

PEEL & HEAT COMPLETETM **INSTALLATION INSTRUCTIONS**



State-of-the-Art, Peel & Stick In-Floor Radiant Heating with Built-In Anti-Fracture Protection



Premium Building Products That Protect

PROTECTO WRAP COMPANY (800) 759-9727 www.peelandheatcomplete.com



Protecto Wrap's Peel and Heat Complete[™] is a unique floor heating and crack isolation system installed under thin-set installations of tile and stone. Non-masonry flooring materials such as carpet, vinyl, or hardwood can be installed over Peel and Heat Complete if the mat is installed in a minimum 3/8" cement-based or gypsum-based material to provide a rigid surface over which to install the wood.

Completely unseen, Peel and Heat Complete combines easy Peel and Stick installation with anti-fracture protection to provide warmth and comfort to flooring surfaces.

Peel and Heat Complete is a safe and efficient electric floor-warming product for interior applications. It can not be used for exterior snow melting applications. It is generally intended for installation below tile, stone, other masonry, and wood flooring materials in residential and moderate commercial installations.

Peel and Heat Complete can be used to heat a room as well. Refer to the Primary Heating Design Section for further information.

Peel and Heat Complete is designed to deliver 12 watts per sq.ft. The floor temperature attainable is dependent upon how well the floor is insulated, the temperature of the floor before start up, and in the case of uninsulated slab applications, the thermal drain of the underlying materials. Please refer to your designer if you have further questions regarding the surface temperature you can expect from Peel and Heat Complete in your particular construction.

- Peel and Heat Complete is available in two separate mat/system configurations: All-in-One, Standard "Kits" include one factory-wired mat (2-foot & 3-foot widths; 3-, 5-, 7-, & 10-foot lengths) with 12' leads, roll-on primer and 7-day programmable thermostat.
- Custom Kits for installations requiring multi-mats and/or mat sizes made to fit specific applications.
 Custom Kits are provided with the necessary Primer and Thermostat(s) and/or relays as needed for large applications. Some Custom Kits may include "Daisy-Chain" type connections utilizing heat shrink "butt" crimp connectors to connect adjacent mats in the field, enabling connection wire leads from only one final mat to be run back to the thermostat. Please see Page 15 18 for Complete Daisy Chain Installation Instructions.

NOTE: Peel and Heat Complete has been tested to the American Standard Test Method ASTM C627, a standard test method for evaluating ceramic floor tile installation systems using the Robinson-Type Floor Tester. This test was performed by the Tile Council of North America for installation above a concrete slab and above a framed floor. This testing resulted in a rating of "Moderate Commercial" for normal, non-vehicular, commercial and light institutional use. This would include all non-vehicular, residential use as well.

Peel and Heat Complete must be embedded in mortar (for tile, stone and marble applications) or self-leveling underlayments (for floating floor and laminate floors), per UL requirements. Do not use glues If you have any questions, please view the Peel and Heat Complete installation video, visit our website at www.peelandheatcomplete.com or call us at (800) 759-9727.

PEEL AND HEAT COMPLETE OVERVIEW & QUICK FACTS



PEEL AND HEAT COMPLETE:

- Is an electric floor heating system that is only 1/8" thick and easy to install.
- Draws 12 watts per sq/ft and produces 41 BTUs per sq/ft, providing even heat throughout the mat.
- Is available in 120V and 240V and in standard and custom sizes (squares, triangles and rectangles).
- Floor temperature is controlled by a variety of programmable and non-programmable thermostat options (refer to Controls section).
- Is warranted to be free of defects in manufacture for a period of 10 years.
- Must be installed on a dedicated 20 amp circuit.
- Maximum thermostat load the is 15 amps (i.e., 150 sq/ft at 120V and 300 sq/ft at 240V.
- Is not warranted for exterior applications or shower pans.

Always 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.

The Peel and Heat Complete Installation guide has four sections:

Part 1: Designing The System is to be used by the heating system designer. This portion of the manual will generally be followed prior to ordering material. The designs and drawings completed during this stage must be made available to the installer(s).

Part 2: Jobsite Preparation, Part 3: Installation, and Part 4: Inspection, Testing, Completion will be used by the actual heating system installers.

Jobsite Preparation provides a complete list of the materials and supplies that must be on hand during the installation and testing of the system.

Throughout this manual three types of notes will direct your attention to important information that must be taken into account during the planning and installation of the system.



PART 1: DESIGNING THE SYSTEM

To select the proper size heating mat(s) for your application, measure the area to be heated and determine the heating mat widths and lengths to fit the clear inside dimensions (wall to wall, etc). It is important to allow up to 6" of clearance around the perimeter of room and from any baseboard heating or permanent fixtures to allow the mats to fit without touching adjacent vertical surfaces or overlapping.

