

# SlabHeat™

## Installation Manual



Series SH



### ⚠ WARNING

Please be aware local codes may require this product and/or the thermostatic control to be installed or connected by an electrician. Please leave this manual with the end user.

**⚠ WARNING**
**THINK  
SAFETY  
FIRST**

Read this Manual BEFORE using this equipment.

Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment.

Keep this Manual for future reference.

SlabHeat products are a simple way to heat a given space. This instruction manual is provided as a guide to installing SlabHeat Cable, including design considerations, cable installation, control installation, precautions, and floor covering guidelines.

## Specifications for SlabHeat Cable:

SlabHeat Cable is a complete heating cable consisting of a series resistance heating cable and a single power lead for easy single-point connection. **The heating cable length cannot be cut to fit.**

**Controls:** SlabHeat must be controlled by a SunStat floor sensing thermostat. (Listed separately)

**Voltages:** 120 and 240 VAC, 1-phase (see Table 2)

**Watts:** 15 W/sqft (51 Btu/h/sqft), spaced at 4 inches on-center

10 W/sqft (34 Btu/h/sqft), spaced at 6 inches on-center

(Cable is designed to operate at approximately 5 W/linear foot of cable at rated voltage.)

**Maximum circuit load:** 15 amps

**GFCI:** (Ground Fault Circuit Interrupter) required for each circuit (included in the SunStat control)

**Listing:** UL Listed for U.S. and Canada under UL 1673, and CAN/CSA C22.2 No. 130-03 , File No. 185866

**Application:** Indoor floor heating only  
(-X on the nameplate label indicates CUL Listing for this application).

Suitable for installation in a shower area (see Step 3.10 for restrictions).

(-W on the nameplate label indicates CUL Listing for Wet Location in Canada per Canadian Electrical Code, Part I (CEC).

Embedded in concrete.

**Minimum bend radius:** 1 inch

**Maximum exposure temperature:**  
(continuous and storage) 194°F (90°C)

**Minimum installation temperature:** 50°F (10°C)

**⚠ WARNING**

Installation must be performed by qualified persons, in accordance with local codes, ANSI/NFPA 70 (NEC Article 424) and CEC Part 1 Section 62 where applicable. Prior to installation, please consult the local codes in order to understand what is acceptable. To the extent this information is not consistent with local codes, the local codes should be followed. However, electrical wiring is required from a circuit breaker or other electrical circuit to the control. It is recommended that an electrician perform these installation steps. Please be aware local codes may require this product and/or the control to be installed by an electrician.

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## Important Safety Information



This is a safety-alert symbol. The safety alert symbol is shown alone or used with a signal word (DANGER, WARNING, or CAUTION), a pictorial and/or a safety message to identify hazards.

When you see this symbol alone or with a signal word on your equipment or in this Manual, be alert to the potential for death or serious personal injury.



This pictorial alerts you to electricity, electrocution, and shock hazards.

### ⚠ WARNING

This symbol identifies hazards which, if not avoided, could result in death or serious injury.

### ⚠ CAUTION

This symbol identifies hazards which, if not avoided, could result in minor or moderate injury.

### NOTICE

This symbol identifies practices, actions, or failure to act which could result in property damage or damage to the equipment.

Table 1

### ⚠ WARNING



As with any electrical product, care should be taken to guard against the potential risk of fire, electric shock, and injury to persons. The following cautions must be observed:

Local building or electrical codes may require modifications to the information provided. You are required to consult the local building and electrical codes prior to installation. If this information is not consistent with local building or electrical codes, the local codes should be followed.

**NEVER** cut the heating cable. Doing so will cause dangerous overheating and will void the warranty. The power lead may be cut shorter if necessary, but never removed from the heating cable.

**NEVER** bang a trowel or other tool on the cable. Be careful not to nick, cut, or pinch the cable causing it to be damaged.

**NEVER** overlap or cross over the heating cable on itself, or place heating cable closer than 4 inches from another heating cable or power lead cable. This will cause dangerous overheating.

**NEVER** allow a power lead or sensor wire to cross a heating cable.

- NEVER** install the heating cable under cabinets or other built-ins having no floor clearance, or in small closets. Excessive heat will build up in these confined spaces and cause damage.
- NEVER** pull any of the heating cable or factory splices into any conduit.
- NEVER** forget to install the floor sensor included with the thermostat.
- NEVER** install the heating cable in walls, over walls or partitions that extend to the ceiling, or in closets.
- NEVER** attempt to repair a damaged cable, splice, or power lead using unauthorized parts. Use only factory authorized repair parts and methods.
- NEVER** extend the heating cable beyond the room or area in which it originates, under or through walls.
- NEVER** remove the nameplate label from the power leads. Make sure it is viewable for inspection later.
- NEVER** put the system into full operation until the tile or flooring installer verifies all cement materials are fully cured (typically two to four weeks).
- 

- ALWAYS** completely embed the heating cable and factory splices in concrete. **Do not** secure cable with adhesives intended for laminate or vinyl flooring.
- ALWAYS** avoid placing the heating cable any closer than 4 inches from other items such as underground cable or piping to keep from overheating them.
- ALWAYS** keep ends of the power leads dry before and during installation.
- ALWAYS** use copper wire as supply conductors to the thermostat. **Do not use aluminum.**
- ALWAYS** pay close attention to voltage and amperage requirements of the breaker, the thermostat, and the SlabHeat. For instance, do not supply 240 VAC power to 120 VAC SlabHeat as damage will result.
- ALWAYS** make sure all electrical work is done by qualified persons in accordance with local building and electrical codes, Section 62 of the Canadian Electrical Code (CEC) Part I, and the National Electrical Code (NEC), especially Article 424.
- ALWAYS** seek help if a problem arises. If ever in doubt about the correct installation procedure to follow, or if the product appears to be damaged, the factory must be called before proceeding with the installation.

**⚠ WARNING**

Installation must be performed by qualified personnel, in accordance with local codes and standards. A licensed electrician is recommended.

## Phase 1 - Preparations

Before installing SlabHeat, make sure to fully inspect the products, and carefully plan your site. The following steps may not necessarily occur in the order shown, depending on contractor and electrician scheduling and variations in site preparation requirements.

