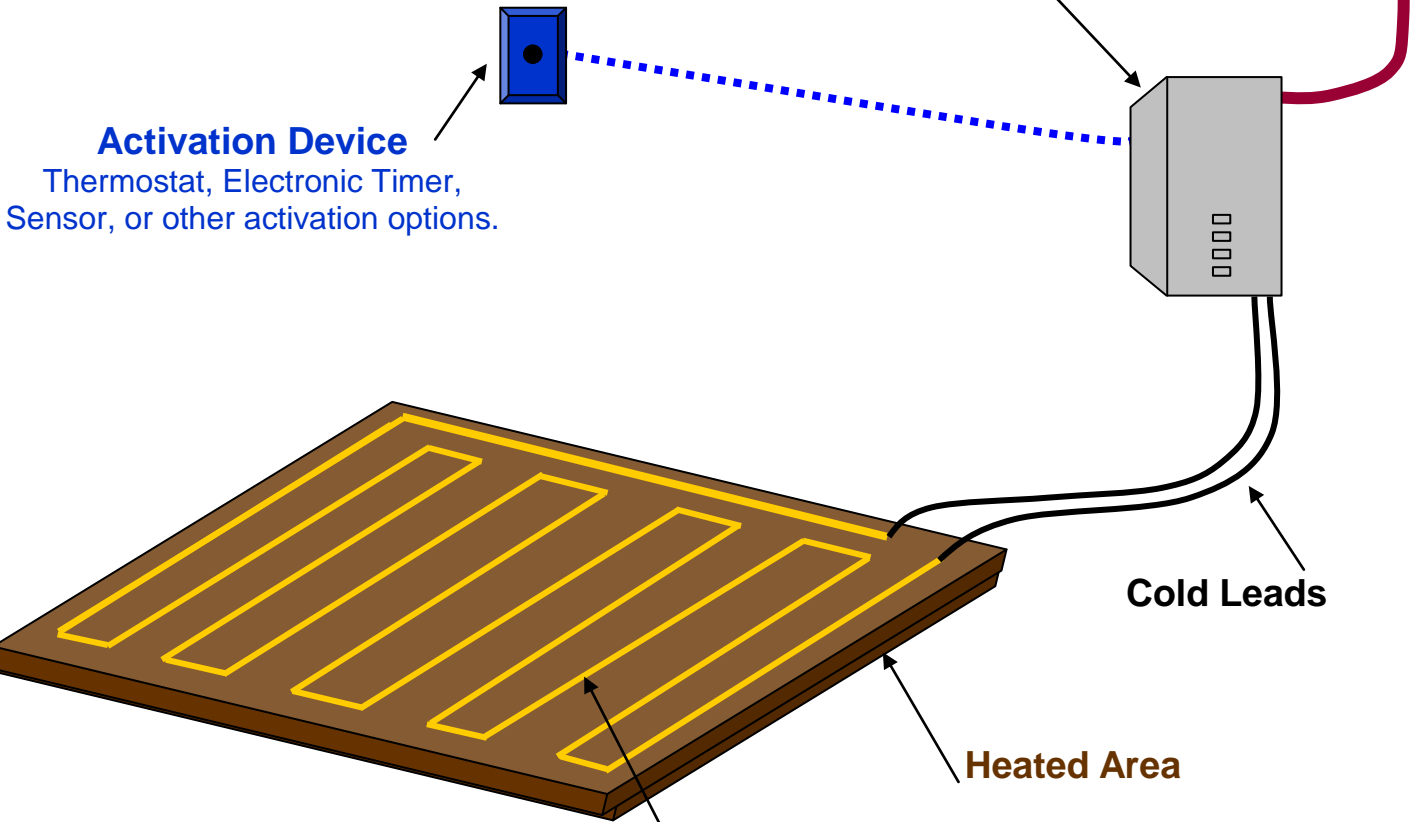


Heatizon Systems utilizes state-of-the-art components and low-voltage electricity to provide products that are easy to operate, virtually maintenance free, safe, and 99% efficient. Z Mesh and Tuff Cable heating elements have a limited 25-year warranty and are engineered to provide simple, problem-free, long term solutions for snow melting, floor warming, roof de-icing, and space heating needs. Heatizon Systems has been "Warming America's Cold Spots" since 1979.

### The CBX6,CBX7, or Radiant 8 Control Unit

Mounted on the back plate, the Control Unit and Transformer are housed together. The Control Unit continually monitors system operation and eliminates the need for a GFCI breaker in the distribution panel.

Primary Power to Control Unit

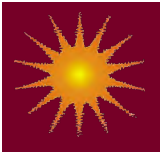


### Activation Device

Thermostat, Electronic Timer, Sensor, or other activation options.

