



**LISTED**  
Radiant Heating Panel  
4UH6

Certified Underwriters  
Laboratories Inc & UL 1683



# **PEEL AND HEAT CUTTING EDGE™**

## **Heating Panel System**

by Protecto Wrap Company



**Design, Assembly  
and Installation Manual**  
**Stone and Tile**  
WWF13GNW

Mat sizes:

20" x 40", 20" x 64", 20" x 88", 20" x 119",  
40" x 40", 40" x 64", 40" x 88" and 40" x 119"

Custom sizes available

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*For additional information regarding any aspect of installation, please contact us at:*

**[www.protectowrap.com](http://www.protectowrap.com)**

Phone: **800-759-9727**      E-mail: **info@protectowrap.com**  
All information in this manual may be updated without notice.

# Cautions and Warnings



*This symbol indicates safety cautions and warnings. This symbol alerts you to potential hazards that can hurt you and others and result in serious personal injuries or damage to property. You must read and follow the cautions and warnings for safety.*



*This symbol indicates that an electric hazard and shock may exist if a particular action is not followed.*



*This symbol indicates that an electrical hazard may cause a fire if a particular action is not followed.*



The Peel and Heat Cutting Edge heating system may only be installed by qualified personnel who are familiar with the construction and operation of the heating panels and the risks involved. The installation must be made in accordance with Article 424, of the National Electrical Code, ANSI/NFPA 70.



If the Peel and Heat Cutting Edge heating system is not installed properly, fire or shock could occur resulting in serious personal injuries or damage to property. You must follow the instructions, warnings and cautions contained in this manual.



Make sure that the work area is always neat and clean prior to any installation. Nails, screws, and other sharp objects and debris can damage the panels. Any and all panels that are torn or penetrated must be discarded. Be sure the subfloor is clean, rigid, flat, level, and free of cracks.



This heating product shall be installed in accordance with the manufacturer's instructions and the regulations of any authority having jurisdiction over installation and use.



Do not install over expansion joints. Follow the manufacturer's instructions. Heating panels should never be installed at or below 32 Degrees F.



Before installation, check your available electrical capacity. It should be enough for the total output of your layout. All wiring, fuses, and/or UL Listed or Recognized circuit breakers must conform to National Electric Codes. A UL Listed or Recognized Thermostat with a floor sensor must be used and it must have a UL Listed and Recognized Ground Fault Circuit Interrupter (GFCI) to prevent electrical hazards. Don't forget to install the floor sensor.



Never install one mat on top of another or overlap the mat on itself. Do not allow any electrical cables to cross themselves or each other. This will cause dangerous overheating. Do not install heating panels in any walls. Never install heating panels under cabinets or other built-ins. Excessive heat will build up in these small spaces, and the heating panels can be damaged by fasteners (nails, screws, etc.) used to install built-ins.



Always refer to the TCNA Handbook recommendations and ANSI references for proper substrate needed for thinset tile installations and for recommendations on proper movement of joints within the plane of the tile per Detail EJ-171.

# **General Information and Features**

## **Product Description**

Peel and Heat Cutting Edge is a low density heating device that utilizes a high tack pressure sensitive adhesive (PSA) that easily secures the heat mats to the substrate. It is recommended to cover the majority of open floor space to create optimal comfort.

The Peel and Heat Cutting Edge heating panels draw 13 watts per ft<sup>2</sup>, providing even heating throughout each heating panel. Floor temperature is controlled by a programmable UL Listed or Recognized Thermostat (refer to the controller specifications section).

Peel and Heat Cutting Edge heating panels are designed for thinset applications only. Any finished flooring surface cannot exceed R-1. The heating panels are designed to be imbedded in mortar underneath ceramic, porcelain, natural stone and tile.

## **Features**

Peel and Heat Cutting Edge heating panels are factory assembled, but can be cut to fit job requirements in the field.

A Peel and Heat Cutting Edge layout can be “changed on the fly” if there is a change or unanticipated condition at the point of installation. This is a significant advantage over other radiant heat systems.

Peel and Heat Cutting Edge is available in 120 volt.

- 20" X 64" (8.9 square feet)
- 20" X 127" (17.67 square feet)
- 40" X 64" (17.74 square feet)
- 40" X 127" (35.23 square feet)
- Custom sizes available

Heating panels come pre-wired from the factory with 12' long leads.

Virtually any size room and installation can be accommodated.

Peel and Heat Cutting Edge heating panels are rated for 13 watts/ft<sup>2</sup>, which produces 44 BTU per square foot.

The temperature of Peel and Heat Cutting Edge heating panels can be limited to a specific set point if the flooring material requires it.

Peel and Heat Cutting Edge is operated by an electronic on/off programmable UL Listed or Recognized Thermostat for controlling temperature by means of a sensor positioned next to the heat mat and built into the thermostat. The thermostat can be configured for control of floor temperature, room temperature or room temperature with a limit switch.

**(UL Listed or Recognized Thermostat sold separately)**

It is possible to use Peel and Heat Cutting Edge heating panels for primary heat when properly designed for the specific space and environment. See Section 1, Step 2.

This manual covers the use of Peel and Heat Cutting Edge heating panels specifically for installations that require installations fully embedded in thinset mortar.

Peel and Heat Cutting Edge heating panels can be covered with carpet, vinyl or hardwood if the heating panel is installed in a minimum of 3/8" cement-based or gypsum-based mortar to provide a rigid surface in which to install the heating film.

Protecto Wrap's Whisper Mat® CS Membrane can be installed under Peel and Heat Cutting Edge heating panels to provide a thermal break and improve system performance and efficiency.



Always refer to the TCNA Handbook recommendations and ANSI references for proper substrate needed for thinset installations and for recommendations on proper movement joints within the plane of the tile per detail EJ-171.

**10 Year Limited Warranty and Activation**



The heating element for Peel and Heat Cutting Edge heating panels have a 10 year limited warranty from the date of purchase as more fully described on the warranty. Warranty does not apply until the customer completes online warranty registration at [www.protectowrap.com/peelandheatcuttingedge/warranty.com](http://www.protectowrap.com/peelandheatcuttingedge/warranty.com)

**Manual Availability**



The manual must be attached to the service panel and must be easily recognizable and accessible. This can help the homeowner or contractor troubleshoot any problems and solutions.