## Items Needed

### Materials:

- CableStrap (for certain installations)
- SunStat thermostat control (with floor sensor)
- SunStat Relay control (if required)
- Control electrical box (UL Listed, extra deep, see control instructions for size and type required)
- Junction electric box (if required, must be UL Listed and proper size)
- Flexible or rigid conduit (must be UL Listed and proper size)
- Wire nuts (if a junction electric box is required, must be UL Listed and proper size)

### Tools:

- Digital multi-meter [for ohms testing; must read up to 20,000 ohms to measure sensor]
- Drill with 1/2" & 3/4" bits
- Hammer and chisel
- Wire strippers
- Phillips screwdriver
- Fish tape (for existing construction)
- Hole saw (for existing construction)
- Floor covering installation tools



**Floor sensor is included in the SunStat thermostat packaging. This must be installed in the slab with the cable.**

## Table 2 - Cable Sizes

Please check the product label for exact ratings. This table is for reference only.

### 120 VAC

Model	15 W/ft <sup>2</sup> 4" Spacing (Sq Feet)	10 W/ft <sup>2</sup> 6" Spacing (Sq Feet)	Cable Length (Feet)	Amp Draw	Ohms
SH15120050	50	75	146	6.3	16 - 21
SH15120066	66	98	193	8.3	11 - 15
SH15120082	82	122	241	10.3	9 - 12
SH15120100	100	149	294	12.5	7 - 10
SH15120114	114	170	336	14.3	6 - 9

### 240 VAC

Model	15 W/ft <sup>2</sup> 4" Spacing (Sq Feet)	10 W/ft <sup>2</sup> 6" Spacing (Sq Feet)	Cable Length (Feet)	Amp Draw	Ohms
SH15240100	100	149	294	6.3	33 - 41
SH15240132	132	196	388	8.3	23 - 30
SH15240164	164	243	483	10.3	18 - 23
SH15240200	200	297	590	12.5	15 - 20
SH15240228	228	339	673	14.3	13 - 17

### NOTICE

It is important to select the proper size cable for the given area. Cable cannot be cut shorter in order to fit a given area. Doing so will damage the heating wire and prevent the system from working.

## Inspect cable, control, and sensor

### ⚠ WARNING



To prevent the risk of personal injury and/or death, make sure power is not applied to the product until it is fully installed and ready for final testing. All work must be done with power turned off to the circuit being worked on.

#### STEP 1.1

Remove the SlabHeat Cable, SunStat control, and SunStat sensor from their packages. Inspect them for any visible damage and verify everything is the correct size and type according to the plan and order. Do not attempt to install a damaged product.

#### STEP 1.2

Record the cable information in **Table 4**. Give this information to the homeowner to keep in a safe place.

The cable model number, serial number, voltage, and resistance range are shown on a nameplate label attached to the power leads. **Do not remove this nameplate label. The electrical inspector will need to see this.**

#### STEP 1.3

Use a digital multi-meter set to the 200 $\Omega$  or 2000 $\Omega$  (2k $\Omega$ ) range to measure the resistance between the conductors of the cable power leads. Record these resistances in **Table 4** under “Out of the box before installation”.

The resistance between the white lead wires should be within the resistance range on the nameplate label. If it is a little low, it may be due to low air temperatures or meter calibration. Consult the factory if in doubt.

The resistance between either of the white leads and ground lead should be “open”, usually indicated by an “OL” or a “1”. This is the same as displayed when the test leads are not touching anything. If there is any change in the reading, record this information and contact the factory before installing. This could indicate damage, test lead problems, or a number of other issues. Try “pinning” the test leads to the cable lead wires against a hard non-metal surface if your readings fluctuate.

Change the meter to the 20,000 ohms (20 k $\Omega$ ) range. Measure between the lead wires of the floor sensor. This resistance varies according to the temperature sensed at the tip. **Table 3** provides approximate values for comparison.

**Table 3 - Floor Sensor Resistance Values**

Temperature	Typical Values
55°F (13°C)	17,000 ohms
65°F (18°C)	13,000 ohms
75°F (24°C)	10,000 ohms
85°F (29°C)	8,000 ohms

#### STEP 1.4

Qualified Electrician Only: It is highly recommended that your electrician perform an insulation resistance test on the cable. A megohmmeter (e.g. Megger®) adjusted to a minimum 1000 VDC should give a measured value at least 20 megohm (M $\Omega$ ). This test will expose any minor damage to the cable that is undetectable by a standard multi-meter.

### ⚠ WARNING

Megohmmeters apply high voltage and could shock or cause serious injury if improperly used. Follow megohmmeter instructions for safe and proper use.

**Table 4 - Cable Resistance Log**

	Cable 1	Cable 2	Cable 3
Cable serial number			
Cable model number			
Cable voltage			
Cable resistance range			
Sensor			
<b>OUT OF THE BOX BEFORE INSTALLATION</b>			
Cable white to white			
Cable white to ground			
Cable white to ground			
Sensor			
<b>AFTER CABLE IS SECURED IN PLACE</b>			
Cable white to white			
Cable white to ground			
Cable white to ground			
Sensor			
<b>AFTER SLAB IS POURED</b>			
Cable white to white			
Cable white to ground			
Cable white to ground			
Sensor			
<b>Retain this log to retain the warranty! Do not discard!</b>			

**INSTALLATION NOTES**

## BASE MATERIAL

### STEP 1.5

Prepare the site that you want to heat with SlabHeat Cable. This includes making sure all utilities and obstructions are accounted for.

### STEP 1.6

**New concrete slab:** Lay a smooth, well-compacted gravel base. Ensure proper slope and drainage as required by local building codes to avoid water buildup in any heated or surrounding areas. Follow local building code and construction guidelines for grade thickness and type.

Make sure you account for the total grade and slab thickness as required. The SlabHeat Cable should be located no more than 1-1/2" to 2" below the finished surface of the floor. See page 4 for some typical SlabHeat installations.

