EASYHEAT®

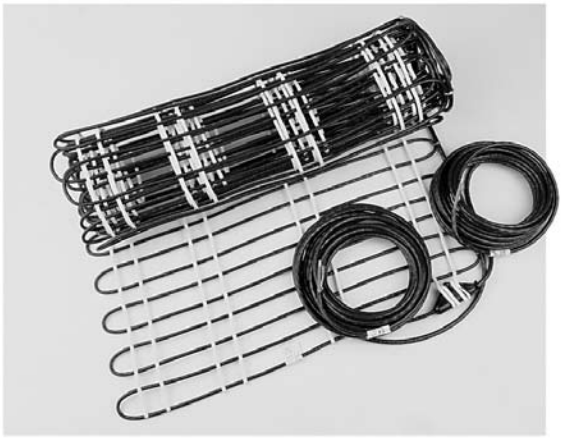
SEECO Heat Mats

Installation Instructions

UL LISTED

READ CAREFULLY

- Read and follow all instructions carefully.
- As with all electrical apparatus, misuse or damage during installation or operation could cause a potentially hazardous situation.
- For additional information concerning the use or installation of this equipment, contact Easy Heat immediately.
- GROUND FAULT PROTECTION MAY BE REQUIRED WITH SEECO-HEAT MATS. CHECK WITH ELECTRICAL INSPECTOR.
- All installations must conform to Article 424 of the National Electrical Code.
- SEECO-HEAT Mats are designed to provide supplemental heating only – the mats are not intended to perform as the primary heat source for a room or area.



DESCRIPTION

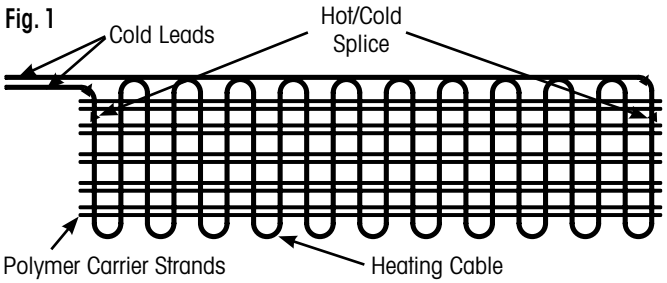
SEECO-HEAT Mats are designed to offer a fast and economical way to provide interior supplementary heat in concrete slabs, ceramic tile floors, asphalt, and laminate wood floors. The mats are ideal for removing floor chill in kindergartens, basements, garages, playrooms, bathrooms, milking parlors and other interior locations. Do not install the mats under carpet, vinyl composition, or linoleum type floors, solid hardwood flooring or any type of nailed-down wood flooring.

SEECO-HEAT Mats contain electrical heating elements designed to provide a fixed amount of heat (15 watts per square foot). These heating elements are a single length of heating cable formed into a rectangular shape and held in place by attached webbing, which shapes the mat and eases installation.

The mats are comprised of a single length of heating cable with factory connected cold leads on both ends (20 foot is standard, custom lengths available). Standard SEECO-HEAT Mats are available in 18″ and 36″ widths and are available in a variety of lengths from 4 feet to 30 feet. Custom width mat sizes also are available. *(See Figure 1)*

SEECO-HEAT Mats are designed to be completely embedded in concrete slabs, under ceramic tiles, in asphalt, and under laminate wood floors and are to be used with a thermostat to provide temperature controlled supplemental heat. The Mats are embedded in conjunction with the flooring installation. Temperature control devices also require installation at this same time.

Fig. 1



PLANNING

P1. Mat Layout Plan/Mat Wiring Plan

Each installation must have a Mat Layout Plan (MLP) and Mat Wiring Plan (MWP) prior to beginning the installation. The MWP & MLP are not done by EasyHeat, these are typically done by the engineering or contracting firm responsible for the installation. This information will ensure that all necessary mats are available at the site prior to installation, and that all mats correspond to the installation requirements (size, power supply voltage, etc.).

The MLP must clearly identify the following:

- location and tag number of each mat
- routing of cold leads for each mat
- location of all junction boxes
- routing of all conduit
- location of all controls/sensors
- location of all drains, pipes, and similar obstructions
- flooring type
- expansion and control joints
- areas which may be drilled in the future for fastening of surface mounted structures, such as hand railings, signs, doorstops, parking bumpers, etc.