# Important Notes to Assemblers and Installers

This manual contains the information required to design, assemble and install the Peel and Heat Cutting Edge radiant heating panel product. **Read This Manual Completely Before Installing the product.** This manual serves as the document and information of record for installation. No other information or representations, including verbal, supersede or replace the information in this manual.



ALL REQUIRED INSPECTIONS MUST BE COMPLETED BEFORE COVERING THE Peel and Heat Cutting Edge HEATING PANEL INSTALLATION.



The installation of this heating product must be in accordance with the manufacturer's instructions and the regulations of any authority having jurisdiction over installation and use.



Only personnel licensed for and familiar with the local and national electrical codes should be conducting the electrical installation.



The installation of this heating product shall be in accordance with article 424, of the National Electrical Code, ANSI/NFPA 70.



Thinset mortar used in the installation must be cured for 28 days before energizing mats. It is the responsibility of the installer to ensure that the thin-set has cured to prevent residual conductivity that would trip the UL Listed or Recognized Thermostat GFCI.



The product must not be used in any way other than described in this manual. Peel and Heat Cutting Edge heating panels must be connected to a **dedicated 20 amp** electrical circuit.



DO NOT overlap the film.



Indicate and label on the electrical panel which circuit is used for the electric floor heating system.



It is mandatory to install a GFCI thermostat with each Peel and Heat Cutting Edge Installation. DO NOT have multiple GFCI's on a single circuit as this can cause inadvertent tripping.



DO NOT USE sharp tools or power tools to clean grout lines. Cleaning grout lines with sharp tools or power tools may damage the film and will void the warranty.



Subfloor must be prepared in accordance to ANSI specifications.



The ambient air temperature must be above 0° C or 32° F when Peel and Heat Cutting Edge heating panels are installed.



The maximum R value of all floor coverings is R-1.



DO NOT install heat mat under large appliances, built-in cabinetry, solid base fixtures or food pantries or in walls, ceiling or between floor joists.



RISK OF ELECTRICAL SHOCK AND FIRE. DAMAGE TO SUPPLY CONDUCTOR INSULATION MAY OCCUR IF CONDUCTORS ARE ROUTED LESS THAN 2 INCHES (51 MM) FROM THIS HEATING PRODUCT. REFER TO INSTALLATION INSTRUCTIONS FOR RECOMMENDED MEANS OF ROUTING SUPPLY CONDUCTORS.

# PHCE Components for Assembly and Installation

## Product

## Description

Peel and Heat Cutting Edge Heating System Boxed Product

Peel and Heat Cutting Edge heating panel, composite end tape to apply to cut end, Warning Labels and this Design, Assembly and Installation Manual.

## Sold Separately

UL Listed or Recognized Thermostat and/or controller

UL Listed or Recognized Thermostat. The capacity of the thermostat must be 20% greater than the installed heating load. If relays are used, a low voltage control UL Listed or Recognized Relay may be used.

Junction Boxes

Use UL Listed or Recognized Junction Boxes to house relays and the UL Listed or Recognized Thermostat. Size the boxes to the specific use.

Thin-set

Multi-purpose and polymer. Thinset must be mixed on-site. Product should not be premixed.

This instruction and operating manual

A full review and understanding of this document is required prior to starting installation.

## Tools

## Description

Tape Measure

25 ft.

Wire Stripper

Stripper and Cutter

Thermometer

Infrared Thermometer

Multi-Meter

Amp, Watts, Ohms. An Ohm meter is required to measure the resistance prior to energizing the heating panels. A digital meter is recommended.



After the materials and tools are assembled, you can begin assembly and installation.

# Section 1: Designing the System

## Step 1 Choosing the Correct Panels and Power

Review the chart below and choose the heating panel for your intended use.

**Note.** 240 volt heating panels can be special ordered through authorized dealers.

| <b>Recommended for this Use</b>                            | <b>120v</b>  |
|--|--------------|
| Heating a tile room  | <i>Great</i> |
| Heating over an non-insulated space                        | <i>Good</i>  |
| Heating a kitchen floor                                    | <i>Great</i> |
| Heating more than 120 SF<br>See Section 1, Step 3, Page 10 | <i>NO</i>    |
| Heating a basement floor                                   | <i>Good</i>  |
| Heating a room over a garage                               | <i>Good</i>  |
| Misc large installations                                   | <i>Good</i>  |



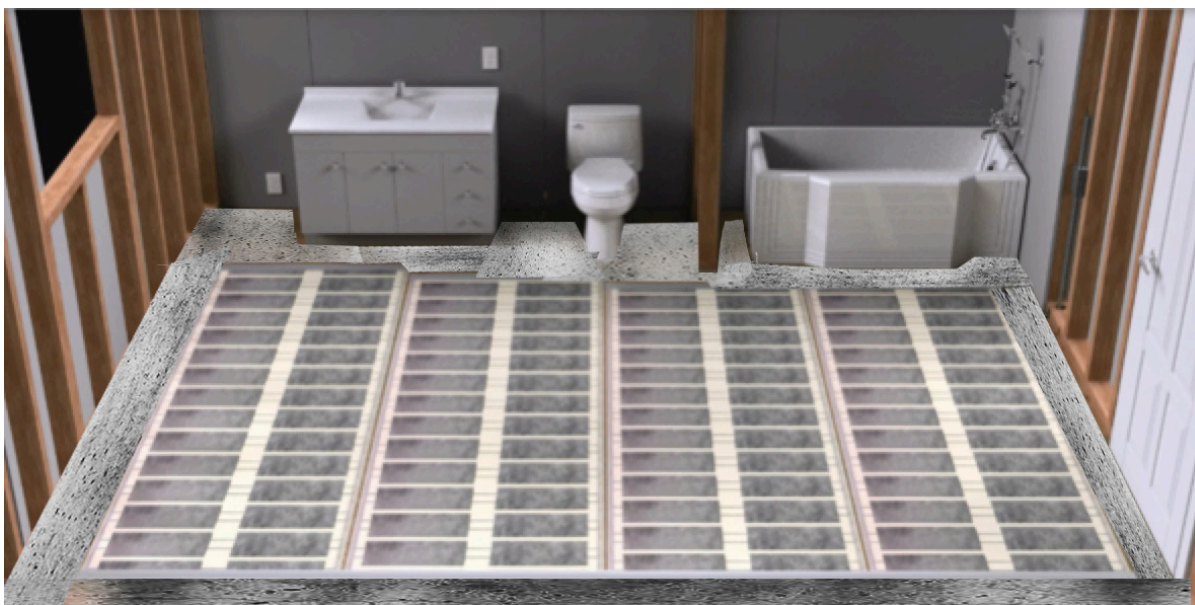
Never mix heating panels of different voltage ratings.  
Never use a different input voltage than rated for the heating panel.