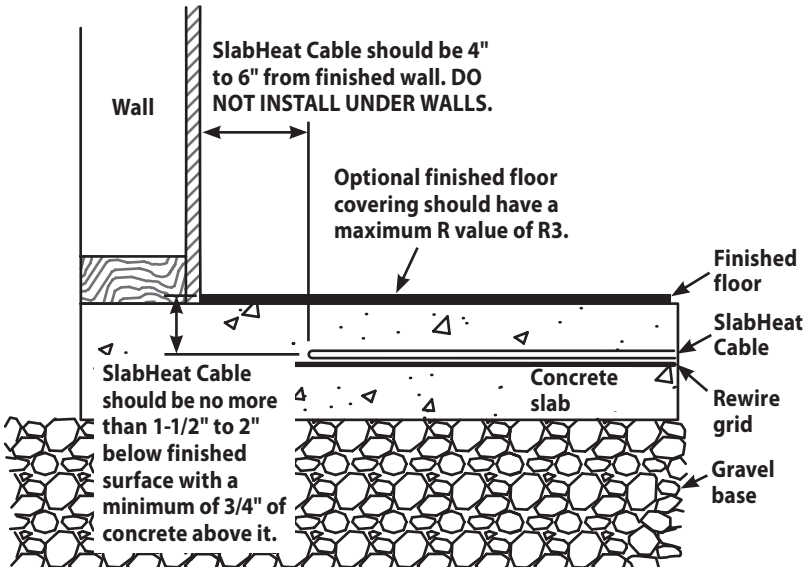
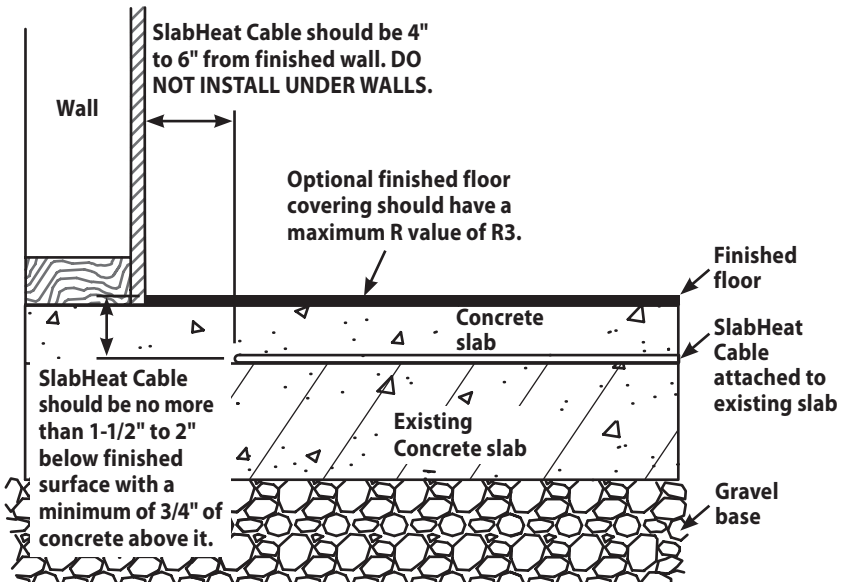
**Existing concrete slab:** If the cable is to be placed on an existing pavement, make sure it is inspected for any sharp objects, loose sections, or other potentially damaging issues that could cause problems later. It is **very important** for the cable to be completely embedded. The cable should be covered by a minimum of 3/4" of concrete.

### STEP 1.7

**New concrete slab:** Attach reinforcement, such as wire mesh or rebar, over the base at about 2 inches below the level of the top surface. You must use "chairs" or other appropriate objects to raise the wire mesh to the correct level. The SlabHeat Cable will be attached to this reinforcement later. It is very important for the cable to be completely embedded in concrete.

Protect or remove sharp protrusions by bending them over, capping, or cutting. Sharp edges may damage the heating cable.



**New Concrete Slab****Existing Concrete Slab (slab cap)**

## Phase 2 - Electrical Rough-in

**⚠ WARNING**

To prevent the risk of personal injury and/or death, make sure power is not applied to the product until it is fully installed and ready for final testing. All work must be done with power turned off to the circuit being worked on.

**STEP 2.1****Circuit Breaker (Overcurrent Protection)**

SlabHeat installations must be protected against overload by a circuit breaker. GFCI type (ground fault circuit interrupter) or AFCI type (arc-fault circuit interrupter) breakers may be used if desired, but are not necessary when using SunStat controls with integral GFCI.

The rating of the breaker is determined by the amp draw of the cable (see **Table 5**). Add the amp ratings of all cables to be connected to the SunStat (see **Table 2** or the Nameplate Label on the cable). If the total is less than 12 amps, use a 15 or 20 A breaker (preference is 15 A). If the total is between 12 and 15 amps, use a 20 A breaker. If the total is over 15 A, another circuit will be required with its own breaker and SunStat.

It may be possible to tap into an existing circuit as long as there is adequate capacity for the cable(s) and any additional appliance, such as a hair dryer or vacuum cleaner. Avoid circuits which have lighting, motors, exhaust fans, or hot tub pumps due to possible interference. Avoid shared neutrals.

**Table 5**

Circuit Breakers and Supply Wire					
VAC	Cable(s)		Supply Wire	Breaker	
	total amps	(AWG)*	qty	type**	rating
120	up to 12 amps	14	1	SP	15 or 20 A
120	up to 15 amps	12	1	SP	20 A
240	up to 12 amps	14	1	DP	15 or 20 A
240	up to 15 amps	12	1	DP	20 A

\* Recommended only. Follow local codes for wire gauge size.

\*\* SP= single-pole, DP=double-pole

**STEP 2.2****Install Electrical Boxes**

**SunStat Thermostat:** Install an extra-deep electrical box for the SunStat thermostat. Follow the instructions included with the SunStat for complete information on location and wiring.

**SunStat Relay:** Install an extra-deep electrical box for any SunStat Relay(s). The SunStat Relay is used when more than 15 amps must be controlled by one SunStat thermostat. Follow the instructions included with the SunStat Relay for complete information on location and wiring.

**Junction Boxes:** If a cable is to be located so its Power lead is not long enough to reach the SunStat thermostat or SunStat Relay directly, a junction box must be installed. Do not attempt to make a connection to other wiring without a junction box. Use a standard junction box with a cover, mounting it below the subfloor, in the attic, in the wall, or in another location easily accessible after all coverings are complete. If the SunStat sensor wire is not long enough to reach the SunStat directly, it may be extended. A junction box may be required by local code to make this connection. Follow the installation instructions included with the SunStat for details.

For construction with an existing wall or where the wall is covered, cut the necessary openings to mount the electrical boxes listed above. Wait to install the boxes until all wiring is fed into these locations to make it easier to pull the wire.

**STEP 2.3****Power Lead Conduit**

Install a minimum of 3/4" rigid or flexible Listed conduit from the control electrical box or junction box to the slab location. Extend it 2" to 6" into the slab edge and attach a bushing to the end to prevent damaging the cable power leads.