1. Measure and accurately sketch the slab, including locations of expansion joints, control joints, cabinets, appliances, expected furniture, walls, etc.
2. Locate mats on the MLP in accordance with the following guidelines:

a Determine the voltage to be used

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b Locate mats as follows *(see Figures 2 and 3)*:

i. Locate mats in traffic areas only. Do not locate mats under cabinets, appliance locations, etc.

ii. Locate mats a minimum of 2 in. from slab edges and walls.

iii. Use the longest mats possible. Mats must not run through expansion or control joints. Allow at least 2 inches between mats.

iv. Arrange mats so the maximum number can be parallel connected in each junction box. Mats may be installed either side up.

Fig. 2

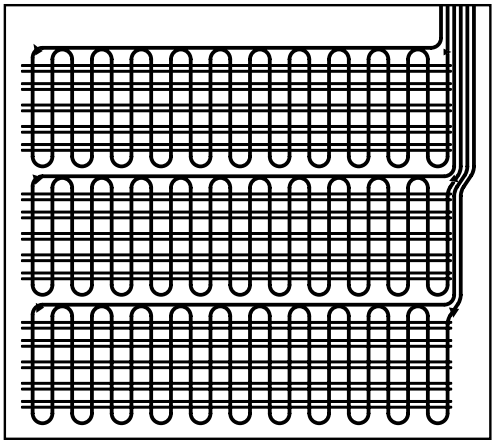
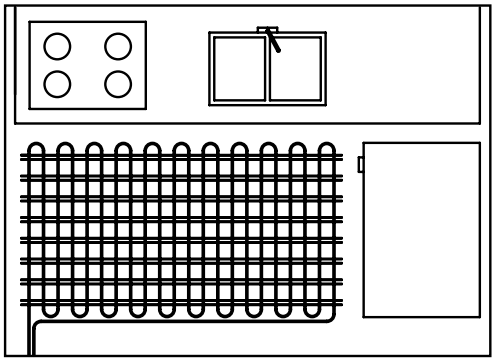


Fig. 3



v. Mats can accommodate curves by cutting the white polymer carrier stands needed. *(see Figure 4)*

vi. Where possible, locate the junction box outside the slab. Standard Mat leads are 20 ft. long: allow 18″ for connections. Never alter factory connections. All leads must pass through conduit from the slab to the boxes. The MLP should plan for junction boxes to be as close to the service source as possible.

vii. SEECO-HEAT Mats must be used with a floor sensing thermostat. The thermostat sensor must not touch the heating cable and must be installed in accordance with the manufacture's instructions.

The MWP must clearly identify the following:

- connection details of mats, controls/sensors and power supply
- identification of each mat, control/sensor, junction box, etc.
- branch circuit ratings

Contact Easy Heat if this information is not available or is incomplete.

3. Power supply layout:
   a. Determine the total amperage of the installation.
   b. Determine the amount and type of power cable required. Boxes, fittings, and power cable must be provided and installed in accordance with the National Electrical Code.

P2. Mat Sizes

The SEECO-HEAT Mat layout must be designed to cover the area to be warmed, and allowance must be made for obstructions, such as poles, expansion joints, etc.

In some cases, such obstructions can be accommodated by modifying mat shape.

Mat Shape Alterations

Mats may be tailored to follow contours of curves and other obstructions by making a series of cuts to the mat carrier strands as shown in *Figures 4 & 5*.

Exercise extreme care to prevent cutting the mat heater wire during this operation.

1. Start all cuts on the side opposite the cold lead and cut strands towards the cold lead side.

2. To make a curve, cut strands as shown in *Figure 4*. The number of strands cut will depend on the mat length and surface curvature. In a similar way, mat shape can be altered to form a wider block pattern or to go around an object. *(See Figure 5)* To ensure adequate heating, do not allow cable spacing at outer edge of curve to be more than 2 times the standard cable spacing.