Accurate dimensions are required for the proper kit size selection or for custom mats to be ordered and fabricated. *NOTE:* The heating mats can not be cut or notched to fit around any obstructions or penetrations such as door openings or floor registers.

For installations over wooden sub-floors, check floor for deflection. If it flexes when walked on, the addition of another layer of plywood may be required to provide sufficient rigidity to support tile. (For further information on wood sub-floor design criteria for tile installations, refer to the International Residential Code.)

CONTROL DEVICE OPTIONS

The fuse or circuit breaker used must be rated for a maximum of 20 amperes (no greater than 16 amp load). If a lower rated fuse or circuit breaker is used, it must be rated at least 25% greater than the heating system load attached to it. If an area requires more than the 16 amperes allowed, additional branch circuits may be used, each having its own overcurrent protection. These branch circuits may all be controlled by a single thermostat if it is used with a system of electric relays.

The National Electrical Code specifies that each branch circuit used in conjunction with a heating system must be for the exclusive use of the heating system. Do not connect lights, outlets, etc. to any branch circuit used with the Peel & Heat Complete System.



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

SYSTEM LAYOUT

A sketch of the area to be warmed, including the mat locations and associated wiring, is recommended to make installation and ordering as smooth as possible. Use the following sketch as an example:



PRIMARY HEATING DESIGN

HEAT LOSS CALCULATION

The designer must determine if the output of Peel and Heat Complete is enough heat to match the heat loss of the structure.

A heat loss calculation must be completed to determine the energy required to adequately heat the space under foreseeable circumstances.

The Air Conditioning Contractors of America (ACCA) Manual includes worksheets for manually calculating the heat loss of a structure. Other, comparable, heat loss methods and/or documents may be used. Make sure that all sources of heat loss (transmission, infiltration and radiant) are taken into account.

A separate heat loss calculation must be done for each enclosed area (room, etc.). A separate control device must be included for each enclosed area.

Always include a recovery factor of at least 20% more than the minimum calculated heat requirement to cover unforeseen circumstances.

Do not install Peel & Heat Complete in any bathroom, room or other enclosure which does not have at least as much heat installed as is called for by the heat loss calculation, plus the recovery factor.

Some heat loss methods, particularly those designed for gas and oil based systems, provide their answers in BTUs PER HOUR. To convert BTUs PER HOUR to WATTS, multiply each area total by 0.293.

ACCA may be contacted at (202) 483-9370, 1712 New Hampshire Ave. NW, Washington DC 20009.

All wiring, fuses and/or circuit breakers must conform to National Electrical Code requirements.



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

Material Typical R-Factor: (Maximum System R Value of 2) Up to 5/8" (16 mm) gypsum board R-0.56 (RSI-0.098) Up to 1/4" (6 mm) plywood R-0.31 (RSI-0.054) Up to 3/8" (9 mm) solid wood mat R-0.51 (RSI-0.089)

Maximum covering for laminated flooring & engineered materials is 5/8" with 3/4" subfloor.

Materials which may not contact Peel & Heat Complete: any vinyl or linoleum floor coverings.

Maximum thermal resistance is R2. Installing Peel and Heat Complete under carpeting with a pad is permittable but not to exceed R2; fibrous and rubber pads acceptable with carpet as long as the combined insulating value does not exceed R2.

PART 2: JOBSITE PREPARATION



The installation of this heating product shall be in accordance with the manufacturer's instructions of the authority having jurisdiction.



Make sure that the job site is neat and clean before working with the Peel and Heat Complete Radiant heating mats. Nails, screws and other sharp debris can damage the mats. Any mats which become torn or otherwise damaged must be discarded.



Heating mats should not be installed at or below 32°F (0°C).



This equipment shall be installed only by qualified personnel who are familiar with the construction and operation of the apparatus and the risks involved.

LIMITATIONS

NEVER:

- Cut, puncture or otherwise alter the Peel and Heat Complete mat to make it fit. Punctures, cuts or modifications to the heating mats may result in risk of electrical concerns and will Void the Warranty.
- Bang a trowel on the mat or heating wire to remove excess mortar from it.
- Attempt to repair the heating Peel and Heat Complete if it is damaged. Call Protecto Wrap Company for instruction before proceeding.
- Install one mat on top of another or overlap the mat on itself. This will cause dangerous overheating.
- Forget to install the floor sensor.
- Install Peel and Heat Complete in any walls.
- 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.
- Install under nail down wood flooring.
- Remove the nameplate label from the power leads.
- Allow solvent based products such as sealers or sealants (including silicone) to come in contact with the membrane.

