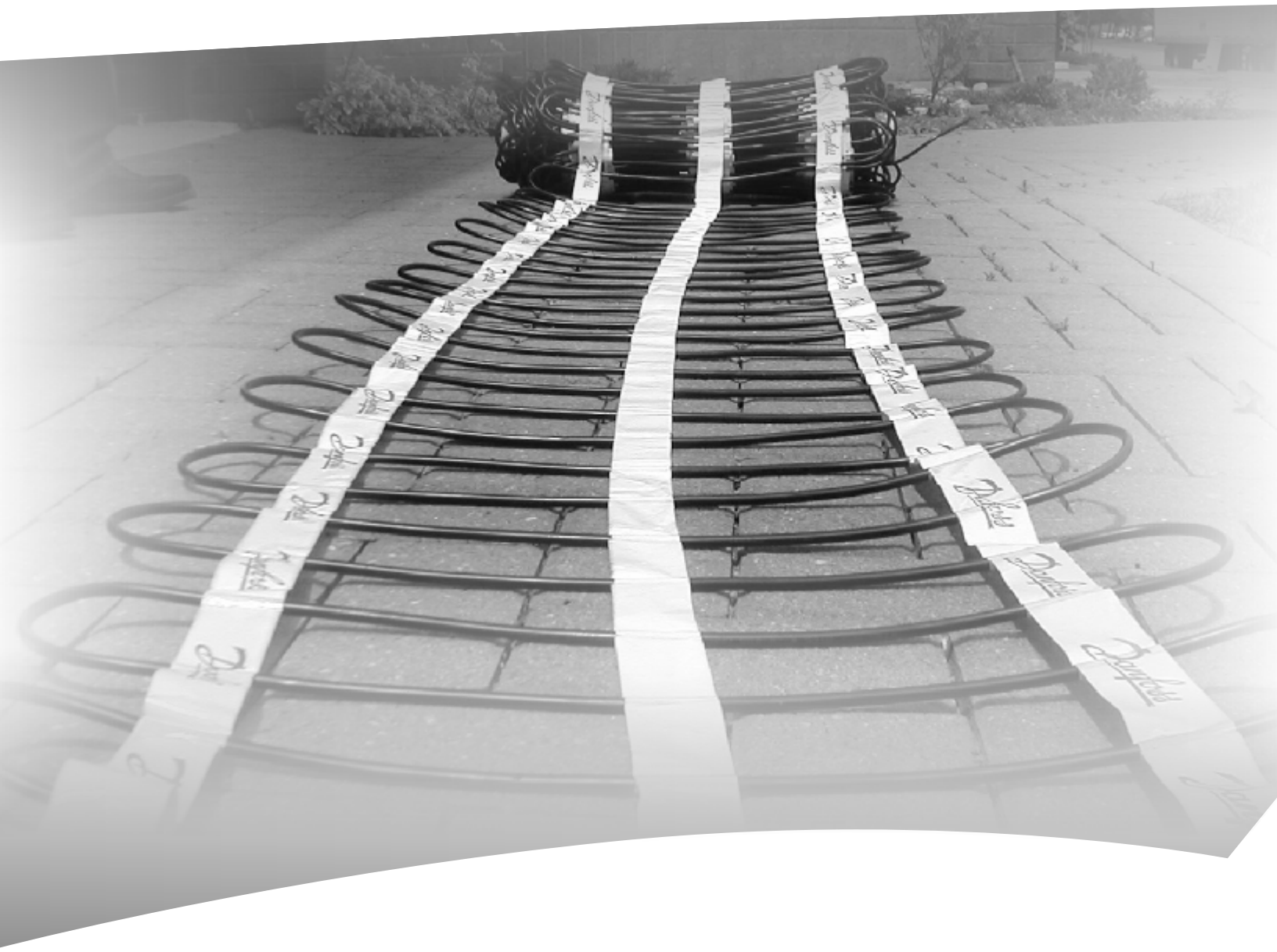
WARMZONE
Premier Radiant Heating



Installation Manual

ClearZone Heating Cables & Mats

Manuel d'installation

Câbles et tapis de chauffage ClearZone

CLEARZONE

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WARMZONE
Premier Radiant Heating