Fig. 4

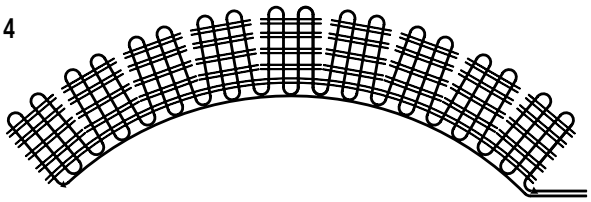
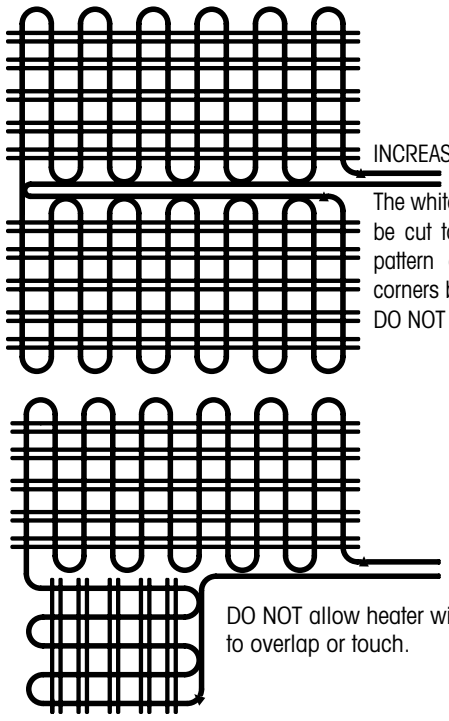


Fig. 5



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P3. Mat Layout

- Mats must be laid in accordance with the Mat Layout Plan (MLP) to which they were manufactured: this plan must be available at the job site.
- Identify location for expansion and control joints. Mats must not be positioned through expansion or control joints.
- Allow 2-4″ on each side of the mats for clearance.
- Allow approximately 4 inches between adjacent mats at expansion or control joints.
- For asphalt, mats must be placed at least 12″ in from edges to accommodate variations in edging.
- Adjacent mats may be positioned within 2″, but must not touch or overlap. continued
- Mats must not be placed under areas to be drilled in the future for fastening of surface mounted structures such as hand railings, doorstops, etc.

P4. Control/Expansion Joints

Control joints are typically indentations in a concrete surface along which cracks are intended to form. The indentations may be hand troweled prior to hardening of the concrete, or cut with a special concrete saw after the concrete has set. Mats must not be positioned under control joints.

Expansion joints are full thickness separations between sections of concrete, with some flexible material forming the separation which then absorbs any thermal expansion in the concrete section. Movement of adjacent sections could damage a mat crossing an expansion joint, hence, mats must not be positioned through expansion joints.

P5. Wiring

Appropriate wiring of all mats must be completed according to the Mat Wiring Plan (MWP). All necessary conduit and other wiring devices to be installed within the surface must be available prior to beginning mat/surface installation.

P6. Junction Boxes/ conduit

In most cases the ideal location for junction boxes is indoors with at least 18″ of accessible mat leads within the box. When planning the location of the junction boxes it is important that at least one foot of mat cold lead remains embedded in the floor. Junction boxes and conduit should be located so that they can accommodate the maximum number of mat leads expected to be routed to/through them.

P7. Controls/Wiring

Controls/wiring must be installed according to the MWP and MLP. (Some controls include devices required to be installed in the heated surface). All wiring must conform to Local and National Electrical Code.

P8. Planning for Installation

The installation must be done in accordance with proper construction practices, including allowance for drainage, reinforcement, etc. Improper installations can result in unstable surfaces which can crack/move and break mat heating cables. Warranty is void if proper construction practices are not followed.

Also refer to installation details in "Installation" Section below.

The mat placement depth must not be greater than 3 ½″ (to ensure adequate surface heating) or less than 2″ for concrete and asphalt, and not less than 1″ for tile and laminate flooring.

Concrete installations must not contain aggregate greater than ¾″. Typically, a base layer of concrete is poured and leveled, then the mats are immediately positioned, and then the remaining concrete is poured. It is also possible to allow the base layer of concrete to set, then position the mats and complete the pour. If the second pour is delayed, a binder or binding agent should be employed to minimize shear plane formation.

Asphalt installations must not contain aggregate larger than 3/8″ and must be delivered to the job site at a temperature less than 340°F – larger aggregate and/or higher temperatures will damage cable and result in failure. Typically, a base layer of asphalt is laid and allowed to set, the mats are positioned, and the final layer of asphalt is laid. (It is also possible to lay mats on an existing layer of asphalt that is being resurfaced). The mats must be located between 3 1/2″ and 2″ of the finished surface to ensure adequate surface heating.

CAUTION: Extreme care must be used when machinery such as wheelbarrows, rollers, front-end loaders, tractors, paving machines, etc., is involved in the installation of heating cables/mats in asphalt or concrete surfaces. It is not recommended machinery be allowed to travel over mats during installation. If it is necessary for the machinery to travel over mats, such machinery must not have cleats or metal tracking of any type, as such cleats /tracking can sink into the asphalt and contact the mat, possibly damaging the cables.