ALWAYS:

- Completely embed the heating mats and factory connection in mortar (tile and stone) or self-leveling underlayment (laminate and non-masonry) materials.
- Enter mat and sensor readings in the mat and Sensor Resistance Log (This can be found on the last Page in the Warranty Information & Registration Form) before, during, and after the installation process.
- 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.

NOTE: Do not apply mats to floors where hydrostatic or moisture vapor rate emissions exist above 4 lbs per 1,000 sq in 24 hours per the Calcium Chloride test method.

The primary components of the Peel and Heat Complete System, depending on the project requirements, are:

- Peel and Heat Complete Mat(s);
- Floor-sensing thermostat (programmable or non-programmable);
- GFCI Breaker (if not part of the thermostat); and
- Protecto Wrap #6000 Water-based Primer.

Other items needed:

- Conduit and Junction boxes as needed for power leads and thermostat;
- 14-gauge electrical wiring; Digital Ohm Meter (multi-meter);
- Tile installation products (mortar, backer board, tile, etc);
- $3/8'' \times 1/4''$ or greater trowel and other tile tools; and
- Various electrical and construction tools (wire stripper, screw driver, chisel, scissors, etc).

POSITIONING OF THERMOSTAT

1. Location of the thermostat should be approximately 60" (120 cm) above the floor on an inside wall, near the center of the room to allow the connection leads to reach. A 3" deep box is recommended for the thermostat.

Installations with multiple heating mats will require a junction box to gang the connections together. If a junction box is required, it should be located directly beneath the thermostat, 12" to 18" above the floor.

Thermostat Requirements: Thermostat included with kit comes complete with a GFCI (ground fault circuit interrupter) that meets the Electrical Code(s). Thermostats are rated at 1,800 watts, 120 volts or 3,600 watts, 240 volts.

If not using the Protecto Wrap-supplied thermostat, user must purchase a suitably rated UL-Listed thermostat with GFCI protection.

Protecto Wrap's Peel and Heat Complete System is available in 2' and 3' standard widths, 22" right angle triangles and 120V and 240V standard voltages.

The total number of mats used in a single circuit is limited to 15 amps. Use the following table as a quick reference when specifying only single voltage/width heating mats. When specifying multiple width heating mats for the same area, make sure that the total power required does not exceed the total power of a single circuit. Add additional 20 amp circuits as required for proper electrical supply to the installation.

Voltage Maximum Total Power 120 1800 watts 15 amps 240 3600 watts 15 amps



Type NM and NMC non-metallic sheathed cable is not suitable for installing this product.



Caution: Use copper only as supply conductor.

Maximum square footage per Voltage System 120V = 150 sq ft 240V = 300 sq ft

12 watts/sq ft X Total Area of Mat(s) = Total Wattage



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

AMPERAGE VALUES PER/SIZE/VOLTAGE

120 volt 24" 3 ft =59.66 watts =.497 amps 5 ft 103.62 watts = .863 amps7 ft 147.58 watts = 1.22 amps 10 ft 213.52 watts = 1.78 amps120 volt 35" 3 ft = 95 watts = .79 amps5 ft = 165 watts = 1.375 amps7 ft = 235 watts = 1.95 amps10 ft = 340 watts = 2.83 amps240 volt 24" 3 ft = 59.66 watts = .248 amps5 ft = 103.62 watts = .431 amps7 ft = 147.58 watts = .61 amps10 ft = 213.52 watts = .89 amps240 volt 35" 3 ft = 95 watts = .39 amps5 ft = 165 watts = .68 amps

7 ft = 235 watts = .979 amps

10 ft = 340 watts = 1.41 amps

PEEL AND HEAT COMPLETE COMPONENTS

NAME	DESCRIPTION				
Heating Mats	The number and type of heating mats needed must have been calculated beforehand as outlined in Part 1 - Designing The System.				
Thermostat or Control	UL Listed thermostat or other appropriate control rated for at least 25% greater capacity than the installed heating load. Low voltage units may be used in combination with appropriate relay.				
Junction Boxes required for each room or area	Two boxes required for each room or area. One box (2x4 inch) required for thermostat; one box (4x4 inch) required for electrical connections.				
System Warning Labels	These labels are an integral part of this heating system and must be installed for the warranty to be in force. See Page 25 for details on affixing these labels.				
	Image: Second				
Ohm Meter or Multi-Meter	An Ohm Meter or Multi-Meter must be used during the heating phase to ensure that the system is correctly installed. A digital meter is recommended (rather than an analog type).				
Instruction Manual	Carefully read and understand the instructions before starting installation.				
Check List & Information	The installation check list and information card must be returned to Protecto Wrap Company. Protecto Wrap Company will send a warranty registration card.				
Operating Manual	The operating manual lists detailed information about the heating system. This manual must remain with the home or building owner when the job is done.				
TOOLS FOR STANDARD KITS					
Assorted Hand Tools	Various electrical and construction tools (wire stripper, screw driver, chisel, scissors, etc)				
TOOLS FOR DAIS	Y CHAIN INSTALLATIONS (In addition to standard kit tools)				
Crimping Tool	Used to crimp butt splice connectors prior to shrinking connectors with heat gun. NOTE: Use only crimping tools designed for insulated terminals.				
Heat Gun	For daisy chain parallel wiring, heat gun must be heated minimum temperature for shrink tubing 221°F to 275°F.				