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ClearZone Snow Melting System

ClearZone Snow Melting System
The ClearZone Snow Melting System consists of the Automatic Control Panel (ACP), heating cables or heating mats and multiple digitally operated sensors which provide an economical and efficient means of snow melting and ice protection. Built for outdoor use, the ClearZone system provides safety and peace of mind to homeowners and business owners alike. Engineered for surfaces such as asphalt, concrete and paving tiles the ClearZone Snow Melting System is both versatile and easy to install. The ClearZone Snow Melting System operates automatically by digitally sensing moisture and temperature.

The ClearZone System is embedded during the paving installation, such that some control and accessories must also be installed at this time.

It is recommended to install thermal insulation below the application of the heating cables or mats. Improved performance and efficiency will decrease overall operating costs.

CAUTION!
It is important that this equipment is only installed by qualified electricians who are familiar with the proper sizing, installation, construction and operation of outdoor heating systems and the hazards involved. The ClearZone system is designed for outdoor ice and snow melting applications only.

Note!
The installation shall be in accordance with the manufacturer's instructions and national and local electrical codes. The installation shall be in accordance with Part 426, American National Standard Institute / National Fire Protection Association (ANSI/NFPA70), National Electrical Code (NEC) and Canadian Electrical Code (CEC), Part 1. You must use a ground fault protection device (GFCI) or a Residual Current Device (RCD) for outdoor areas.

ClearZone Cable/Mat

ClearZone snow melting cables are the basis of an electric snow melting system designed to ease the snow removal process as well as lessen its environmental impact. The ClearZone system is both efficient and economical. It consists of twin conductor heating cables and a single point connection with a 20' (6m) power lead. ClearZone cables are CSA certified.

- Snow melting cables/mats suitable for concrete, asphalt, pavers, and stonework
- Ideal for driveways, parking lots, sidewalks, stairs, ramps, loading areas and bridges
- Reduces the environmental impact of snow and ice removal by eliminating the use of fossil fuel driven snow blowers, snowplows, rock salt and/or other chemicals
- Silent, efficient, automatic and safe

ClearZone Cable/Mat Specifications

Type:	Twin conductor
Voltage:	208, 240, 277, 347, 480, 600V
Output:	50W/sq.ft. (540W/m^2)
Heating Element Size:	
Mat	6.5' (1.98 m) - 80' (24.38 m) long x 2' (0.61 m) wide
Cable	35' - 545' (10.7 - 166 m)
Power lead	20' (6.0 m)
Bending radius:	Minimum 1.5" (3.8 cm)
Cable Diameter:	1/4"(0.65 cm)
Wire insulation:	FEP' Teflon
Filler Sheath:	PEX
Casing:	PVC
Max. Temperature:	220°F (105°C)
Min. Installation Temp.:	40°F (5°C)

Connection (all voltages)

Phase - Black
Phase- White
Ground - Green

Warnings

Caution!

Is it important to read the instructions carefully before installing the ClearZone Snow Melting System.

- **For outdoor installation only;**
- **Never cut the black heating cable;**
- Extreme care must be used to ensure the ClearZone cables are not damaged when using sharp tools, wheelbarrows, heavy machinery and paving equipment, shovels, rakes, or other implements. Avoid walking on the cables or mats during installation;
- It is not recommended to install the ClearZone heating mats with a controller that does not contain an integrated temperature limiter;
- The ClearZone mat or ClearZone cable must be embedded in mortar or mortar mixture, concrete, sand or similar material;
- **The power lead/heating cable connection and at least 1' (30 cm) of the power lead must be embedded in the paved surface;**
- The power lead may be extended if required;
- **Do not install the ClearZone cables in such a manner that two black heating cables touch, cross or overlap;**

Remember to always measure, verify and record the actual resistance throughout the installation process:

1. Out of the box
2. After installation
3. Before pouring the sand/concrete/asphalt
4. After surface material application