**STEP 2.4****Sensor Conduit**

The SunStat sensor is designed to be embedded in the slab. However, it is recommended that the sensor be installed in a minimum of 1/2" rigid or flexible Listed conduit for added protection. If the end of the conduit is sealed, this would allow the sensor to be removed and replaced if there ever is a problem. Install so that the sensor tip is located 1" below the surface, half-way between heating cables, and at least 1' into the heated area.

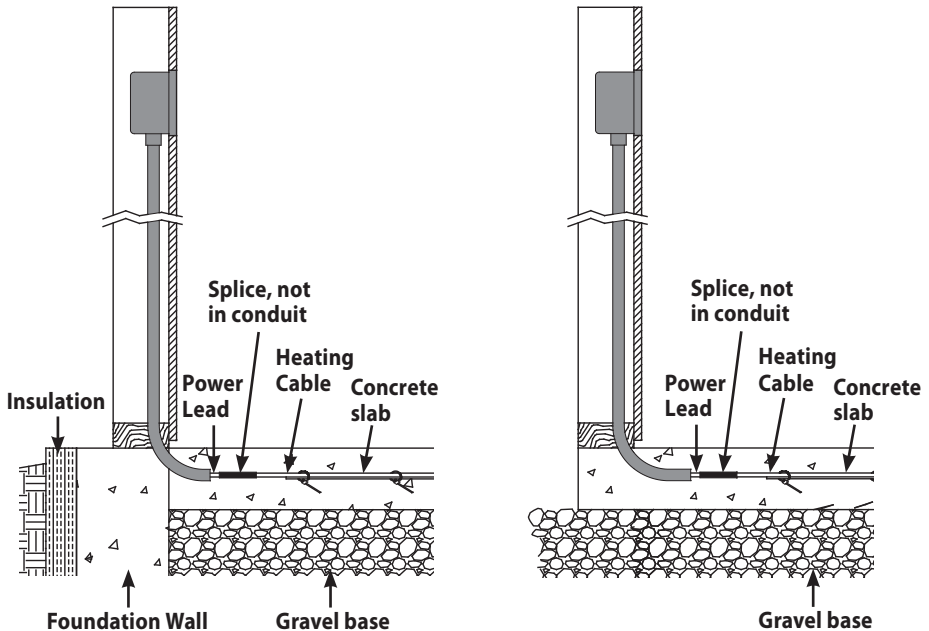
**STEP 2.5****Rough-in Wiring**

Install appropriate 12 or 14 AWG electrical wire from the circuit breaker or branch circuit source to the SunStat electrical box (and SunStat Relay box(es) if needed) following all codes, see **Table 5**.

If SunStat Relay(s) are used, feed appropriate wire between the SunStat Relay(s) and the SunStat thermostat. See SunStat Relay instructions for details of wire size and type.

**STEP 2.6**

Mark the circuit breaker in the panel which feeds the system with "Floor warming/bath" or similar description.



## Phase 3 - Cable Installation

The following Steps 3.1 through 3.8 cover installation basics. Step 3.9 covers some specific applications and their special requirements.

### BASIC INSTALLATION

#### STEP 3.1

Determine a time to install the cable when equipment, heavy tools, and site traffic will be minimal to keep from possibly damaging the product. Be prepared to apply the surfacing courses over the cable the same day so it will be protected from damage.

If installing cable in the upper layer of a two-stage concrete slab, the cable should be completely ready for the second stage. There is limited time between stages, as the slab should not be allowed to fully cure. Therefore, when using SlabHeat Cable, you may want to lay it out and tie it to rewire that can be quickly lifted into place after the first is laid.

- Inspect the area and remove any sharp objects.
- Install in temperatures at least 50°F (10°C).

#### STEP 3.2

Begin by test-fitting the cable in the area to be heated. Make sure it fits the area with no excess cable.

#### ⚠ CAUTION

This heating cable CANNOT be cut shorter to fit! Do not overlap or cross over heating cable on itself. Do not space heating cable closer than 4 inches. Failure to do so may result in damage to the product and dangerous overheating.

- Avoid crossing expansion joints in a slab, unless proper technique and protection steps are followed (see Step 3.9 on page 14).
- Avoid placing the heating cable any closer than 4 inches from other items such as underground cable or piping and 6 inches from toilet rings to keep from overheating them.

#### ⚠ WARNING

The heating cable and factory splices of SlabHeat Cable **must be completely embedded in the concrete**. Failure to do so may result in damage to the product and risk of fire. Never try to use up excess heating cable in surrounding walls or other unprotected applications.

- Do not repeatedly bend the heating cable, and never bend factory splices.
- Never install heating cables in direct contact with non-masonry materials such as insulation board, vapor barriers, vinyl goods, etc. Damage may result.
- For a new concrete slab, when a run of cable exceeds 20 feet, an additional downward U-shaped loop with a 1 to 2 inch radius, should be added to help minimize possible damage to the cable from thermal expansion.

#### STEP 3.3

Place the power leads of the cable next to the conduit entry. The electrician will pull this through the conduit later. Make sure it is positioned so that **no part of the splice connection** or the heating cable will be pulled into the conduit.

#### STEP 3.4

**SlabHeat Cable:** Begin securing the heating cable at the desired spacing to the reinforcement mesh or rebar using plastic cable ties. These cable ties should be applied at the ends of each run and at every 2 to 3 feet. Turn the cable tie ends downward, or trim them so they will not poke up through the surface layers. Do not use metal ties as they may damage the cable.

If installing on top of existing slab, secure CableStrap to the surface. Use nails or similar, every 6 to 10 inches. CableStrap should be placed at either end of the heated area, and additional straps should be applied every 3 to 4 feet in between to hold the cable in place during surfacing.

### STEP 3.5

Use a digital multi-meter to measure the resistance between the conductors of the cable power leads again. Record these resistances in **Table 4** under "After cable is secured in place".

### STEP 3.6

Feed the power leads through the conduit into the junction box, leaving at least 6 inches of free lead length. Secure the heating cable and splice so that they will not be pulled into the conduit. Insert a generous amount of electrical conduit sealant into the conduit end around the power leads to prevent water entry.