The installation of this heating product shall be in accordance with the manufacturer's instructions of the authority having jurisdiction.



This equipment shall be installed only by qualified personnel who are familiar with the construction and operation of the apparatus and the risks involved.



Heating mats should not be installed at or below 32°F (0°C).



Make sure that the jobsite is neat and clean before working with the Peel and Heat Complete Radiant heating mats. Nails, screws and other sharp debris can damage the panels. Any panels which become torn or otherwise damaged must be discarded.



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

STEP 1: INSTALL GFCI BREAKER (OVERCURRENT PROTECTION)

Peel and Heat Complete mat must be protected by a ground fault circuit interrupter (GFCI). This can be done either by the internal GFCI in the thermostat (as long as it directly controls the mat) or an indicating-type GFCI circuit breaker.

Follow all local building and electrical codes.

Typical Amperage Requirement:

120 VAC Peel and Heat Complete mats: 0.1 amps per sq.ft., or 10 amps per 100 sq.ft. of mat. 240 VAC Peel and Heat Complete Mats: 0.05 amps per sq.ft., or 5 amps per 100 sq.ft. of mat.

STEP 2: INSTALL SECONDARY SLAVE UNIT (THERMOSTAT RELAY)

Depending on the amperage requirements of the mat(s), a secondary slave unit (Thermostat Relay) may be required. Do not load the Thermostat control with more than 15 amps. Be sure to protect this contactor circuit with a GFCI breaker.

The National Electrical Code specifies that each branch circuit used in conjunction with a heating system must be for the exclusive use of the heating system. Do not connect lights, outlets, etc. to any branch circuit used with the Peel & Heat Complete System.



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

STEP 3: INSTALL ELECTRICAL BOXES

Thermostats are usually located near the power leads. However, they can be located almost anywhere, because the power leads and the sensor wire can be routed to electrical junction boxes and extended to

a location outside the heated room (such as a utility room or basement).

Install Junction box for the control device (thermostat) according to the manufacturer's instructions. This box should be located, unobstructed, on an inside wall so that the device reads accurately.

Install a 4x4 inch junction box for making electrical connections between the mats and thermostat.



STEP 4: BOTTOM PLATE WORK

Drill or saw holes at the bottom plate. One hole is for routing power leads or conduit and the other is for the thermostat sensor. These holes should be directly below the electrical box(es).



Bottom Plate Alternate Notch Technique



Protecto Wrap recommends drilling or sawing holes at the bottom plate. You may also use a notch technique as an alternativve.

STEP 5: INSTALL POWER LEAD CONDUIT AND THERMOSTAT SENSOR

Power Lead Conduit:

Route the power leads from the thermostat down the wall cavity through opening in the bottom of plate to connect the mats.

Thermostat Sensor:

A floor sensor comes with our Thermostat control. The sensor wire can be installed without a conduit or in a conduit separate from the electrical power leads if conduit is required by code. Open a second knockout in the bottom of the thermostat box. Feed the sensor (and conduit, if including) through the knock-out, down the wall cavity, through the opening in the bottom plate. Temporarily tape the sensor to the slab or subfloor in a location approximately 6" to 12" from the wall---final location of sensor after mat installation will be taped down at the edge of or in between two mats so that the sensor is not directly above a heating mat. (*NOTE*: The sensor is located in the thermostat packaging.)

Rough-in Wiring:

Install appropriate electrical wire (conductor) from the power source and breaker protection to the thermostat following all codes. Leave 6" to 8" extra wire at the thermostat box.

HEATING MAT INSTALLATION

INSPECTION AND TESTING OF HEATING MATS

NOTE: Verification that the heating mats were received in operable condition is important prior to installation. When the heating mats are removed from the shipping box test the resistance using an Ohm meter and record the information. If the resistance reading varies greatly from the recorded readings on each mat do not install the mat and call Protecto Wrap Company at (800) 759-9727 for replacement assistance.

PREPARING THE FLOOR

Clear the floor of all debris, nails, etc. so the floor is smooth, clean and dry. Roll or brush on a coat of Protecto Wrap #6000 primer diluted 2 parts clean water to 1 part concentrate and allow to dry to a tacky finish (30 minutes minimum). Protecto Wrap #6000 Primer is water-based and must be protected from freezing.