# Section 1: Designing the System

## Step 2 Designing the Peel and Heat Cutting Edge Heating Panel System

Measure and design the installation area. Calculate the gross floor area of the room to be heated. In the example below it is 120 square feet. Calculate the “net area” which is the aggregate surface area of the heating panels to be installed. In this example, it is 87.5 square feet.



The Peel and Heat Cutting Edge (PHCE) panel system works very well as primary heat. When calculating your heating needs be aware that the better insulated the structure, the better the performance. PHCE produces 44 BTU per square foot. This should be more than enough to heat a properly designed primary heat system.

PHCE should be installed on a properly prepared stable sub-floor. For wood subfloors, 3/8 inch backer board or a self-leveling system of at least 3/8 inch should be present or applied. Cover the entire panel system with thinset or self leveling compound to embed the PHCE.

If a laminate or other surface than stone or tile is chosen as the finished floor, 3/8 inch backer board or self-leveling compound may replace stone or tile as the top layer of the system. This protective surface acts as a non-decorative tile. Check with the flooring manufacturer to determine if the floor covering is radiant heat compliant.

If a synthetic underlayment is desired (flexible antifracture), make sure that at least 3/8 inch of thinset is applied prior to installing the PHCE.

# Section 1: Designing the System

## Step 3 Calculating Power Requirements

Power requirements and size of a **single panel**

| Minimum Panel Size | Voltage AC | 20" wide Panel Maximum Panel Size | 40" Wide Panel Maximum Panel Size | Ohm/ft <sup>2</sup> | Amps/ft <sup>2</sup> | Maximum Density W/ft <sup>2</sup> | Maximum Length |
|--------------------|------------|-----------------------------------|-----------------------------------|---------------------|----------------------|-----------------------------------|----------------|
| 8in x 20in         | 120        | 1.7ft x 10ft                      | 3.35 ft x 10ft                    | 1107                | 0.108                | 13                                | 10             |

Power requirements and size of a **system of panels**

| Voltage AC | Maximum Watts per individual panel | Maximum Amps per circuit | Maximum watts per system of panels | Maximum system of panels/ft <sup>2</sup> |
|------------|------------------------------------|--------------------------|------------------------------------|--|
| 120        | 433.29                             | 15                       | 1560                               | 120                                      |

### Power Calculation Formulas

| Panel Type    | 120V AC    |
|---------------|------------|
| Rated Voltage | 120V-60Hz  |
| Rated Amp     | +10 or -10 |
| Power Output  | +10 or -10 |

Power requirements **example (120V)**

| 120V       | Formula  | Calculation      |
|------------|--|------------------|
| Net Area   | 87.5 ft <sup>2</sup>                           |                  |
| Total Amp  | 0.108A/ ft <sup>2</sup> x 87.5 ft <sup>2</sup> | 9.45 Total Amps  |
| Total Watt | 13W / ft <sup>2</sup> x 87.5 ft <sup>2</sup>   | 1137 Total Watts |



If the installation area exceeds the maximum installation area with one UL Listed or Recognized Thermostat, install a UL Listed or Recognized Relay Slave Unit in accordance with the capacity of recommended thermostat.



Do not design a system to exceed the above maximum amp and watt output with one UL Listed or Recognized Thermostat or Slave Unit.

# Section 1: Designing the System

## Step 4 Calculating Power Requirements for Your Design

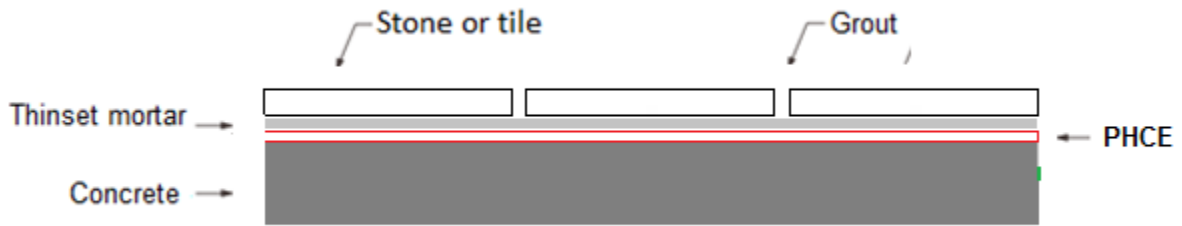
Calculate your power requirements by completing the gray boxes in the following table. Be sure to perform the calculations only for the row that applies to the voltage of your system. There is one table for 120V and one table for 240V.

| 120V AC    | Formula                    |  |          | Calculation |             |
|------------|----------------------------|--|----------|-------------|-------------|
| Net Area   | Calculated in Step 2 above |  |          |             |             |
| Total Amp  | $0.108A / ft^2 \times$     |  | $ft^2 =$ |             | Total Amps  |
| Total Watt | $13W / ft^2 \times$        |  | $ft^2 =$ |             | Total Watts |

| 240V AC    | Formula                    |  |          | Calculation |             |
|------------|----------------------------|--|----------|-------------|-------------|
| Net Area   | Calculated in Step 2 above |  |          |             |             |
| Total Amp  | $0.054A / ft^2 \times$     |  | $ft^2 =$ |             | Total Amps  |
| Total Watt | $13W / ft^2 \times$        |  | $ft^2 =$ |             | Total Watts |

# Section 1: Designing the System

## Step 5-A Installing Peel and Heat Cutting Edge Heating Panels in a Concrete Base for Stone and Tile Option



|                | Spec     | Thickness    | How to Install                |
|----------------|----------|--------------|-------------------------------|
| Tile or Marble | -        | Per supplier | Refer to Manufacturer's guide |
| Thinset        | -        | 3/8"         | Refer to Manufacturer's guide |
| Base           | Concrete | -            |                               |



NOTE: Do not apply heating panels to floors where hydrostatic or moisture vapor rate emissions exist above 4 lbs./1,000 ft<sup>2</sup> in 24 hours per the Calcium Chloride test method.