### Heating Element

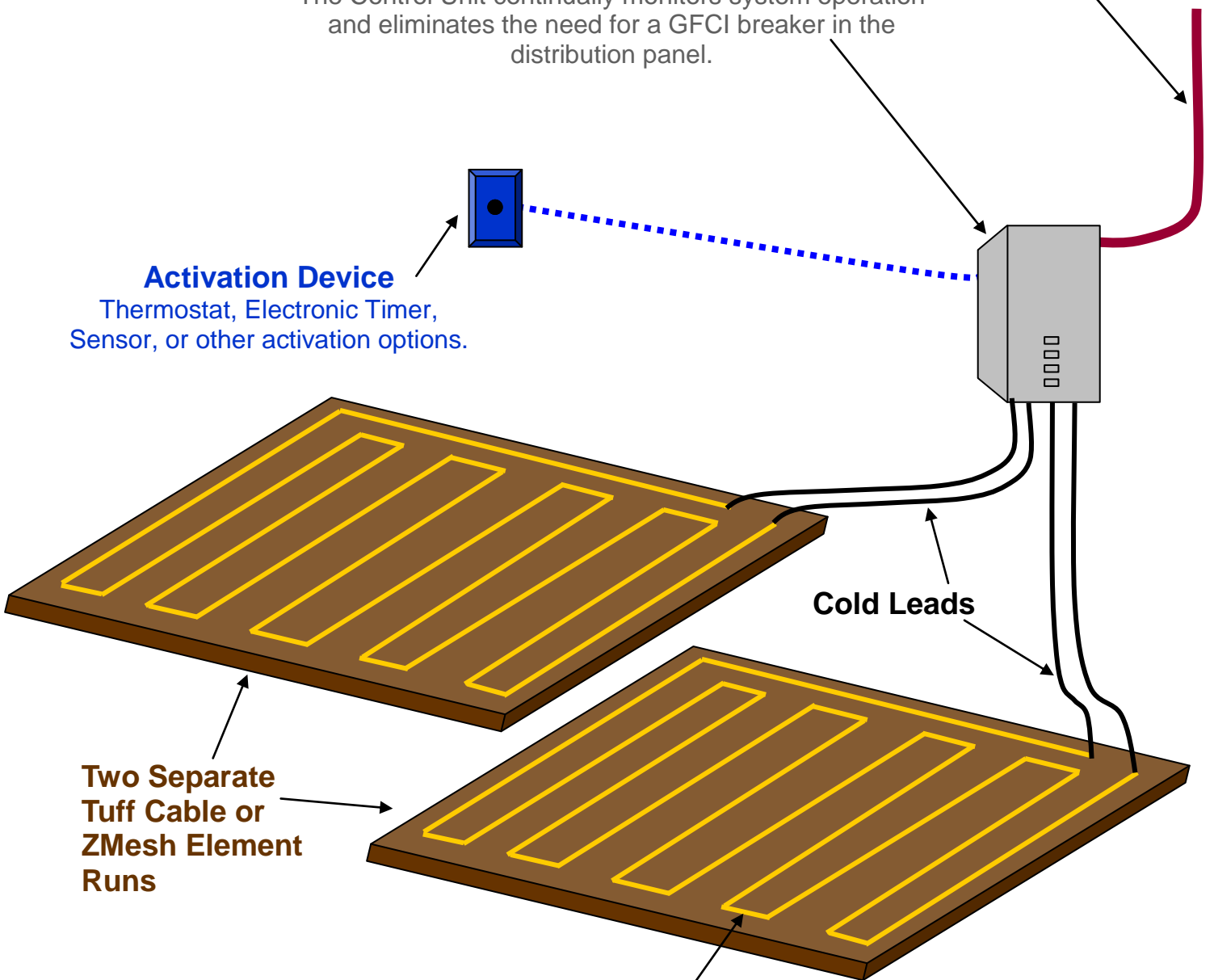
*Tuff Cable*, a durable coated copper cable, is installed **IN** something, like concrete, asphalt, a mud bed, a sand bed under pavers, Heatizon Invizimelt, or a Heatizon Heatsink Kit;  
*Z Mesh*, a bronze mesh screen, is designed to go **ON** something, like a concrete or wood sub-floor.



**The CBX23 or Radiant 8 Control Unit**  
Mounted on the back plate, the Control Unit and Two-Sided or Dual Transformer are housed together. The Control Unit continually monitors system operation and eliminates the need for a GFCI breaker in the distribution panel.