NOTE: Application of the Primer is a requirement of the Warranty.

INSTALLING THE MAT

Pre-wired Kits:

Connection leads from the pre-wired mats in packaged "kits" are 12' long and can be cut to desired length to connect at the junction box.



Daisy Chain Installation:

Each mat in daisy chain series installation is factory-wired and clearly marked with the appropriate length leads for your specific installation.

The heating mats should be laid out so the connection leads are running to the wall of the room where the thermostat is located.

1. With the release paper still on, position the mat into place making sure the leads are within reach of the junction box and that there are no obstructions or floor penetrations in the way.

2. When mat is in proper position, roll the end with the connections back far enough to trim off approximately 12" (30cm) of the release paper to expose a portion of the adhesive surface.

3. Press this exposed section of the mat onto the primed surface and then roll the other end back to the point where the release paper was removed.





4. 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.

5. For adjacent mats, follow the same procedure starting with alignment of side by side mats in a butt joint fashion. Do not overlap mats.

6. Peel off quick-release paper and set mat in place, leaving 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 primed surface it will provide a tenacious bond.

FOR PRE-WIRED KITS ONLY:

7. Feed power leads and thermostat sensor to junction box, make proper connections and connect to thermostat.



Peel and Heat Complete Installation over Wood Sub-floor

FOR MULTI-MAT DAISY-CHAIN INSTALLATIONS KITS ONLY:

Please see MULTI-MAT DAISY-CHAIN INSTALLATION instructions on Pages 15 to 18.

THERMOSTAT SENSOR INSTALLATION

As the mats are installed, locate the thermostat sensor probe. Sensor probe can be held in position with a small amount of tape. The sensor should extend approximately 6" to 12" from wall into the mat as shown. Be careful not to locate the sensor near other heating sources such as a heating duct below the floor.



IMPORTANT NOTE: The thermostat sensor is thicker than the heating mat. If thin-setting over backerboard or slab, saw a groove to recess the sensor to the level of the mat. Use hot glue or tape to secure the sensor in the groove. Do not damage the sensor. Ensure the sensor is set down so it is level with the mat and not on top of it.

HEATING MAT LEAD WIRE CONNECTION

Depending on the thickness of the mortar bed, you may also may need to chisel a space under the point where

the wires connect with the mat in order to recess the connection. Be extremely careful not to damage the heating mat or connection.

Now, depending upon your wire lead installation, run the lead wires from the individual mat(s) or final mat in a the daisy chain installation from the mat(s) along the base of the wall and up to the junction box.

Also provide a visual check to look for any signs of damage to the mat of connection leads that may have occurred during installation. If damage is found, contact Protecto Wrap Company for advice and/or replacement assistance at (800) 759-9727.

MULTI-MAT DAISY-CHAIN INSTALLATION

By using heat shrink butt crimp connectors to connect adjacent mats in the field, only one lead off of the final mat is required to be run back to the junction box and into thermostat, rather than a required pair of leads from each mat.



DAISY CHAIN PARALLEL MAT WIRING DIAGRAM

HEAT SHRINK BUTT CRIMP CONNECTORS



These heat shrink butt splices and ring terminals pair polyolefin heat shrink tubing with an adhesive melt liner for secure sealed connections. Simply crimp on the wire, then shrink the tubing with a heat gun to permanently seal and protect your connection.

Heat shrink butt connectors are color-coded to industry standard wire range. Heat shrink protects against corrosion and the adhesive makes the connector waterproof.

The translucent heat shrink allows for visual inspection of the connection, and has the wire gauge printed on it. Rated to 600 volts.

Made with adhesive-lined Heat Shrink material. Uniform adhesive formula will not run or disrupt electrical signal. When properly crimped and shrunk, provide a seal that is resistant to water, steam, salt and other contaminants.

Also known as heat shrink butt splices. Provides improved pullout strength and strain relief. For wire sizes 22 gauge to 10 gauge.



"DAISY-CHAIN" PEEL AND HEAT COMPLETE MULTI-MAT INSTALLATION INSTRUCTIONS

1. After priming floor, lay down and install parallel mats (see Daisy Chain Parallel Mat wiring diagram on Page 15).



NOTE: Daisy Chain Mat Lead Length

For any Daisy Chain mat series, the first mat in the series (far left mat) will have only one non-heating lead of each polarity just long enough to make connections with adjacent mat to the right. This equates to two 24" non-heating leads.

The middle mat (and all mats in any series) will make Daisy Chain connections with mats on either side, so will require four 24" non-heating leads.

The far right mat in the series needs one 24" non-heating lead of each polarity to connect with the middle mat to the left and one 8' to 20' non-heating lead of each polarity to go to the thermostat\junction box.