Record these values in the table on page 20, failure to do so will void the warranty;

- Measure the resistance between two live conductors as well as the resistance between each conductor and the ground wire.
- Remember to check that the supply voltage matches the voltage required for your particular ClearZone product;
- Remember to place the labels as instructed in this manual;

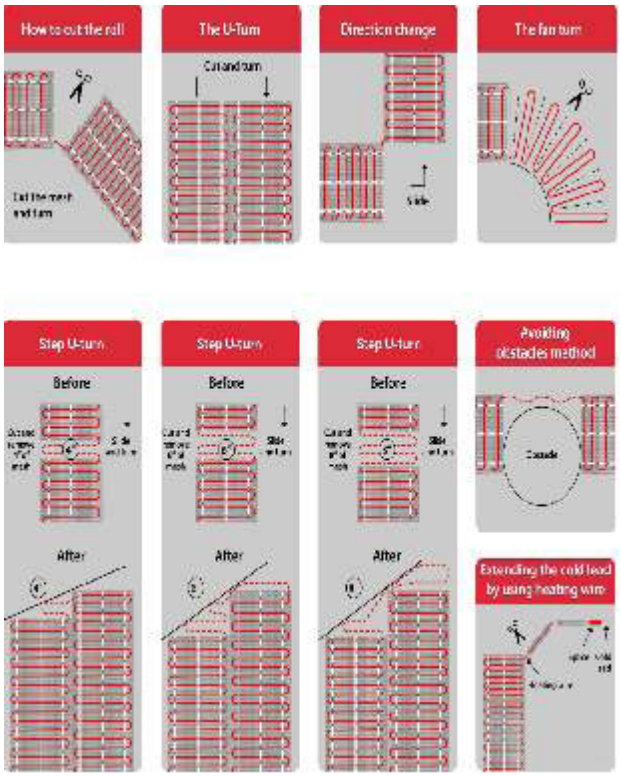
Please consult Warmzone for any other questions, concerns or advice.

Metal structures or materials used for the support of or on which the ClearZone is installed must be grounded in accordance with CSA Standard C22.1, Section 10 and the NEC.

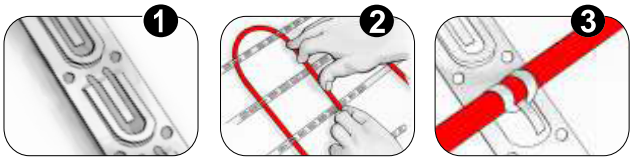
General Installation Guidelines

Planning
It is recommended to sketch a plan of the layout for the heating system installation. Mat/cable location, sensor placement, junction boxes, conduits and the location of drains and other obstructions should be noted.

Mat Alterations
The ClearZone heating mats can be altered to accommodate drains, obstructions or bends in the layout. By carefully cutting the mat tape, many patterns and designs can be created. The figure below illustrates this.



Free Cable and Cable Strapping
Should the Warmzone cable strapping be used for the ClearZone cable, follow the instructions below for ease of installation.



Attach the strapping to the ground surface (3' apart) (3' apart)

Place the cable (3" loops - standard c-to-c distance)

Clip the ClearZone cable in place

Installing a Feeder Cable

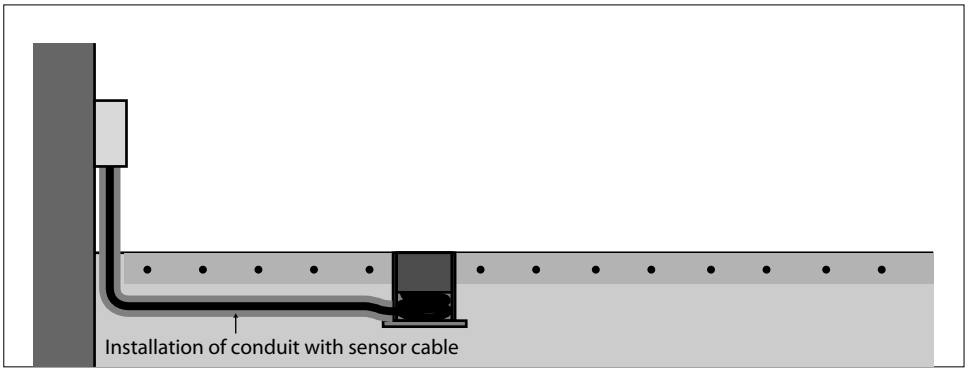
(For use with ClearZone850 and/or ground sensors, not applicable when using DS-2B.)