Refer to the TCNA Handbook recommendations and ANSI references for proper substrate needed for thinset tile installations and for recommendations on proper movement joints within the plane of the tile per Detail EJ-171.

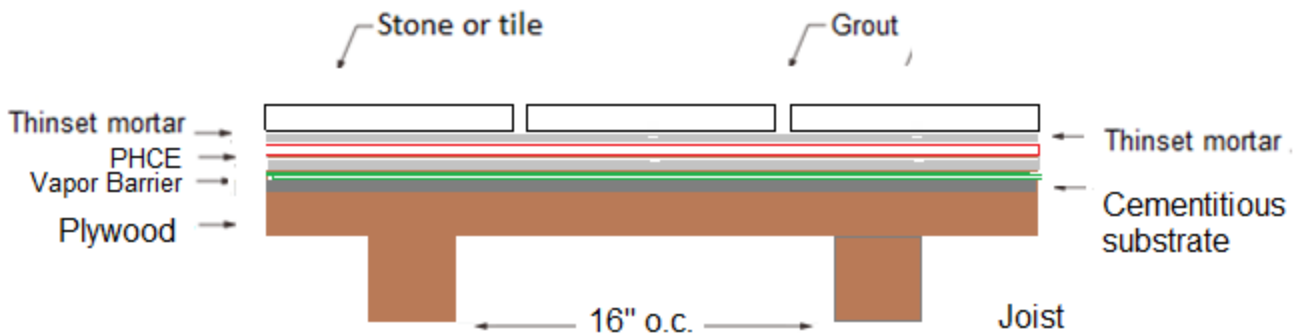


ALWAYS: Completely embed the heating panels and connections in mortar (tile and stone) or self-leveling underlayment (laminated and non-masonry) materials.

# Section 1: Designing the System

## Step 5-B Installing Peel and Heat Cutting Edge Heating Panels in a Wood Base for Stone and Tile Option

### Radiant Heat over a Plywood Subfloor



|                          | Spec                                | Thickness    | How to Install                    |
|--------------------------|-------------------------------------|--------------|-----------------------------------|
| Tile or Marble           | -                                   | Per supplier | Refer to Manufacturer's guide     |
| Thinset                  | -                                   | 3/8"         |                                   |
| PHCE                     | Non Woven Surface                   | 1/32 "       |                                   |
| Thinset                  | -                                   | 3/8"         | Refer to Manufacturer's guide     |
| Cementitious Substrate   | Backer board-self leveling compound | 3/8"         | Refer to Manufacturer's guide     |
| Vapor Barrier (optional) | -                                   | 1/32"        | Refer to Manufacturer's g<br>uide |
| Base                     | Wood                                | -            |                                   |



**NOTE:** Do not apply heating panels to floors where hydrostatic or moisture vapor rate emissions exist above 4 lbs./ft<sup>2</sup> in 24 hours per the Calcium Chloride test method.



Refer to the TCNA Handbook recommendations and ANSI references for proper substrate needed for thin-set tile installations and for recommendations on proper Movement Joints within the plane of the tile per Detail EJ-171.



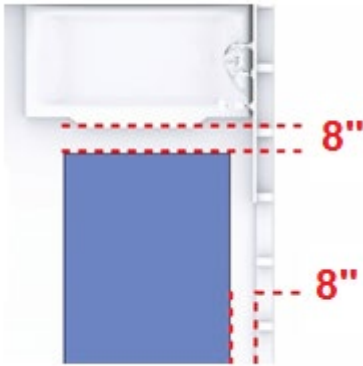
**ALWAYS:** Completely embed the heating mats and connection in mortar (tile and stone) or self-leveling underlayment (lamine and non-masonry) materials.

## Section 2: Assembling Heating Panel

### Step 1. Select heat panels

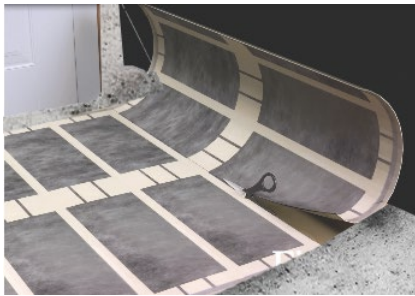
Select the heating panel sizes needed for your room. If there is no need to shorten the heating panel, continue with installation under Section 4 Wiring.

Unroll each of the panels on a clean flat surface. Make sure each panel is free and clear of anything that might damage it. It is easiest to put them on a work table one at a time, if available.



### Step 2. Measure

Measure how much of the panel has to be removed by jobsite measurement or simply placing the panel on the floor. Make sure to have the mat 8 inches away from the outside walls or permanent obstructions such as a cabinet.



### Step 3. Cut

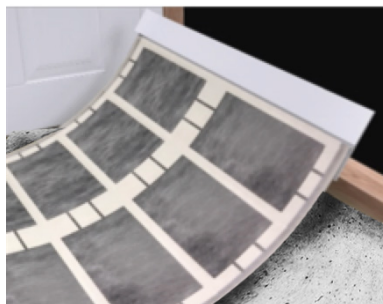
Only using scissors, cut the heat mat at the cut line closest to the desired length.

Apply the Peel and Heat Cutting Edge End Tape to the cut end.