CAUTION: The use of sharp implements, such as rakes, shovels, etc., is usually required during surface installations. However, unless care is taken, these can damage mats during installation. All workers must be advised to avoid contacting the mats with such implements. If accidental contact is made, the mat must be immediately checked for damage.

It is recommended that workers not walk on the mats. When mats are installed on rebar or in other situations where weight on the mats would be highly concentrated, possible damage to the cable could result in immediate or later operational failure.

P9. Electrical Inspection

Local electrical inspectors may require inspection prior to, during, and/or after surface installation. Be certain that they are contacted prior to beginning mat installation.

P10. Identification

Electrical panels and controls must be identified as to their function per the National Electrical Code.

CAUTION:

1. Do not use admixtures or chemical compounds that may be harmful to copper or PVC.
2. It is required that all products listed by UL be properly identified. Therefore, if the leads on these mats are shortened, ensure that a minimum 6″ of cold lead with the identification tag is retained within the junction box.

SITE MAT PREPARATIONS

S1. Excavation

Excavate and compact surface area.

S2. Wiring/Controls

Lay mats in position according to the MLP. Install all wiring, conduit and control devices associated with the surface installation and according to the MLP and MWP. Do not connect the power supply at this time. Conduits must extend into surface to ensure no wiring is exposed.

Position all control/sensors to be installed within the surface and connect all wiring/conduit. If necessary, provide appropriate protection for these devices during surface installation.

S3. Initial testing

The continuity and insulation resistance of each mat must be tested prior to paving or covering. Record readings on Installation Test Record Form included with this instruction. Connect a megger between the copper grounding braid and the inner conductor on one lead of a mat. Ensure the other lead of the mat is isolated and that the heating element is not in contact with the ground braid. Set the megger at 500 V (minimum) and measure the resistance. The resistance must be 10 Megohms minimum. This test assures that the mat has not been damaged during shipment or subsequent handling.

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Next connect an ohmmeter between the inner conductors of the two leads of the mat. Measure the resistance of the mat. Be certain that the mat resistance is appropriate for the marked wattage and voltage.

Repeat above test for each mat used in the installation.

S4. Connections

- Position all mats associated with the surface installation according to the MLP and MWP.
- Thread mat cold lead wires through conduit into associate junction box. Lay mats in position to check original layout and spacing.
- Leave sufficient slack in lead wires to permit handling of mats.
- Lay mats aside temporarily to allow for installation of base layer of surface material.
- If necessary, provide protection for any controls which may get damaged or dislocated during pour.

INSTALLATION

Ensure that the MWP & MLP are available to all workers involved in installation. Ensure that the details in the MWP & MLP are followed. Refer to "Mat Shape Alterations" above if mat shape needs to be altered.

INSTALLATION IN CONCRETE

C1. Base Pour

Pour concrete to mat placement depth. Distribute concrete such that top surface is roughly level.

C2. Mat positioning/alternating

Position mats, in accordance with MLP, with all lead wires secured within the concrete and maintaining appropriate clearances to edges of forms and between adjacent mats.

C3. Controls/Sensors

Position all controls as required.

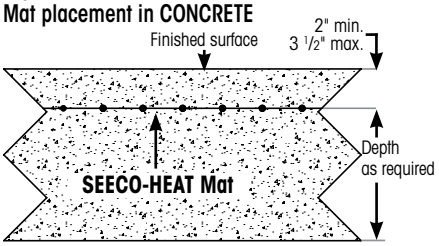
C4. Surface Completion

Complete the slab pour and level. Install mats a minimum of 2", and a maximum of 3 ½" below the surface. *(See Figure 6)*

C5. Final Testing

Retest mats according to Initial Testing above.

Fig. 6
Mat placement in CONCRETE



INSTALLATION UNDER TILES

T1. Base Preparation

SEECO-HEAT Mats are intended to be embedded in concrete or cement-based mortar. The mats are not to be installed directly on wooden surfaces. It is acceptable to apply a thin layer of cement-based mortar on the concrete or mortar slab to help hold the mats and lead wires in place during positioning.

T2. Mat Positioning

Position mats, in accordance with MLP, with all lead wires secured within the mortar and maintaining appropriate clearances to edges and between adjacent mats. Secure strands with fasteners or hot melt glue.

T3 Controls/Sensors

Position all controls as required.

