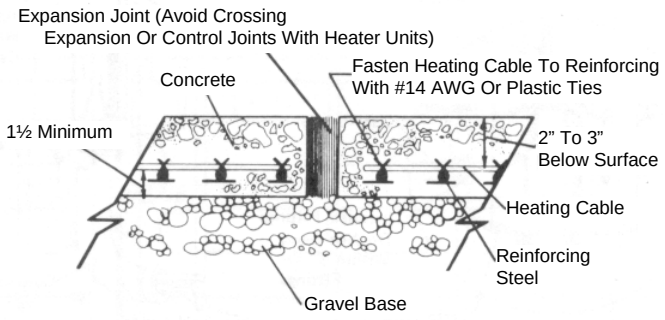

FIG. 2 TYPICAL CONCRETE INSTALLATION

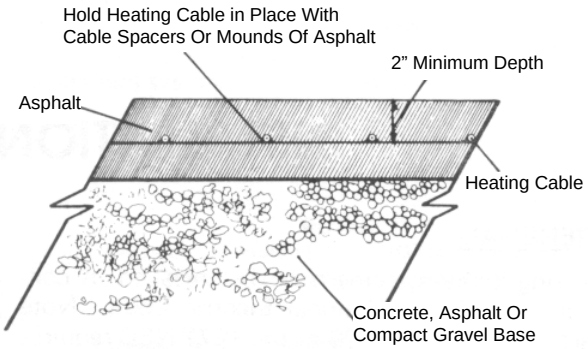

FIG. 3 TYPICAL ASPHALT INSTALLATION

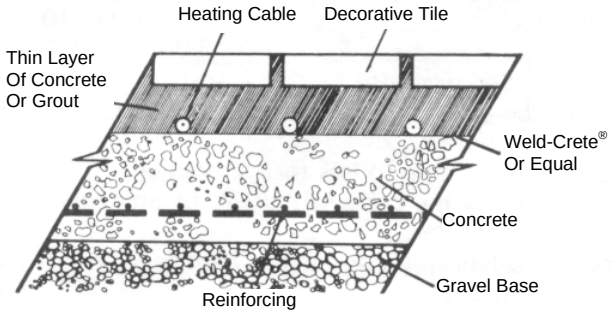

FIG. 4 TYPICAL TILE* INSTALLATION
*Also Brick, Terrazzo And Marble Or Granite Slab

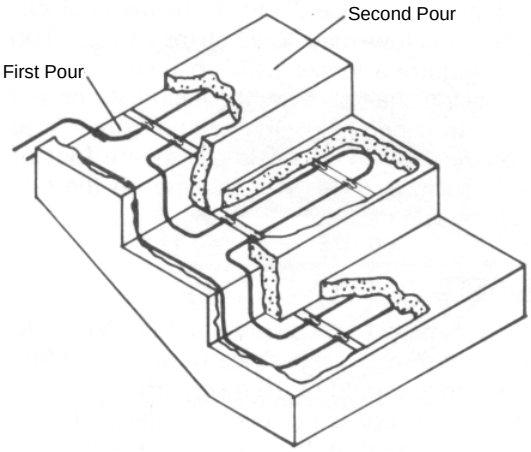

FIG. 5 TYPICAL STEP INSTALLATION