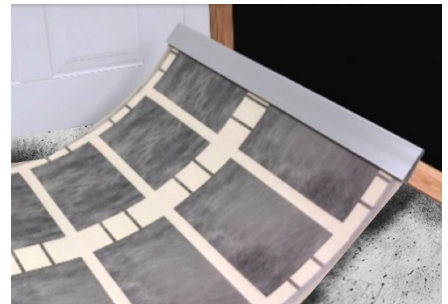
### Step 4. Tape



Peel back film from back side of mat from end that was cut.



Apply piece of end tape onto bottom of mat, underneath the pulled back film.



Wrap tape around end and adhere to top side of mat. Make sure the release liner of the tape facing the floor.

# Section 3: Installing Peel and Heat Cutting Edge

## Preparation Before Installation



Confirm the electric capacity of the installation location. It should be enough to accommodate the total output of the heating panels. The UL Listed or Recognized Circuit Breaker should be rated for a maximum of 20 amps (with no greater than a 15 amp load). Determine how many UL Listed or Recognized Thermostats should be needed and the location of each thermostat and/or relay. Drill or cut a hole for many UL Listed or Recognized Electrical Junction Box. Make a groove in the substrate for the path of wires (power and sensor).



Be sure the subfloor is clean, rigid, flat, level, free of cracks and objects that can damage the heating panels. **DO NOT INSTALL FILM OVER EXPANSION JOINT.** Nails, screws and other sharp debris can damage the panels. Any and all panels that are torn or penetrated must be discarded.



Heating panels should never be installed at or below 32 F°.



Never install one mat on top of another or overlap the mat on itself. This will cause dangerous overheating. Do not forget to install the floor sensor. Never install mats under cabinets or other built-ins. Excessive heat will build up in these small spaces, and the mat can be damaged by fasteners (nails, screws, etc.) used to install built-ins.



Always refer to the TCNA Handbook recommendations and ANSI references for proper substrate needed for thinset tile installations and for recommendations on proper movement joints within the plane of the tile per Detail EJ-171.

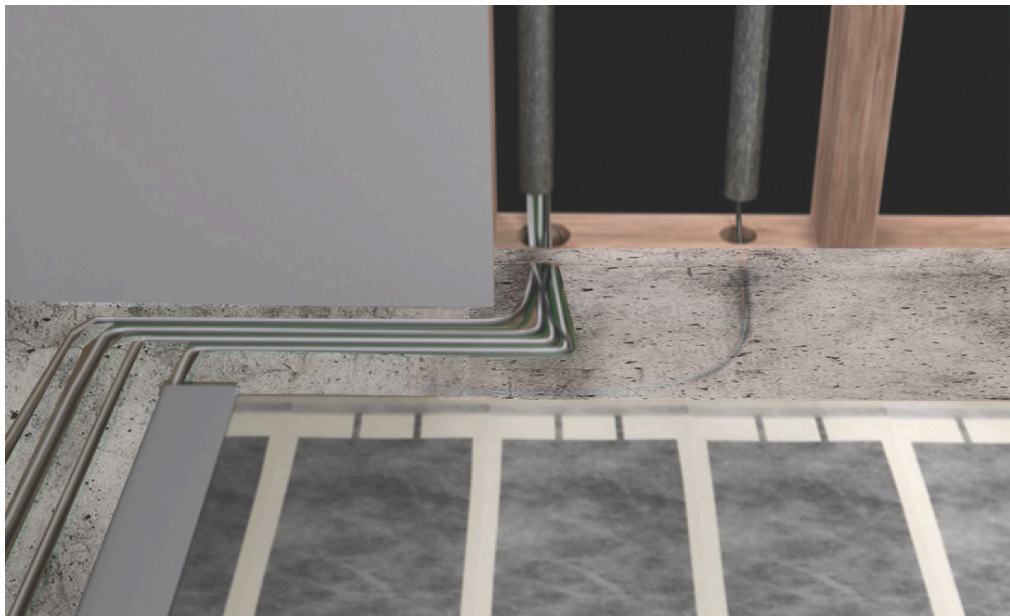




Figure 1

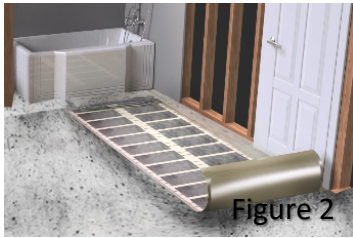


Figure 2



Figure 3

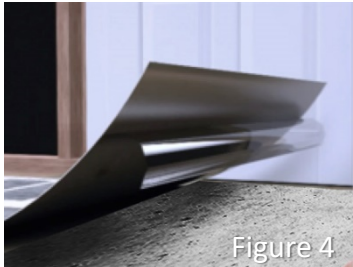


Figure 4



Figure 5

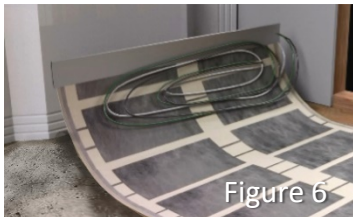


Figure 6



Figure 7

## Section 3: Installing Peel and Heat Cutting Edge Mat

### Step 1

Completely prepare and clean the subfloor of all obstructions including nail heads and debris. See “subfloor inspection and preparation” below. Wipe down the subfloor with a wet sponge and let dry completely. (Figure 1)

#### Subfloor inspection and preparation

Prior to installing a PHCE system make sure the subfloor is properly prepared. Inspect that there are not any nails, screws or other protrusions in the floor. Determine that at least  $\frac{1}{4}$  of cementitious substrate such as self-leveling compound is present or applied. A properly prepared subfloor is required to fully embed and encapsulate the PHCE system.

If this is a direct concrete floor installation make sure the concrete is clean and ready for a properly embedded installation.

The PHCE system should be fully embedded as described in this manual.

### Step 2

With the release paper still on, practice fit the mat into place allowing 8” clearance around walls, drains and fixtures. (Figure 2)

### Step 3

Make sure the leads are within reach of the junction box and that there are no obstructions or floor penetrations in the way.