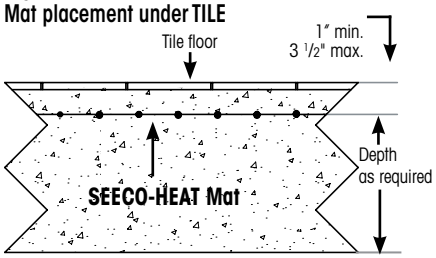
T4. Surface Completion

Complete the mortar application and leveling with the mats installed a minimum of 1" below the surface of the mortar. After the mortar has dried, tiles can be set using a bond coat using proper industry practices. *(See Figure 7)*

T5. Final Testing

Retest mats according to Initial Testing above.

Fig. 7
Mat placement under TILE



INSTALLATION IN ASPHALT

A1. Base Layer

Pour and roll the base layer. If mats are to be placed on an existing surface, make sure the surface is clean and free of any sharp material that could puncture mat heating cable during installation.

A2. Mat Positioning

If necessary, apply a coat of bituminous binder to the base layer. Reposition each mat according to MLP, allowing clearance to edges and between adjacent mats. If necessary, apply a coating of binder over each mat.

A3. Control/Sensors

Reposition all controls as required.

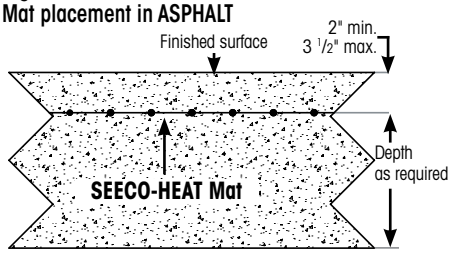
A4. Topcoat

It is advisable to cover the entire mat in one continuous layer. Note: Do not dump large quantities of hot asphalt on the mats. The temperature at the base of the pile may damage heater wire. Maximum asphalt temperature is 340 F – higher temperatures will damage cable and result in failure.Install mats with a minimum of 2", and a maximum of 3 ½" below the surface.
(See Figure 8)

A5. Final Testing

Once asphalt has cooled to below 100 F, again check the mats according to Initial Testing above to be sure no damage has occurred during installation.

Fig. 8
Mat placement in ASPHALT



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INSTALLATION UNDER FLOATING LAMINATE FLOORS

F1. Base Preparation
SEECO-HEAT Mats are intended to be embedded in concrete or cement-based mortar. The mats are not to be installed directly on wooden surfaces. It is acceptable to apply a thin layer of cement-based mortar on the concrete or mortar slab to help hold the mats and lead wires in place during positioning.

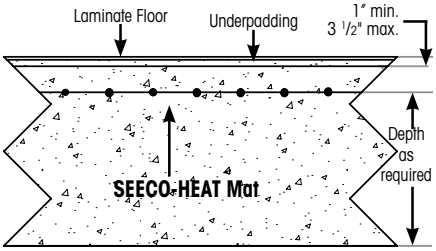
F2. Mat Positioning
Position mats, in accordance with MLP, with all lead wires secured within the mortar and maintaining appropriate clearances to edges and between adjacent mats.

F3. Controls/Sensors
Position all controls as required.

F4. Surface Completion
Complete the mortar application and leveling with the mats installed a minimum of 1" below the surface of the mortar. (See Figure 9). After the mortar has dried, the flooring can be installed using proper industry practices.

F5. Final Testing
Retest mats according to Initial Testing above.

Fig. 9
Mat placement under LAMINATE FLOOR



READ CAREFULLY
Only floating laminate/engineered wood flooring designed to be used with electric radiant underfloor heating is to be used. Check with the flooring manufacturer to verify the flooring is suitable for the application.

Do not use natural wood flooring because the heat from the cables will cause the flooring to warp, crack, and/or discolor.

Typically, laminate/engineered wood floors are installed with a layer of underpadding. It is recommended the underpadding not exceed 3/16 in. to ensure the floor heating is not negatively affected.

After the mortar has cured, install the floating laminate/engineered wood flooring in accordance with the flooring manufactures instructions.

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WIRING CONNECTIONS

When the surface is cured, connections to the controls and power supply can be completed according to the MWP.

WARNING: All lead wires of all mats contain identification labels when shipped from the factory. This identification must be maintained within all connection boxes to ensure ease of identification of individual mats at any time in the future. Warranty is void if lead wires are not identified.

The MWP and MLP must be maintained for future reference, else warranty is void.

IDENTIFICATION

Apply warning labels per National Electric Code to power supply and adjacent to the heated surface.