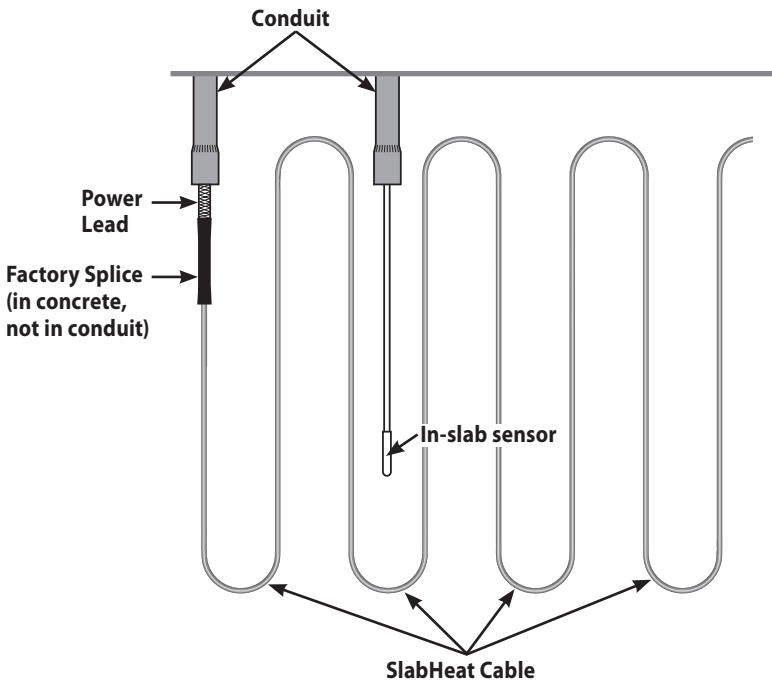
### STEP 3.7

Feed the sensor wire through the sensor conduit, leaving at least 6" of free lead length at the control electrical box. If the sensor tip is directly embedded in the slab, secure it using a cable tie. Make sure the sensor tip is located about 1" below the surface, half-way between heating cables, and at least 1' into the heated area.

### STEP 3.8

Take a photo of the cable installation. This can be very helpful later for utility work, changes to the site, etc. to avoid possible damage. Keep the photos with this installation manual and provide to end user upon completion.

## Top-Down view of SlabHeat cable and the slab sensor entering slab.



Available at: 888-470-2757

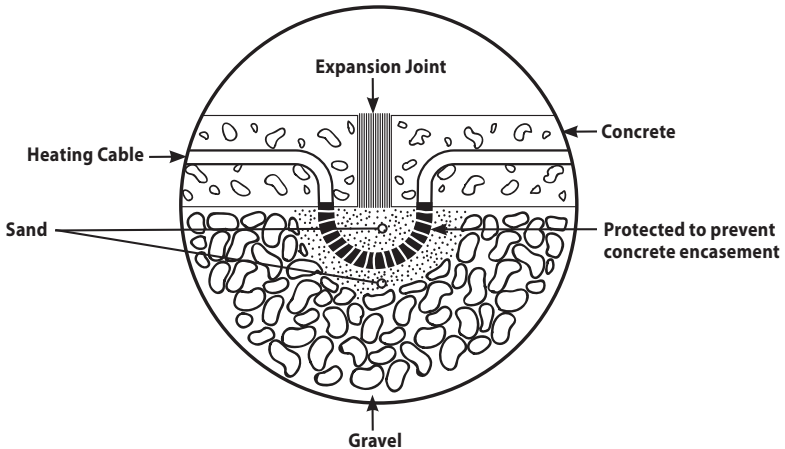
**PEXHEAT.COM**

## SPECIAL APPLICATIONS

### STEP 3.9

**Expansion Joints:** Heating cable must never be run through an expansion joint. Doing so may cause damage to the cable with slab movement. It is recommended to lay the cable so these joints are avoided.

However, if it is necessary, a portion of the heating cable may be dropped into the grade below the expansion joint as shown. Fill around the cable with at least 1 inch thick sand. The loop of heating cable should be long enough to allow flexing, and must not be embedded into the concrete (the sand should protect against this) since this would not allow the cable to flex with slab movement.



### STEP 3.10

#### Wet Locations

##### NOTICE

Acceptance of this application must be verified by the local inspector or authority having jurisdiction (AHJ).

- Never make a field splice to cables installed in a wet location.
- Never begin the cable in a wet location. The connection between the power lead and the heating cable must be fully embedded in concrete and located at least 1' (305 mm) away from the wet area.
- SlabHeat controls must be located at least 4' (13.1 m) away from shower openings. Controls cannot be exposed to water or touched by a person while in a shower area.

## Phase 4: Finish Coverings

### STEP 4.1

Before beginning work, inspect the cable for damage and secure any cable that may have come loose.

**To avoid burying any possible damage that may have occurred since the cable was laid, the following tests should be performed:**

Use a digital multi-meter to measure the resistance between the conductors of the cable power leads again (see Step 2.3). Your electrician should perform an insulation resistance test on the cable. A megohmmeter (e.g. Megger®) adjusted to a minimum 1000 VDC should give a measured value at least 20 megohm (MΩ). (see **Step 1.4**)

**STEP 4.2**

Pour concrete over the base and SlabHeat Cable so that there is a minimum of 3/4" of material above the heating cable. The SlabHeat Cable should be no more than 1-1/2" to 2" below the top finished surface of the floor.

**⚠ CAUTION**

Do not use sharp tools which could damage the SlabHeat cable. Blunted shovels should allow you to work the concrete carefully into all areas.

Make sure the heating cable is fully embedded, as well as 2 to 6 inches of the conduit(s) enclosing the power lead and slab sensor wiring.

Allow the concrete to fully cure as required by the concrete supplier. Do not energize the SlabHeat Cable except to briefly test it, as this would improperly accelerate the curing and potentially cause concrete damage.

**STEP 4.3**

Make a final inspection of the installation. Take another resistance reading! Use a digital multi-meter to measure the resistance between the conductors of the cable power leads. Record these readings in the Cable and Sensor Resistance Log (**Table 4**).

**STEP 4.4*****Ceramic or Stone Tile Applications***

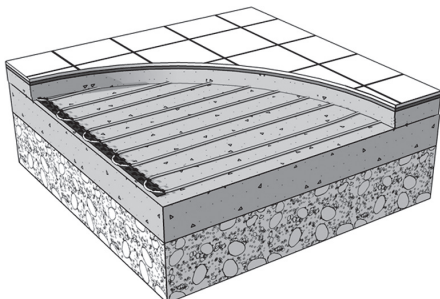
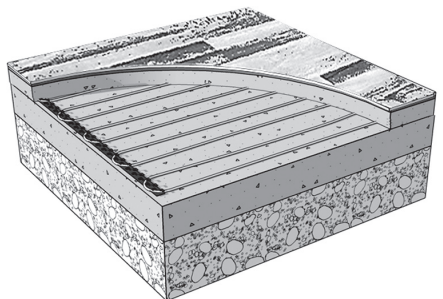
Apply mortar and tile such that the heating cables in the slab will be no more than 1-1/2" to 2" below the top finished surface. Greater depth than this will reduce the system performance. Install following manufacturer's recommendations. Tile should be installed in accordance with Tile Council of North America (TCNA) and American National Standards Institute (ANSI) guidelines.