### Step 4

When mat is in proper position, roll the end with the power lead connections back far enough to trim off approximately 12” of the release paper to expose a portion of the adhesive surface. (Figures 3-5)

### Step 5

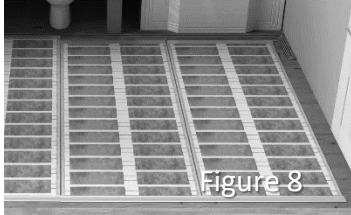
Press this exposed section of the mat onto the clean substrate and then roll the other end back to the point where the release paper was removed. (Figure 6)

### Step 6

Begin pulling the release paper off and hand smooth the mat into position as it unrolls to achieve a positive bond while avoiding trapping air bubbles. (Figure 7)



## Section 3: Installing Peel and Heat Cutting Edge Mat (continued)



For adjacent mats, follow the same procedure starting with alignment of side-by-side mats. (Figure 8)

The heat mat can be installed with up to 3" of space between panels. "Cold spots" can form if spaced farther apart.

Do not overlap mats, which can cause the system to overheat and fail. (Figure 8)



### Step 7

As you set mat(s) in place leave, clearance to walls or partitions at the connector end for wiring and final connections. It is important to take care in the placement of the heating mats, as once the adhesive side of the heating mat comes in contact with the surface, it will provide a tenacious bond. (Figure 9)



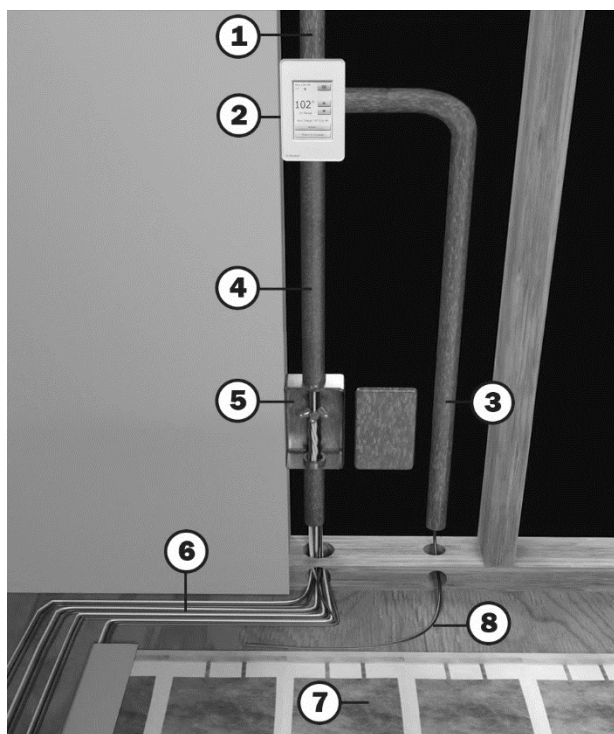
"RISK OF ELECTRIC SHOCK AND FIRE. DAMAGE TO SUPPLY CONDUCTOR INSULATION MAY OCCUR IF CONDUCTORS ARE ROUTED LESS THAN 2 INCHES (51 MM) FROM THIS HEATING PRODUCT. REFER TO INSTALLATION INSTRUCTIONS FOR RECOMMENDED MEANS OF ROUTING SUPPLY CONDUCTORS."

## Section 4: Wiring

### Step 1 Roughing in the cold leads to the power source and UL Listed or Recognized Thermostat



Cold leads are the pre-installed wires that exit the bottom of the heating panels to be run through the conduit system to the UL Listed or Recognized Thermostat. Panels with longer cold leads can be acquired from the manufacturer. Do not cut cold leads prior to the thermostat.



1. Power source
2. UL Listed or Recognized Thermostat 4" square
3. Conduit for the sensor line
4. Conduit for the cold leads
5. Junction box if needed
6. Cold leads
7. Peel and Heat Cutting Edge heating panels
8. Sensor

For clarity, the framing members have been removed. See the line drawing to show standard framing and the bottom plate.



Type NM and NMC non-metallic sheathed cable is not suitable for installing the product. UL797, UL1242, UL6, BS4568, BS31 UL listed conduit is required for all installations.



The cold leads of the heating products shall be suitable for the applied voltage and the temperature to which they are subjected under normal and abnormal operating conditions.



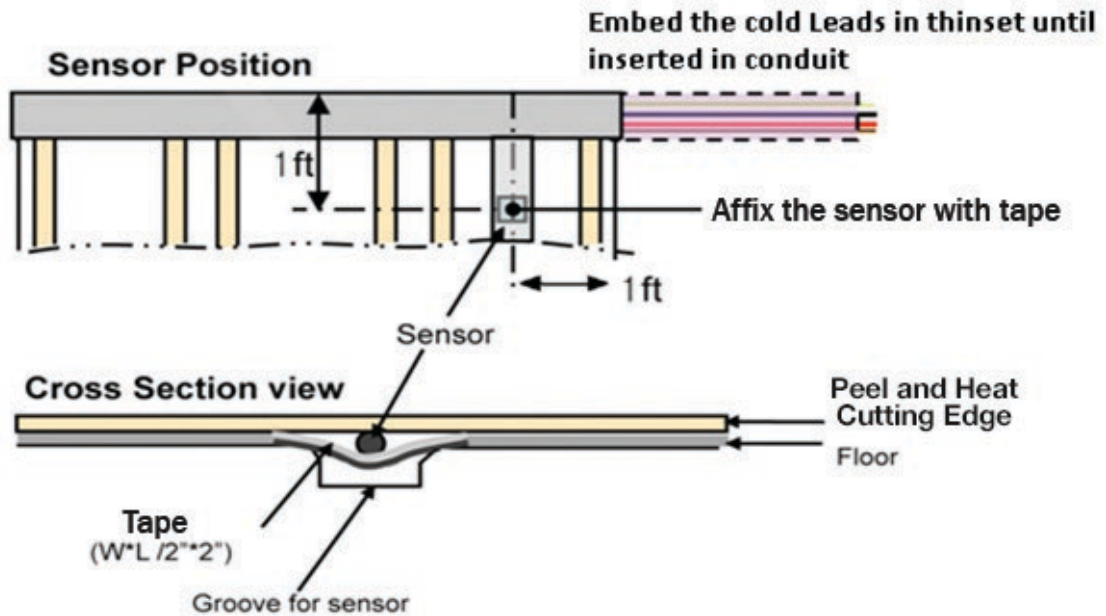
The installation of this heating product shall be in accordance with article 424, of the National Electrical Code, ANSI/NFPA 70.