OPERATION

Mats must be controlled by a floor sensing thermostat. Adjust the thermostat setting to the desired floor temperature. The thermostat will control only the floor temperature. The room air temperature will be controlled by the primary heating system.

Do not allow thick mats or rugs (greater than ¼' thick) on the heated floor; such coverings impede the transfer of heat away from the cables and will cause the floor area beneath them to be warmer than in other areas. Avoid mats with rubber or vinyl type backing, as these may decompose in the presence of heat resulting in floor staining.

MAINTENANCE

Surfaces should be inspected annually for cracks, exposed cable, etc., and sealed as required.

Easy Heat LIMITED WARRANTY AND LIABILITY

Easy Heat warrants that if there are any defects in material or workmanship in any heating cable or accessory during the first year after the date of purchase, we will provide new products to replace any defective items, or we will refund the purchase price paid for the accessory or cable, not including any labor or other installation costs. As an alternate, we may elect to repair the cable or accessory at our factory with all shipping and other removal costs borne by the purchaser.

We further warrant that, for a period of twelve (12) months after the date of performance, any services performed hereunder will be in a good and skillful manner, based on our understanding of pertinent technical data as of the date of performance of such services. Easy Heat's sole responsibility and liability in the event of any defect, error, omission, or failure in the services rendered hereunder shall be to provide corrected services of the type provided for herein, designed to correct such defect, error, omissions, or failure, and in no event shall Easy Heat's liability with respect to such warranty exceed the amount received by it from the Buyer on account of such services.

Our obligation to provide corrected services, new products, refund the purchase price, or perform the repair described above is conditioned upon (a) the installation of the accessory or cable conforming to the specifications set forth in our installation instructions and (b) the accessory or cable not having been damaged by mechanical or electrical activities unrelated to the operation of the accessory or cable.

A refund of your purchase price, provision of replacement products, repair of the accessory or cable or provision of corrected services as described above, shall be your sole and exclusive remedy for a breach of this warranty. THESE ARE THE SOLE AND EXCLUSIVE WARRANTIES GIVEN BY EASY HEAT WITH RESPECT TO THE GOODS AND SERVICES AND ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHETHER OR NOT THE PURPOSE OR USE HAS BEEN DISCLOSED TO EASY HEAT IN SPECIFICATIONS, DRAWINGS OR OTHERWISE, AND WHETHER OR NOT EASY HEAT'S PRODUCTS ARE SPECIFICALLY DESIGNED AND/OR MANUFACTURED BY EASY HEAT FOR YOUR USE OR PURPOSE.

This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, negligence, unauthorized modification or alteration, use beyond rate capacity, or improper installation, maintenance or application. To the extent that you or your agents have supplied specifications, information, representation of operating conditions or other data to Easy Heat in the selection or design of the Goods and the preparation of Easy Heat's quotation, and in the event that actual operating conditions or other conditions differ from those represented by you, any warranties or other provisions contained herein which are affected by such conditions shall be null and void.

If within thirty (30) days after your discovery of any warranty defects within the warranty period, you notify Easy Heat thereof in writing, Easy Heat shall, at its option, repair, correct or replace F.O.B. point of manufacture, or refund the purchase price for, that portion of the Goods found by Easy Heat to be defective. Failure by you to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of your claim for such defects. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days from the date of shipment of the repaired or replaced goods, whichever is longer.

This limited warranty does not cover any costs relating to the repair or replacement of any accessory or cable at the installation site. Our accessories and cables are not easily accessible. A failed accessory or cable usually cannot be easily repaired. Replacement of a failed accessory or cable will require that the materials under which it is installed be removed to permit replacement of the accessory or cable. We will not reimburse any costs relating to the repair or replacement of any accessory or cable at the installation site.

IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL EASY HEAT'S LIABILITY TO YOU AND/OR YOUR CUSTOMERS EXCEED THE PRICE PAID BY YOU FOR THE SPECIFIC GOODS PROVIDED BY EASY HEAT GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. YOU AGREE THAT WE SHALL NOT BE LIABLE TO YOU OR YOUR CUSTOMERS FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL OR PUNITIVE DAMAGES. No agent, employee or representative of ours has authority to bind us to any affirmation, representation or warranty concerning the goods sold unless such affirmation, representation or warranty is specifically incorporated by written agreement.

To obtain new products, arrange repair of existing product, or a refund under this warranty, please contact Easy Heat with a description of the defect and proof of purchase at the address noted herein.

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