**STEP 4.5*****Wood, Laminate, and Carpet Coverings***

The combined R-values of all floor coverings over the SlabHeat Cable should not exceed R-3.

**⚠ CAUTION**

Do not use floor coverings that require nailing into the floor, or damage to the heating cable may result.

**TILE OVER SLAB****WOOD/LAMINATE OVER SLAB**

**Phase 5: Control Installation****STEP 5.1*****Install the Controls***

If it has not already been done, install an electrical box for the SunStat thermostat and SunStat Relay. See **Step 2.2** for details.

**STEP 5.2**

Read and follow the instructions included with the SunStat thermostat and SunStat Relay for complete connection instructions, requirements, and mounting.

**⚠ CAUTION**

The ground wire supplied with the cable must be connected to a suitable grounding/earthing terminal.

**STEP 5.3**

Make any final connections to the circuit breaker or branch circuit source.

**⚠ WARNING**

Make sure 120 VAC is supplied to 120 VAC cable and 240 VAC is supplied to 240 VAC cable. Otherwise, dangerous overheating and possible fire hazard can result.

**STEP 5.4*****System Start Up***

After all controls are installed, do not energize the system, except to briefly test operation of all components (no longer than 10 minutes). Do not put the system into full operation until the flooring installer verifies all cement materials are fully cured (typically two to four weeks). See concrete manufacturer's instructions for recommended curing time.

**NOTICE**

Most laminate and wood floor manufacturers specify their flooring should not be subjected to temperatures over 82° to 84°F (27° to 28°C). Check with the flooring dealer or manufacturer and set the thermostat Floor Limit temperature appropriately.

**NOTICE**

Refer to the installation sheets provided with the controls for proper setting. The system should now operate as designed. Please leave this instruction manual, SunStat instructions, and copies of photos of the installed heating system with the end user.



## Appendix - Typical SlabHeat Installations

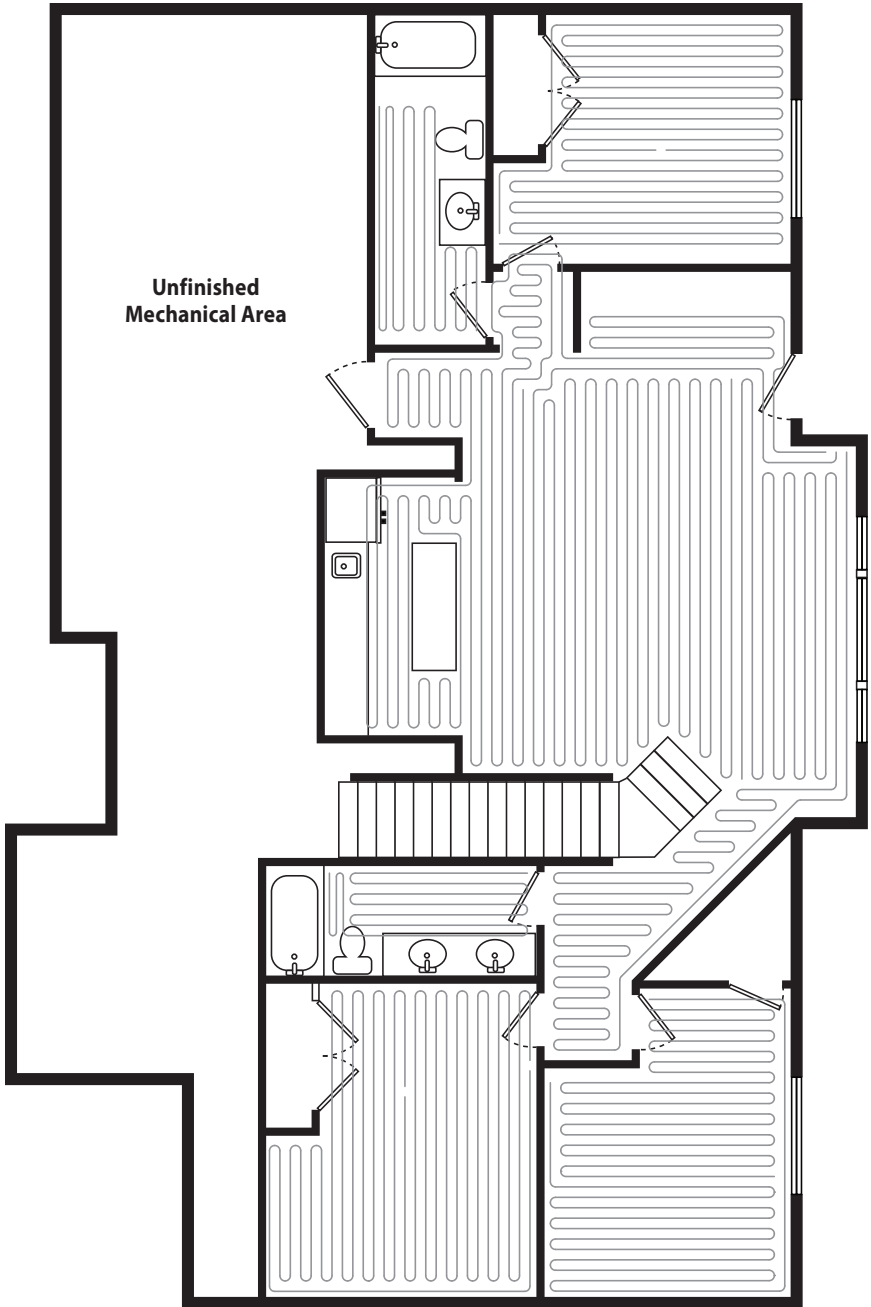
These illustrations show some of the typical installation locations of SlabHeat. In addition to these, SlabHeat is also well suited for any kind of home addition with concrete slab. It's perfect for a bedroom addition, a sun room, a detached garage, or an extended living area. SlabHeat also works well for use in commercial areas.