Caution: Use copper only as supply conductor.

## Section 4: Wiring

### Step 2 Installing Sensor and Thermostat



### UL Listed or Recognized Thermostat and Sensor Requirements



A line voltage UL Listed or Recognized Thermostat that measures ambient air temperature and floor temperature through a sensor is included with specifically marked Peel and Heat Cutting Edge products. A low voltage controller can be used if it controls slave relays that are required if the heating panels are larger than the maximum power requirements.



Any substituted UL Listed or Recognized Thermostat is required to have a built in UL Listed or Recognized GFCI and must be rated to handle the required voltage.



The installation of this heating product shall be in accordance with article 424 of the National Electrical Code, ANSI/NFPA 70.

# Section 5: Inspection and Testing of Heat Mats

## Step 1 Calculating Resistance

The formula to calculate resistance is:  $\Omega = W/I^2 \pm 10\%$

$\Omega$  = resistance in Ohms

W = total watts in the system (13 w/ft<sup>2</sup> X the number of ft<sup>2</sup> of the combined heating panels)

I = total amps in the system (0.105 A/ft<sup>2</sup> x the ft<sup>2</sup> of the combined heating panels for 120V panels and 0.054 A/ft<sup>2</sup> of the combined heating panels for 240V). This manual will use the more descriptive symbol "A" for amps

For simplicity, this manual will use the formula  $\Omega = W / A^2 \pm 10\%$

### Resistance in sample design (Section 1 Step 2)

| Panel Type | System Area          | Total System Watts          | Total System Amps            | Total System Resistance ( $\Omega$ )              |
|------------|----------------------|-----------------------------|------------------------------|---|
| 120V       | 87.5 ft <sup>2</sup> | 1137<br>(87.5 x 13 = 1137W) | 9.45<br>(87.5 x .108 = 9.2A) |   |
|            |                      | <b>1137 W</b>               | <b>9.45</b>                  | <b>13.43 <math>\Omega</math></b><br>(1137/84.64 ) |

### Resistance in your design

Copy your calculations from page 11 into the gray boxes in the appropriate line for your system voltage. **Calculate your resistance by completing the remainder of the gray boxes in the table, OR use the pre-calculated values on the next page where you are using a whole panel (NOT cut) for the product size purchased.** You must perform the calculations if you cut the panel.

| Panel Type  | System Area |                 | Watts<br>(area x 13) |   | Amps<br>(area x 0.105)<br>(area x 0.054) |   | Amps <sup>2</sup><br>(amps x amps) |                | Resistance<br>Watts/Amps <sup>2</sup> |          |
|-------------|-------------|-----------------|----------------------|---|--|---|------------------------------------|----------------|---------------------------------------|----------|
| <b>120V</b> |             | ft <sup>2</sup> |                      | W |  | A |                                    | A <sup>2</sup> |                                       | $\Omega$ |

| <b>120 V Heating Panel</b> | <b>Ohms</b>  |
|----------------------------|--------------|
| 20" wide x 5' long         | 133 $\Omega$ |
| 20" wide x 10' long        | 66 $\Omega$  |
| 40" wide x 5' long         | 66 $\Omega$  |
| 40" wide x 10' long        | 33 $\Omega$  |

## **Step 2 Test Electrical Resistance**



Then check the resistance in your system to see if it matches your resistance calculation.



If the result is Zero (0)  $\Omega$ , the system circuit is shorted. Check all electric connection points and the path of all electric wires. If damaged sections are found on the film or electrical parts, replace the entire panel. Then measure the resistance in your system to verify that it is correct.



If the resistance is not matched within the limits, you should check the resistance of each heating panel section individually to isolate the problem.



After verifying that the resistance matches your measured resistance to a tolerance of  $\pm 10\%$ , connect the control device UL Listed or Recognized Thermostat and any required UL Listed or Recognized Relays according to the manufacturer's instructions in the junction box and the thermostat box.



## **Step 3 Testing for Heat**

Turn on power supply and check whether the heating panels work properly by using an infrared thermometer on the surface of the heating panels. (Check the heat on all panels.) If the surface temperature does not increase by  $3F^{\circ}$  in one minute, repeat all wiring inspections and calculations. Do not use the heating panel if calculated and actual values do not match within the proper tolerance or the panel does not warm properly.



## **Step 4 Turning Off Power Supply**

Once the floor has been tested for heat, turn off power to the UL Listed or Recognized Thermostat at the breaker in the panel.

# Section 6: Installing Finished Floor Topping



## Tile, Stone & Marble Installation

Install tile using a 3/8" layer of Latex-Portland Cement Mortar, take care during the troweling process to not nick or cut into the mat. When installing tile or stone over Peel and Heat Cutting Edge, follow the TCNA guidelines and ANSI specifications as a minimum standard of installation. Use a Latex-Portland Cement Mortar that meets ANSI 118.4.



**Warning:** Never bang a trowel on the mat to remove excess mortar from the trowel. This could damage the mat.

Make sure 28 days has passed prior to operating system.



## Floating Floor and Other Floor Coverings Installation

Warm Wave panels are designed for thin-set applications only. Any finished flooring surface cannot exceed R-1. The Warm Waves Heating panels are designed to be imbedded underneath the following surfaces.

- A. High Density floors
- B. Engineered Wood floors
- C. Natural Stone Floors
- D. Ceramic Tiles



- Warm Waves can be covered with carpet, vinyl or hardwood if the mat is installed in a minimum of 3/8" cement- based or gypsum-based material to provide a rigid surface which to install the material



- Use of anti-fracture membranes and underlayment for stone and tile is allowed. Warm Waves should be installed above the membrane

Flooring materials must be rated for use with electric floor warming systems.



Install laminate/engineered wood per manufacturer's instructions. After installation, make sure 28 days has passed prior to operating system.