To summarize, far left mat has one non-heating lead of each polarity @ 24"; middle mat(s) has/have two non-heating leads of each polarity @ 24"; far right mat has one non-heating lead of each polarity @ 24" and one non-heating lead of each polarity @ 8' to 20'.



2.Insert the wire lead from each of two adjacent mats into the hollow barrel on each side of a heat shrink butt splice. Insert each wire end completely into its barrel of the butt splice connector, allowing for full overlap of the connector over the wire extending out.

3. Crimp on the wire. To crimp two wires, first determine the proper barrel size for wire gauge. Peel and Heat Complete comes factory installed with 14 gauge wire leads. Now strip back both wires so that when inserted into the barrel they will not extend past the middle while also keeping all stripped wire inside the barrel.



Insert wires into barrel while twisting to prevent frayed wires from sticking out of the connector. Line up crimpers over the metal on each side and crimp

DO NOT crimp on the ends where only nylon is or the connection will not hold. <u>Only use insulated</u> <u>barrel crimpers when making Peel and Heat Complete Daisy Chain connections.</u>

4. Shrink the tubing around the butt splice connector with a heat gun (minimum temperature for shrink tubing (221°F to 275°F) to permanently seal and protect your connection. Before shrinking the butt splice confirm that your heat gun is set for the recommended heating temperature. Any commercial or DIY heat gun can be used to shrink the butt splice.

5. Begin shrinking at one end, and gradually work your way down to the other to ensure that the tubing shrinks evenly and without air bubbles as you're applying heat. Most heat gun instruments come with a heat reflector to ensure consistent heating on all sides.

6. Since uncontrolled heat can cause uneven shrinkage, physical damage and insulation failure, the use of open flame is not recommended.

7. Evenly apply heat over the length and around the diameter of the butt splice, until it is uniformly shrunken and conforms to the shape of the 14 gauge wire lead coming from each mat. Immediately remove the heat source, and allow the wire/butt splice connection to cool slowly before you apply physical stress to it.



Avoid overheating the heat shrink tubing, because it will become brittle and/or charred.

FINAL WIRING

Install the Controls

Install the floor-sensing thermostat in the 4" square electrical box, according to the installation sheets provided with the thermostat. Connect the mat power leads, floor sensor, and power supply wiring.

If using multiple mats, route all power leads up through the electrical conduit and into the 4" square thermostat box or separate junction box. Wire the leads in parallel (not series)—black-black, white-white, or for 240V systems; black-black, red-red.



Route and secure wires between the heating panels, from the heating panels to the thermostat box and from the thermostat box to the electrical panel using standard wiring practices that confirm to all of the requirements of all applicable electrical and building codes.



WARNING! Risk of electric shock and fire damage to the 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.

PART 4: INSPECTION, TESTING, & COMPLETION

A visual and electrical check must be performed on the heating mats prior to activation.

VISUAL INSPECTION

When visually checking the mats, look for any signs of damage, wear or scratching that might have occurred during installation. If any portions of a mat appear damaged, replace the entire mat.

ELECTRICAL TEST

A resistance check across the supply leads using an accurate ohm meter must be made to detect any short or open circuits — record the resistance readings. Use the resistance chart in the operating manual to determine the acceptable readings. Use the following formulae to determine the acceptable resistance values:

High Resistance Limit =	120 Volt Panels 15,840 installed watts	240 Volt Panels 63,360 installed watts
Low resistance limit =	13,680 installed watts	54,720 installed watts

After any remedies have been performed for open or short circuits, if any, retest the system.

READING INDICATION ACTION

Between High & Low Limits: Good System is connected properly. No low resistance limits action is necessary.

Higher than High Limit:

Open Circuit

Check all electrical connectors and re-crimp or replace any that are attached improperly.

Zero (0):

Short Circuit:

Check the path that the wiring is taking and make sure that no wires pierced or otherwise damaged. Mats with damaged, non-heating leads must be replaced.

TEST FOR HEATING

NOTE: Ensure that the breaker that will supply power to the heating mats has been turned off before making electrical connections.

1. Install control device and connect to electrical panel box. Install and wire the control device according to manufacturer's instructions in the junction box added at the beginning of Part 3: Installation.

2. Wire the heating mat(s) to junction box and/or thermostat according to the thermostat manufacturer's instructions.

3. Turn on the breaker and adjust the thermostat so that it is calling for heat. Refer to the installation sheets provided with the controls for proper setting. After all controls are installed, do not energize the system, except to briefly test operation of all components.

4. After the system has been on for several minutes, run your hand over the heating mats to ensure that they are warm. The system should now operate as designed. Please leave the instruction sheets for the thermostat in a safe place for future reference.