A feeder cable for a sensor may be needed. A 50' (15m) cable is supplied with each sensor. Approx. 1.5' (0.5m) of this cable should be coiled inside the bottom of the sensor tube. The remaining cable may be lengthened. The feeder cable must be a four wire cable.

Installing a Sensor and a Conduit

The sensor and the conduit may be installed in connection with the actual construction work and connected at a later date. The following applies for all types of installations:

1. Ensure that the conduit is sealed when the concrete is poured.
2. The conduit must be positioned so that it is flush with the surrounding terrain. The sensor must be placed so that the upper brass surface is horizontal.
3. The base below the tube must be hard, e.g. a concrete tile, in order to ensure that the sensor is not pushed into the ground if for example a vehicle runs over it. The tube is designed to be mounted on a plate using the two screw holes inside the conduit.
4. A metal/plastic pipe, through which the sensor cable may be passed, should be run as far as the sensor conduit.
5. Coil approx. 1.5' (0.5m) of the sensor cable inside the conduit.
6. Place the sensor inside the tube until it is horizontally flush with the edge of the conduit and resting on the internal collar inside the conduit. The sensor may be extracted at a later date using the two holes found around the edge of the sensor conduit. The grooves on the outside of the sensor should correspond with the holes in the conduit.



Installation in Asphalt

The temperature must not exceed 176°F (80°C) around the sensor/tube. A wooden block or similar place holder may be used in the area where the tube/sensor can be placed subsequently. The installation pipe used for the sensor cable should, in that case, be a metal tube that can withstand high temperatures.

Placement of Ground Sensors

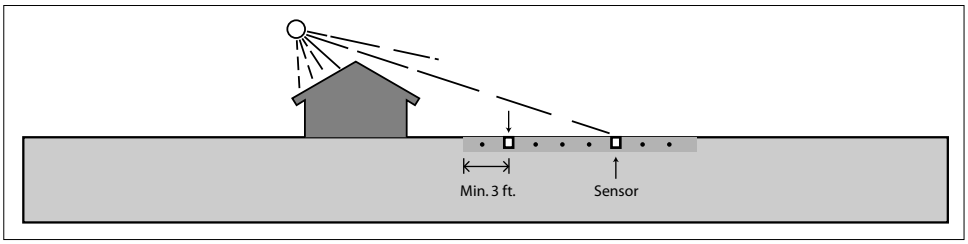
Correct placement of the sensor(s) is important for the system to work as intended. Some basic guidelines follow:

The number of ground sensors:
1. The more sensors added to the system the better the performance.

2. The basic principle is to place one sensor where the snow/ice will appear first (for fast detection) and one sensor where the snow/ice will disappear last (for complete melting). If it is not obvious just place the sensors as far apart from each other as possible.

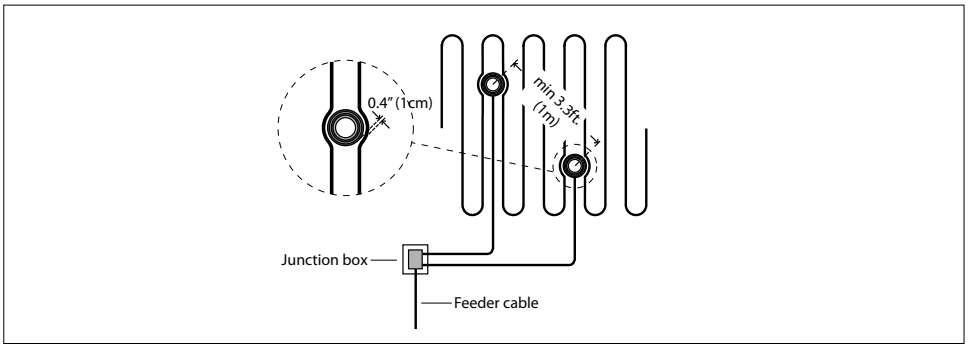
3. With only one sensor you will have to decide what is most important:
   a) fast detection and activation of the system or
   b) securing a complete melting of all snow/ice. A one sensor ground system will be slower in terms of detection and activation than a two sensor ground system, where one sensor measures the ground temperature and the other sensor measures the moisture.