## RADIANT FLOOR HEATING DEVICE

WARMWAVES CUTTING EDGE

Affix to the device that is controlling the Peel and Heat Cutting Edge heating panel system.



### WARNING RISK OF ELECTRIC SHOCK

HEATING PANELS BELOW THE FLOORING.  
DO NOT PENETRATE THE FLOOR WITH NAILS  
STAPLES TOOLS OR ANY OTHER OBJECT

# PANELS: \_\_\_\_\_ AMPS: \_\_\_\_\_ WATTS: \_\_\_\_\_ OHMS: \_\_\_\_\_

Affix to the electrical panel. Record the number of systems installed, along with amp, watt and ohm readings.



### CAUTION RISK OF ELECTRIC SHOCK

RADIANT HEATING PRODUCTS INSTALLED IN THIS  
AREA. AVOID ACTIONS WHICH MAY RESULT IN  
MECHANICAL DAMAGE TO THE PRODUCT

Affix to other points of access where the wiring or heating panels are accessible.

# System Record (Information Card)

## Customer Information

|                                 |  |  |  |
|---------------------------------|--|--|--|
| <b>Name</b>                     |  |  |  |
| <b>Address</b>                  |  |  |  |
| <b>Tel.<br/>Mobile<br/>Fax</b>  |  |  |  |
|                                 |  |  |  |
|                                 |  |  |  |
| <b>Installation<br/>Address</b> |  |  |  |

|                                 |  |  |  |
|---------------------------------|--|--|--|
| <b>Name</b>                     |  |  |  |
| <b>Address</b>                  |  |  |  |
| <b>Tel.<br/>Mobile<br/>Fax</b>  |  |  |  |
|                                 |  |  |  |
|                                 |  |  |  |
| <b>Installation<br/>Address</b> |  |  |  |

## System Information Designed Specification

| <b>Location</b> | <b>Model name</b> | <b>Sq.ft</b> | <b>V</b> | <b>A</b> | <b>W</b> |
|-----------------|-------------------|--------------|----------|----------|----------|
|                 |                   |              |          |          |          |
|                 |                   |              |          |          |          |
|                 |                   |              |          |          |          |
|                 |                   |              |          |          |          |

## Inspection Data

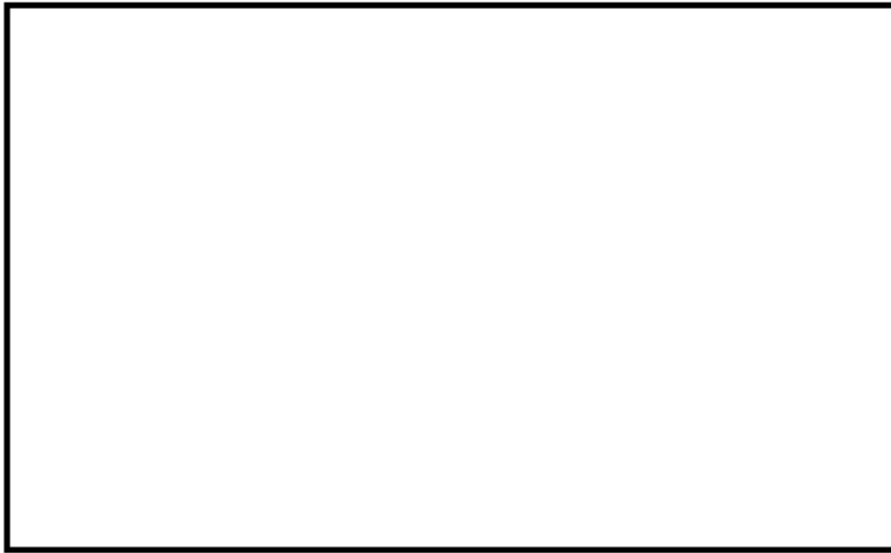
| <b>Location</b> | <b>Model name</b> | <b>Sq.ft</b> | <b>V</b> | <b>A</b> | <b>W</b> |
|-----------------|-------------------|--------------|----------|----------|----------|
|                 |                   |              |          |          |          |
|                 |                   |              |          |          |          |
|                 |                   |              |          |          |          |
|                 |                   |              |          |          |          |

# System Record

## Sketch of the System

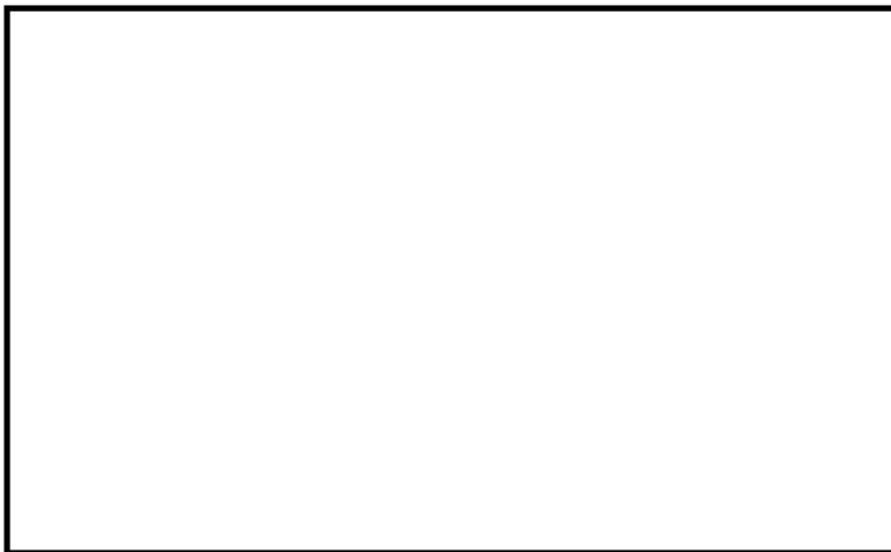
*Diagram of circuit*

| Location | Sq.ft | W | A | Model |
|----------|-------|---|---|-------|
|          |       |   |   |       |



*Diagram of circuit*

| Location | Sq.ft | W | A | Model |
|----------|-------|---|---|-------|
|          |       |   |   |       |





## Notes