NOTE: The mats will not become hot, but will generate a low, comfortable warmth. If the area is cold during installation it is likely that the panels will not seem warm so you will have to rely on the electrical tests. If the mats do not become warm, double-check all wiring and re-perform the electrical tests above (after turning off power at the breaker).

DO NOT TURN ON THE MAT FOR 28 DAYS ALLOWING THE THIN-SET AND GROUT TO MATURE.

All Electrical Connections should be performed by a licensed Electrician.

Apply caution stickers provided with kit in appropriate locations. After the tile installation has been installed for a minimum of 28 days, turn on the power to the system and set the programmable Thermostat to desired temperature and time schedule by following instructions provided in thermostat box.



Affix to the electrical panel box. In the space provided, record the numbers of all circuits to which floor heating panels are attached.



Affix adjacent to points of access to all concealed areas in whichinstalled heating products are accessible.



Affix to all devices controlling radiant heat (thermostat, switch, etc.).

COMPLETE THE INSTALLATION

Install the floor covering according to the manufacturer's instructions.

FINAL FLOOR INSTALLATION

We recommend working with professional flooring installers to make sure proper materials are used and proper installation techniques are followed. *NOTE:* The Peel and Heat Complete installation video is not a flooring installation video—it only covers the installation of Peel and Heat Complete floor-warming mats.

Use a digital ohmmeter to check the resistance of the mat(s) and sensor(s) before, during and after the installation of any floor coverings. Record the readings in the Mat and Sensor Resistance Log (See Form on last page), continuing to check for short circuits caused by nicks or pinches. If possible, take photographs of the mat installation before installing the flooring.

TILE, STONE & MARBLE INSTALLATION

The mats are now ready for tile installation using a latex modified thin-set with a maximum thickness of 3/8" after the tile is embedded. It is recommended to use a plastic notched trowel to help prevent damage to the heating mat surface. Take care during the troweling process to not nick or cut into the mat.

When installing tile or stone over Peel and Heat Complete, we highly recommend Tile Council of North America (TCNA) guidelines or ANSI specifications as a minimum standards of installation. We recommend latex-modified or epoxy modified mortar and grout, instead of water-based multi-purpose materials.

Select the proper size **PLASTIC** trowel for the installation of tile or stone. We recommend a minimum $3/8'' \times 1/4''$ trowel. This trowel works best for most 1/4'' tile.

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

NOTE: When installing tile, stone or marble over Peel and Heat Complete, it is important to maintain a thin-set thickness of 3/8" or less after the tile is embedded, even if the mortar manufacturer allows for thicker installations. Thicker mortar beds can potentially provide sufficient moisture to cause some natural stones to warp or crown.

If you need more information on tile installation, contact TCNA at (864) 646-8453 or visit their Web site at www.tileusa.com.

FLOOR COVERINGS OTHER THAN TILE, STONE & MARBLE

When installing floor coverings other than tile or stone, follow industry and/or manufacturer's recommendations. Also, make sure nails, screws, or other fasteners do not penetrate the floor in the area of Peel and Heat Complete. The wire can easily be damaged by fasteners penetrating the floor.

All floor coverings must be in direct contact with the cement- or gypsum-based material that encase the Peel and Heat Complete. For this reason, "floating" wood/laminate floors work much better than strip hardwood flooring.



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

FLOATING FLOOR INSTALLATION

Install vapor barrier, if applicable, and self-leveling underlayment, per manufacturer's instructions.

Install the sensor probe on top of the underlayment, a minimum of 12" in from the edge of the heated area. Tape the sensor probe in place and run the sensor wire up to the thermostat location. The thermostat sensor probe should be placed above the underlayment to avoid compromising the performance of the Peel and Heat System.

Install laminate/engineered wood, per manufacturer's instructions. After installation, gradually increase the performance of the Peel and Heat System temperature over a period 72 hours.

1. Attach system labels. The small label must be attached to each thermostat controlling a heated floor. The large label must be attached to the breaker box and the circuit number of each circuit breaker controlling a heated floor noted.

2. Re-perform the electrical testing noted above to ensure that the mats have not been damaged during installation process. If they have been damaged, follow the guidelines noted to remedy the situation.

3. Turn on power at the breaker box, set thermostat and enjoy.

NOTE: The flooring manufacturer may require that the heating system be turned on for a period of time to help curing and dry time.

DOCUMENTATION

The check list and system registration card records vital information about the installation you have just made. Fill out all requested information. The bottom copy is returned to Protecto Wrap Company to register the installation.

The operating manual lists detailed information about the heating system. The manual must be attached to the service panel so that it is easily accessible to the homeowner and any repair technicians.

TROUBLESHOOTING GUIDE

The Heating Element used in the individual Protecto Wrap Peel and Heat Complete Radiant In-Floor Heating Mats are laminated within the membrane and all Heating Element connections and terminations are crimped and/or insulated and well protected within the lamination making Peel and Heat one of the most durable heating mats on the market. Problems with the system operation that are the result of a damaged mat are not covered under warranty.