4. With more than two sensors it is possible to cover problem spots where snow usually is not detected or where snow is not completely melted when the system stops.



Placement of Individual Ground Sensors

1. The sensor must be placed within the heated area and at least 3.3' (1 m) from the edge of the area, if possible.
2. The sensor must be placed in between the heating cables - a distance of minimum 0.4" (1 cm) should be maintained between the sensor tube and the heating cable.
3. There must be a distance of minimum 3.3ft. (1 m) between the two sensors.



Installing the heating mat

Begin by fastening the heating mat to the mesh reinforcement using tie-wraps or cable strapping. Do not fix the heating cable of the mat in such a way that it is compressed or strained - it must be able to move. Unroll the mat up to the point at which it is to be flipped and turned. Use the figure on page 5 to alter the mat.

Cut the tape using scissors and rotate the mat so that it can be unrolled to cover the area next to the already unrolled mat. **Do not cut the cable!** The cable can be carefully detached from the tape and then placed as free cable. This feature can be very useful for curves and around drains or other obstructions.

Installing the heating cable

The ClearZone cable must be laid out with even spacing over the entire area to be heated. To ensure an accurate and easy method of installing the ClearZone cable it is recommended to use Warmzone cable cable strapping. Attach the cable strapping to the rebar or other supporting structure using tie-wraps. The strapping should be laid perpendicular to the direction the cable will be unrolled. Space the strapping 3' (75cm) apart. Secure the heating cable to the cable strapping at the correct center-to-center distance. Do not secure the cable too tightly as this may damage the cable. If not using the cable strapping, affix the heating cable to the rebar or wire mesh using tie wraps.

Center-to-Center (C-C) distance

The C-C distance is the distance between the ClearZone cables (ClearZone mats have a preset C-C distance). Standard spacing for 50W/sq.ft. (540W/m^2) is 3" (7.5 cm). In a typical application the C-C distance should not exceed 4" and be less than 3" if the cables are installed as part of a total heating system. If the C-C distance is higher, cold spots may form on the surface and incomplete melting may occur.

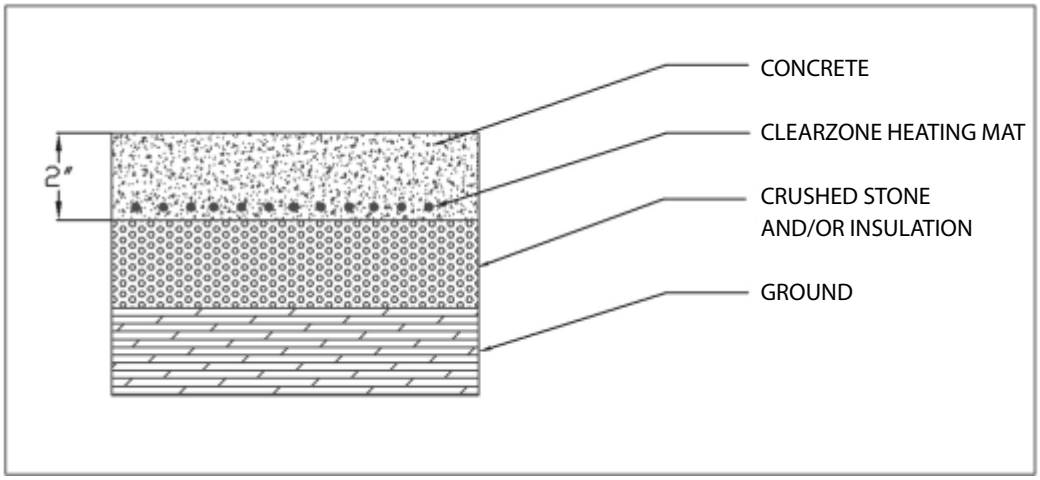
Concrete Installation

When installing ClearZone heating cables the following should be observed:

- Begin installation as close as possible to electrical supply source. The heating cable must not be cut or shortened or exposed to strain in the areas of the cold tail/heating cable coupling.
- Insulation (i.e. Perlite volcanic rock) should be used below the cables and on the sides of the heated area to improve the efficiency of the heating system.
- When placing the sensors please see page 7.
- The concrete should not contain an aggregate greater than 3/4".
- Special care should be taken not to damage the heating cables with tools and machinery during the installation and application of the surface material.
- Ensure that all sharp stones and debris are removed from the area where the heating cables are going to be installed.
- Should the cable become damaged during the installation process it is helpful to know the location of the cold tail/heating cable connection. Take a picture or sketch to show where the connection/end cap is in case a fault needs to be found.
- Connection of the heating cable must be carried out by an authorized electrician.
- Note the maximum output allowed for your installation. Do not exceed it. Contact your local ClearZone dealer for questions/concerns.
- Make sure the cable is not subjected to excess tension or strain. It should not cross an expansion joint. Where expansion joints are present, separate mats/cables should be used.
- The heating cable braid must be grounded in accordance with local electrical codes.
- Make sure when the cable is laid it is not pushed into the insulating material.
- Ensure no air pockets exist in the surface material as this can result in damage to the cable.
- An upstream disconnect must be installed to ensure a means of de-energizing the cable or mat.
- At low temperatures, the heating cable stiffens and may be difficult to work with. To overcome this, connect the cable to the mains for a brief period of time. Ensure the cable is fully rolled out when this is done.

Concrete Installation (continued)

- There should be a minimum of 1.5″ (3.8 cm) and maximum of 2″ (5 cm) of concrete covering the heating cables. The 2″ maximum is for ideal heat transfer through the concrete. A thicker surface may be required depending on the pour and application.
- Make sure that the free cable is fastened at intervals of minimum 1.5′ (45 cm), as the concrete might move the cable when it is poured.
- The concrete mixture must not contain sharp stones as these may damage the cable.
- The concrete should be allowed to set for 30 days before the heating cables are turned on.
- It is not recommended for the ClearZone mat or cable to cross an expansion joint.



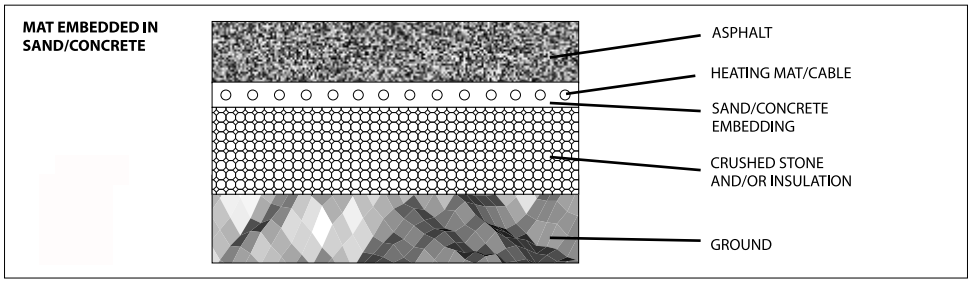
Asphalt Installation

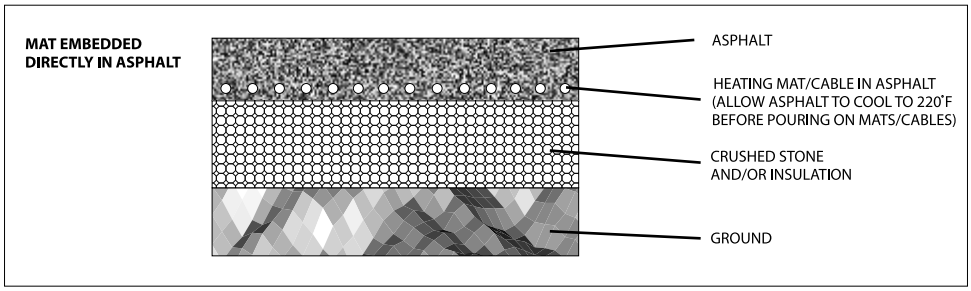
When installing heating cables the following should be observed:

- Begin installation as close as possible to electrical supply source. The heating cable must not be cut or shortened or exposed to strain in the areas of the cold tail/heating cable coupling.
- Install cables in a direction perpendicular to the direction that the paving rollers will pass to prevent straining or damaging the cable.
- Insulation (i.e. Perlite volcanic rock) should be used below the cables and on the sides of the heated area to improve the efficiency of the heating system.
- When placing the sensors please see page 7.
- Special care should be taken not to damage the heating cables with tools and machinery during the installation and application of the surface material.
- Ensure that all sharp stones and debris are removed from the area where the heating cables are going to be installed.
- Should the cable become damaged during the installation process it is helpful to know the location of the cold tail/heating cable connection. Take a picture or sketch to show where the connection/end cap is in case a fault needs to be found.
- Connection of the heating cable must be carried out by an authorized electrician.
- Note the maximum output allowed for your installation. Do not exceed it. Contact your local ClearZone dealer for questions/concerns.
- Make sure the cable is not subjected to excess tension or strain. It should not cross an expansion joint.
- The heating cable braid must be grounded in accordance with local electrical codes.
- Make sure when the cable is laid it is not pushed into the insulating material.
- Ensure no air pockets exist in the surface material as this can result in damage to the cable.
- An upstream disconnect must be installed to ensure a means of de-energizing the cable or mat.
- At low temperatures, the heating cable stiffens and may be difficult to work with. To overcome this, connect the cable to the mains for a brief period of time. Ensure thecable is fully rolled out when this is done.

Asphalt Installation (continued)

- It is recommended to cover the cables with a layer of sand or concrete at least 1" (2.5 cm) before the asphalt is applied to protect them from the heat of the asphalt. Use of concrete will ensure an effective and efficient heat transfer through the asphalt.
- Allow the asphalt to cool to a temperature of 265 - 285°F (130-140°C) before pouring on mats/cables. Ground sensors/tubes should not be exposed to temperatures above 80°C (176°F.)
- The asphalt should have a minimum thickness of 1.25" (3.2 cm). For optimal heat transfer, the asphalt should be no thicker than 1.5" (3.8 cm).





Stonework Installation

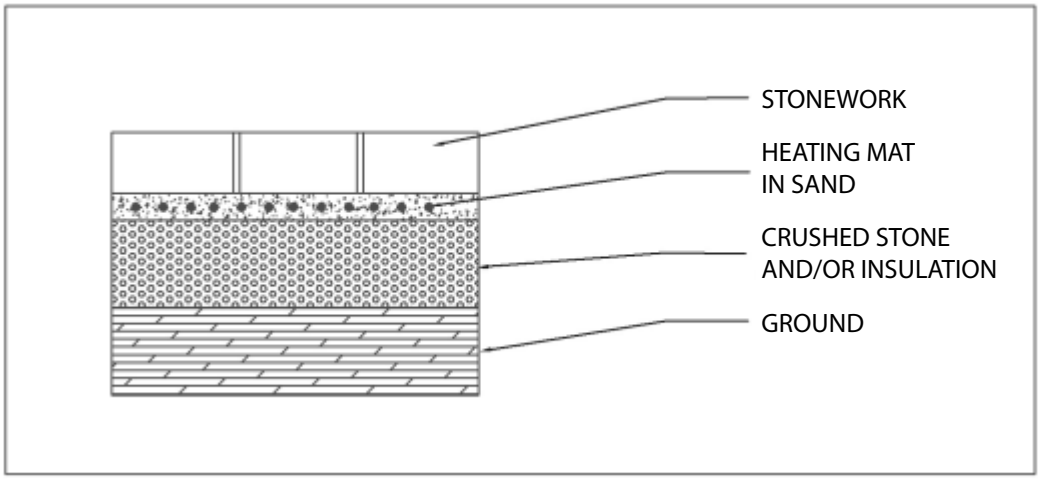
When installing heating cables the following should be observed:

- Begin installation as close as possible to electrical supply source. The heating cable must not be cut or shortened or exposed to strain in the areas of the cold tail/heating cable coupling.
- Insulation (i.e. Perlite volcanic rock) should be used below the cables and on the sides of the heated area to improve the efficiency of the heating system.
- When placing the sensors please see page 7.
- Special care should be taken not to damage the heating cables with tools and machinery during the installation and application of the surface material.
- Ensure that all sharp stones and debris are removed from the area where the heating cables are going to be installed.
- Should the cable become damaged during the installation process it is helpful to know the location of the cold tail/heating cable connection. Take a picture or sketch to show where the connection/end cap is in case a fault needs to be found.

Stonework Installation (continued)

- Connection of the heating cable must be carried out by an authorized electrician.
- Note the maximum output allowed for your installation. Do not exceed it. Contact your local ClearZone dealer for questions/concerns.
- Make sure the cable is not subjected to excess tension or strain. It should not cross an expansion joint.
- The heating cable braid must be grounded in accordance with local electrical codes.
- Make sure when the cable is laid, that it is not pushed into the insulating material.
- Ensure no air pockets exist in the surface material as this can result in damage to the cable.
- An upstream disconnect must be installed to ensure a means of de-energizing the cable or mat.
- At low temperatures, the heating cable stiffens and may be difficult to work with. To overcome this, connect the cable to the mains for a brief period of time. Ensure the cable is fully rolled out when this is done.

Special care must be taken not to damage the heating cables when they are installed under bricks or tiles.
The area must be completely level and free of stones or other sharp objects.
The heating cable must be installed close to the bricks or tiles, typically in a layer of sand (at least 1" (2.5 cm) under the brick).



MANUFACTURER EXTENDED WARRANTY

For a period of ten (10) years from the date of purchase manufacturer warrants that the cable is free from defects in material, design and workmanship. The extended warranty is only valid if the resistance table on page 20 and the warranty certificate are correctly filled out and the installation is in accordance with the installation instructions.
The filled out resistance table and the warranty certificate shall be presented to manufacturer in the case a claim is made. The defective cable has to be inspected by or submitted to manufacturer or an authorized dealer. Failure to comply with all of the foregoing will void this extended warranty.
Manufacturer will, when the customer has documented that a defect in the cable was present at the date of delivery, repair or supply a new cable at manufacturer's option. All claims shall be made within the extended warranty period. Manufacturer shall not be liable for any claims made later than ten years from date of purchase. Manufacturer shall not be liable for any consequential and secondary costs or damages linked to the defect or replacement of the heat cable.
Manufacturer will be liable for any costs related to the dismantling of defective product and the installation of a new product; however, such liability is limited to the amount of five (5) times the invoice value of the initial product supplied for each damage/case.

THE FOREGOING WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ON THE PART OF MANUFACTURER. MANUFACTURER DISCLAIMS ANY WARRANTY, EXPRESS OR IMPLIED OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. MANUFACTURER NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON, FIRM OR CORPORATION TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH SALE OR PRODUCT. MANUFACTURER SHALL NOT BE HELD RESPONSIBLE FOR DAMAGE TO PERSON OR PROPERTY, CONSEQUENTIAL LOSS, LOSS OF PROFIT, LOSSES ON GOODS IN STORE, OR THE LIKE WHICH MIGHT ARISE OUT OF THE FAILURE OF THE EQUIPMENT DELIVERED, IRRESPECTIVE OF THE CAUSE (INCLUDING FAULTY MANUFACTURE).

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