### Whole house





# Finished Basement

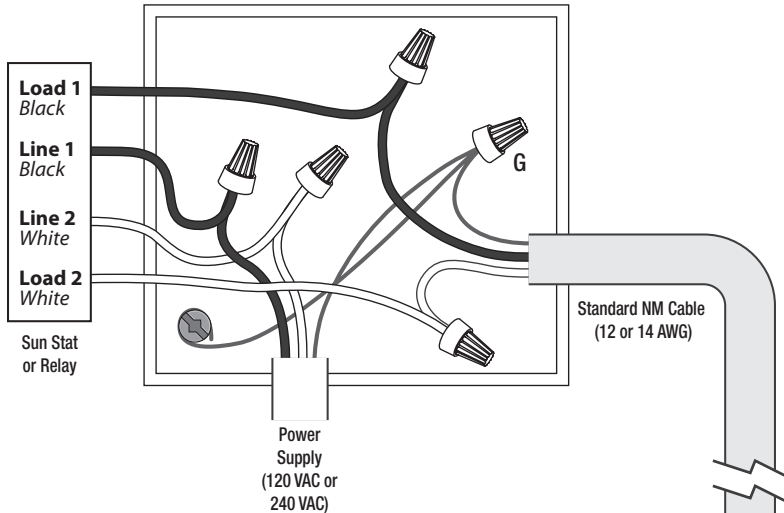


## Connecting Multiple Cables

### ⚠ WARNING

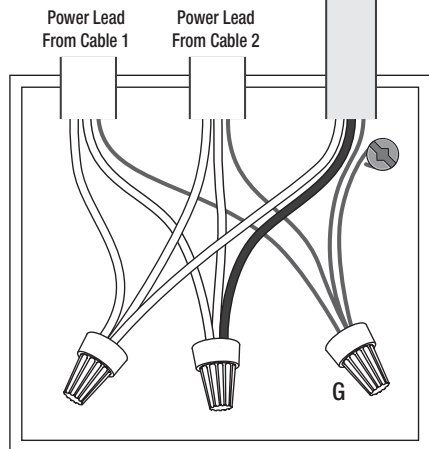
To prevent the risk of personal injury and/or death, do not perform any electrical work unless qualified to do so. Work should be done with great care and with power turned off to the circuit being worked on. Follow all local building and electrical codes.

### SunStat / Relay Connections



Multiple heating cables can be connected to a single SunStat or SunStat Relay. Refer to Table 2 and Table 5 for details on calculating the maximum number of heating cables per control or relay.

### SlabHeat Cable Connections



### ⚠ WARNING

The SunStat is not fully illustrated in these diagrams in order to simplify them. These diagrams are given only as examples of how to properly connect multiple cables. Care must be taken not to overfill a box. Be sure to use wire nuts that are the correct size for the connections being made. Follow all codes for wiring.

All electrical work must be done by a qualified licensed electrician in accordance with local building and electrical codes, and the National Electrical Code (NEC), especially Article 424 of the NEC, ANSI/NFPA70 and Section 62 of CEC Part 1.

## Troubleshooting Guide

If problems arise with the system or its related electrical components, please consult this troubleshooting guide. If not qualified to perform electrical work, it is highly recommended a qualified, licensed electrician be hired.

### ⚠ WARNING

Any electrical troubleshooting work should be performed with the power removed from the circuit, unless otherwise noted.

Although this troubleshooting guide is provided to assist with problems experienced with a system, results are never guaranteed. Watts Radiant does not assume any liability or responsibility for damage or injury that may occur from using this guide. If problems with the system persist, call the manufacturer.

Problem	Possible Cause	Solution
Cable resistance measurement is outside the range printed on the nameplate label.	An analog meter (using a moving needle) was used to take the reading.	Obtain a digital multimeter able to read 0 to 20,000 ohms and remeasure the resistance.
	If measurement shows an open or short circuit, the cable has been damaged.	Record resistances between all wires and contact the manufacturer.
	If measurement is just a little low or high, room temperature has affected the resistance.	Make the room temperature 65°–75°F, or contact the manufacturer.
	The resistance measurement could be from more than one cable wired in series, or wired in parallel. Either will provide false resistance readings.	Make sure resistance measurements are for only one cable at a time.
	The multimeter may be set to the wrong scale.	The multi-meter should typically be set to the 200 ohms (200Ω) scale. For cables with resistance range higher than 200 ohms on the nameplate label, set the meter to the 2000 ohm (2kΩ) scale.
Floor does not get warm.	Cable has been damaged.	Measure cable resistance. Check for both “open circuit” and “short circuit” as detailed earlier in this manual. If damaged, record resistances between all wires and contact the manufacturer.
	GFCI has tripped, indicated by a light on the control or “GFCI TRIP”.	Check for loose wire connections. Reset the GFCI on the control or circuit breaker. If it trips again, check for a short circuit in the cable as detailed earlier in this manual. If cable is damaged, record resistances between all wires and contact the manufacturer. If cable is not damaged, replace the GFCI control. Also see “GFCI conflicts” below.
	Incorrect voltage supplied, or mismatched electrical components used.	Measure “line” voltage, 120V cable have Yellow tags marked “120V” and 240V cables have Red tags marked “240V”.
	Cables are wired in “series” or “daisy chained” (end-to-end).	Multiple cables must be connected in “parallel” .

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Floor heats continuously.	Incorrect wiring. The control was “bypassed” when it was wired to the power supply.	Make sure wiring connections are correct. Consult the wiring diagram on the back of the control, the instructions that came with the control, or the wiring diagrams in Appendix 2.
	Defective control.	Return control to dealer for replacement.
Floor temperature shows much higher than what the floor feels like.	Floor sensor is not wired properly, or is located incorrectly.	Make sure only one floor sensor is connected to the control.
Control is not working correctly.	If a programmable control, the programming may be incorrect.	Carefully read and follow control programming instructions.
	Incorrect voltage supplied, or mismatched components used.	Test voltage, verify parts. See “Incorrect voltage supplied” above.
	Floor sensor is not wired properly, or is not working properly.	Make sure only one floor sensor is connected to the control.
	Loose connection(s) on line side and/or load side of control.	Remove and reinstall the wire nuts at each connection. Make sure the wire nuts are tight. Check all connections back to the breaker.
	Defective control.	Return control to dealer for replacement.
Control is not working at all.	No power is supplied.	Check circuit breaker. Measure voltage at the control. Check all connections between breaker and control.
	Floor sensor is not wired properly, or is not working properly.	Make sure only one floor sensor is connected to the control.
	Defective control.	Return control to dealer for replacement.
GFCI conflicts and false-trips.	An electric motor or a ballasted light source is sharing the circuit with the cable(s).	Electric motors and other electrical devices can cause a GFCI to false-trip. Run a dedicated circuit to the floor-warming system or select a different branch circuit