It is important that the Peel and Heat Complete Installation Manual be followed during the installation procedures and that all Warnings be followed. Wiring should be performed by a licensed electrician in accordance with all applicable building and electrical codes during the installation as well as for any trouble shooting of the system. Failure to do so voids warranty.

The individual mats provided with each system have OHM readings written on the mat. It is important that these readings be checked, verified and recorded upon receipt of the product and again after the mats have been installed (prior to tile installation). A test of the system to make sure all elements are heating properly is recommended prior to installation of tile. Protecto Wrap will not be responsible for the replacement of the floor tile if the system operation was not checked verified prior to installation of the tile.

PEEL AND HEAT COMPLETE TROUBLESHOOTING GUIDE					
	PRODUCT VOLTAGES				
120 Volt Elements	150 sq ft max. per Thermostat (or Power Relay) – Wires Black & White Note: 120 Volt Elements are not rated for use with 240 Volt Power				
240 Volt Elements	300 sq ft max. per Thermostat (or Power Relay) – Wires Red & White				
PROBLE	MS AND RECOMMENDED TROUBLE SHOOTING SOLUTIONS				
Floor Not Warming	Verify power is connected to the system and that the GFCI is not tripped at the Thermostat or the breaker is not tripped at the Main Service Panel.				
Mat Not Warming	Verify that all leads from all mats are connected together to power source. Areas within a mat that are not heating could be the result of damage and will require the mat to be replaced.				
Slow to Heat	Installations on concrete slabs can require a period of several hours to warm up to desired temperature especially if the slab is un-insulated in a cold climate. Set Thermostat to maximum heat to allow system to continue running until it becomes warm. Then adjust thermostat down if needed.				
	Verify floor temperature sensor is not directly on top of Heating Element causing the thermostat to shut off more frequently				
System Too Hot	Verify that 240 Volt Power is not being applied to Heating Elements rated for 120 Volt service				
	Verify that Thermostat has not been bypassed				
	Floor temperature sensor may need to be repositioned				
	Adjust Thermostat				
Thermostat GFCI	If the Thermostat trips and will not re-set - check the following:				
	System is to be on a dedicated branch circuit separate from any other electrical devices which could overload the circuit or create interference issues resulting in the GFCI to trip.				
	Check electrical connections to verify leads from all mats are wired in parallel (black to black / white to white) and all connections are tight and properly insulated against grounding.				
	Check leads from mats to verify no nicks or cuts have occurred during construction that may be causing a short. For further assistance with GFCI problems contact Protecto Wrap Company for Technical Assistance.				
Thermostat Screen	If the Thermostat screen is blank, verify that the power is on and that the GFCI at the Thermostat is not tripped.				
Programming	Refer to the Thermostat Instructions received with the Peel and Heat System for Programming Instructions.				
For Technical Assista and Heat Technical 80223 or fax (303)	Ince, please contact Protecto Wrap Company at (800) 759-9727 and ask for Peel Support, write to Protecto Wrap Company, 1955 S Cherokee St., Denver, CO 777-9273.				

S/N:



PEEL AND HEAT COMPLETE[™] WARRANTY INFORMATION & REGISTRATION

Thank you for purchasing Peel and Heat Complete! To register your system, complete the warranty form below within 30 days of purchase and fax to 303.777.9273 or mail to Protecto Wrap Company 1955 S Cherokee St., Denver, CO 80223.

Homeowner In	oformation						
Company Name			Telephone				
Address			Email				
City		State	Postal/Zip				
Fax		Purchased From					
Purchase Date		Where Installed					
Floor Installer Information			Check here if homeowner installed 🔲				
Company Name			Telephone				
Address			Email				
City		State	Postal/Zip				
Installer Name			Fax				
Electrician Information							
Company Name			Telephone				
Address			Email				
City		State	Postal/Zip				
Electrician Name			Fax				
Heating Systen	n Information						
Install Date							
Sub Floor Material							
Total Rolls Installed							
	Factory Ohm Reading	Out-of-Box Reading	Pre-Tile Installation Readings				
Roll 1							
Roll 2							
Roll 3							
Roll 4							
Roll 5							
Roll 6							
Roll 7							
IMPORTANT! HAVE YOU							
Performed a visual inspection of all materials before installation? Yes 🔲							
Confirmed that no damage was done to heat mat during shipping? Yes 🔲							
Installed Wiring Label on Thermostat? Yes 🗖							

The undersigned represents that the above installation has been performed in accordance with the installation instructions and all applicable codes and that all of the above statements are true, correct, and complete. Copy of this form must be kept on-site as a permanent record.