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WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information: [www.watts.com/prop65](http://www.watts.com/prop65)

## Electric Floor-warming Products 25-year Limited Warranty

SunTouch and Watts Radiant (the Companies) warrant their respective electric floor heating mats and cables (the Products) to be free from defects in materials and workmanship for twenty-five (25) years from the date of manufacture. Thermostats and controls sold by the Companies are warranted, parts and materials, for three (3) years from the date of purchase. The sole remedy for controls is product replacement. This warranty is only provided to customers who purchase the Products from authorized resellers, and is transferable to subsequent owners of properties where the Products are initially installed.

### Under this Limited Warranty, the Companies will provide the following:

If the Product is determined by the Companies to be defective in materials and workmanship, and has not been damaged as a result of abuse, misapplication or modification, the Companies will refund all or part of the manufacturer's published list price of the Product at the time of purchase in accordance with the following: 100% for the first ten (10) years, then prorated on a diminishing 25-year scale for the remaining warranty period.

### For example:

- (1) Product found defective in the 5th year will receive the full manufacturer's published list price of the Product at the time of purchase;
- (2) Product found defective in the 15th year, with 10 years remaining in the warranty period, will receive 10/25ths of the manufacturer's published list price of the Product at the time of purchase.

### In order to make a claim, you must:

- (a) Provide the Company with sufficient details relating to the nature of the defect, the installation, the history of operation, and any repairs that may have been made.
- (b) At the Company's discretion and at the owner's expense, ship the Product to the Company or the Company's local representative or distributor.
- (c) Provide proof that the Product was installed in accordance with the applicable Product Installation Manual and any special written design or installation guidelines by the Companies for this project.
- (d) Provide proof that the Product was installed in accordance with the National Electrical Code (NEC) or the Canadian Electrical Code (CEC), and all applicable local building and electrical codes.
- (e) Provide a retail sales receipt or proof of purchase.

### The following are not covered by this Limited Warranty:

- (a) Any incidental or consequential damage, including inconvenience, loss of time or loss of income.
- (b) Any labor or materials required to repair or replace the Product or control, not authorized in writing by the Company.
- (c) Any labor or materials required to remove, repair or replace flooring materials.
- (d) Any freight or delivery costs related to the Product, the control, or any related flooring or electrical products.

The Companies assume no responsibility under this warranty for any damage to the Product caused by any trades people, visitors on the job site, or damage caused as a result of post-installation work. The staff at the Company is available to answer any questions regarding the proper installation or application of the Product at this toll-free phone number: 800-276-2419. If you are ever in doubt about the correct installation procedure to follow, or if the Product appears to be damaged, you must call us before proceeding with the installation, or proposed repair.

THE COMPANIES DISCLAIM ANY WARRANTY NOT PROVIDED HEREIN, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. THE COMPANIES FURTHER DISCLAIM ANY RESPONSIBILITY FOR SPECIAL, INDIRECT, SECONDARY, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING FROM OWNERSHIP OR USE OF THIS PRODUCT, INCLUDING INCONVENIENCE OR LOSS OF USE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE OF THIS DOCUMENT. NO AGENT OR REPRESENTATIVE OF THE COMPANIES HAS ANY AUTHORITY TO EXTEND OR MODIFY THIS WARRANTY UNLESS SUCH EXTENSION OR MODIFICATION IS MADE IN WRITING BY A CORPORATE OFFICER.

DUE TO DIFFERENCES IN BUILDING AND FLOOR INSULATION, CLIMATE, AND FLOOR COVERINGS, THE COMPANIES MAKE NO REPRESENTATION THAT THE FLOOR TEMPERATURE WILL ACHIEVE ANY PARTICULAR TEMPERATURE, OR TEMPERATURE RISE. UL® STANDARD LISTING REQUIREMENTS LIMIT THE HEAT OUTPUT OF REGULAR MATS AND CABLES TO 15 WATTS PER SQUARE FOOT DEPENDING ON CABLE INSTALL SPACING, AND UNDERFLOOR MATS TO 10 WATTS PER SQUARE FOOT, AND AS SUCH, USERS MAY OR MAY NOT BE SATISFIED WITH THE FLOOR WARMTH THAT IS PRODUCED. THE COMPANIES DO WARRANT THAT ALL PRODUCTS WILL PRODUCE THE RATED OUTPUT LISTED ON THE PRODUCT NAMEPLATE, WHEN OPERATED AT THE RATED VOLTAGE.

Some states do not allow the exclusion or limitation of incidental or consequential damages and some states do not allow limitations on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights, which vary from state to state. SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO TWENTY-FIVE YEARS FROM THE DATE OF MANUFACTURE.

### Terms and Conditions

**Shipping Discrepancies:** Incoming materials should be inventoried for completeness and for possible shipping damage. Any visible damages or shortages must be noted prior to accepting the material. Once the receiving personnel accept the material on their dock, they have relieved the freight company of any responsibility. Any discrepancy concerning type or quantity of material shipped, must be brought to the attention of the Companies within 15 days of the shipping date entered on the packing slip for the order.

**Return Policy:** The Companies items may be returned within one year from the date of purchase, if they are not damaged or used. There will be a 15% restock charge applied to items returned due to overstock or customer order error. All returned items must be in new condition. Products, controls or other parts that have a quality defect will be replaced (not credited) at no charge to the customer. If an item is shipped in error, there will be no restocking charge. All items returned, for replacement, credit or repair, must have a Returned Goods Authorization (RGA) number, or they will not be accepted. Please call our order desk for an RGA number. Products older than one year are excluded from these terms and conditions and may not be returned. No returns will be accepted for the Custom TapeMat product. Products that have been damaged, or Products that have been cut, may not be returned. This includes Products that have had mortar or concrete materials applied to them. These Products cannot be repaired and cannot be resold; therefore, we cannot accept them.

**Effective:** APRIL 1, 2006. This warranty applies to all Products purchased after this date.

# Affiliations:



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