**Primary Power to Control Unit**

**Activation Device**  
Thermostat, Electronic Timer, Sensor, or other activation options.



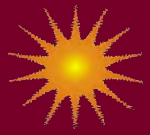
**Cold Leads**

**Two Separate Tuff Cable or ZMesh Element Runs**

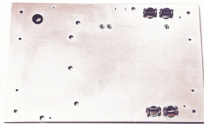
**Heating Element**

*Tuff Cable*, a durable coated copper cable, is installed **IN** something, like concrete, asphalt, a mud bed, a sand bed under pavers, Heatizon Invisimelt, or a Heatizon Heatsink Kit; *Z Mesh*, a bronze mesh screen, is designed to go **ON** something, like a concrete or wood sub-floor.

# SYSTEM DESCRIPTION



**The Rough-In Kit.** The Rough-In Kit contains the Control Unit and Transformer mounting plate or Back Plate (Heatizon Part Number P1320), Thermostat Wire, Cold Lead Wire, and Installation Manual. Each Cold Lead should be long enough to extend the total vertical and horizontal distance between the Back Plate location and the ending points of the heating element. A Rough-In Box (Heatizon Part Number P4184) may be necessary if the Back Plate will be mounted on a concrete wall or other surface where no studs are present.



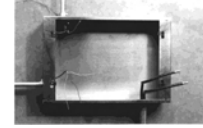
Back Plate  
P1320



Cold Lead  
E210



Thermostat Wire  
M316



Rough-In Surface Box  
P4184 (Optional)

**The Heating Element:** *The Tuff Cable* (Heatizon Part Number E101) is a durable 10 gauge coated copper cable, Tuff Cable comes labeled with footage marks and Heatizon's name on it. *ZMesh* (Heatizon Part Number E102) is a durable 9" or 12" wide, woven 1/32" thick bronze screen. The ZMesh element is approximately the same thickness as the fabric in a screen door. Specific uses of each heating element vary based on application and installation conditions.



Tuff Cable Kit



ZMesh Kit

**The Transformer.** Both heating elements can produce up to 12 watts of heat per lineal foot. ZMesh systems are sized with transformers from 1/2 to 3 kVA, 2X2 kVA and 2X3 kVA. Tuff Cable systems are sized with transformers from 1/2 to 6 kVA, 2X2 kVA and 2X3 kVA.

**The CBX Series Control Unit** (Note: CBX7 is only to be used with Tuff Cable heating element). This component houses the appropriate sized step-down transformer and the other electronic components necessary to provide low-voltage electricity to the heating element. The CBX6 and CBX23 Control Units continually monitor system operation and are self-testing and problem diagnosing. The CBX7 Control Unit monitors over current and SCR failure. Both are engineered to provide simple and problem free operation. One Control Unit can energize one area or multiple areas that have been "jumpered" (connected in series) together on the same system. The Control Unit operation is controlled by the Activation Device. Dimensions for the Control Unit are 17" wide X 12" high X 9" deep.



Transformer



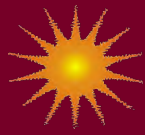
Control Unit

**Activation Device.** Activation Devices available for Heatizon's Control Unit include many options for its varied applications. Devices include:

- Programmable Thermostats
- Temperature/Moisture Sensors
- Mechanical Timers
- Remote Temperature Sensors

Most Heatizon Activation Devices include a system indicator light (LED) to notify the owner of the system status.





## Space Heating

Heatizon Systems products are plenty robust to provide total space heating. Like all other space-heating products, heat-loss calculations should be performed prior to selecting the appropriate Heatizon Systems product. Heat-loss calculations define the amount of heat which must be delivered in order to heat the given space. Heatizon Systems Tuff Cable and ZMesh products are suitable for installation under most floor coverings. Article 424.98(a) of the NEC limits the amount of heat produced by heating panels or heating panel sets embedded in concrete or poured masonry to 33 Watts/ft<sup>2</sup> of heated area.

## Floor Warming

Heatizon Systems products may be used in conjunction with a primary heat source to provide warm floors or supplemental heat. Floor warming applications require 7 to 15 Watts per square foot. Article 424.99(b) of the NEC limits the amount of heat produced by heating panels or heating panel sets embedded in concrete or poured masonry to 15 Watts/ft<sup>2</sup> of heated area. Heatizon Systems Tuff Cable and ZMesh products are suitable for installation under most floor coverings.

## Snow Melting

Rate of snow-fall, moisture content of the snow, ambient air temperature, ground temperature, wind velocity, orientation of exposure to the sun and installed heat density of the snow-melting system all affect the performance of snow-melting systems. Heatizon Systems has proven products with long track records for all of your snow-melting needs. Consult the American Society of Heating, Refrigeration and Air Conditioning Engineers (“ASHRAE”) HVAC Handbook for snowmelt design requirements for your area.

## Roof Snow & Ice Melting

“Out of sight” and “Permanent Installation” are phrases that describe Heatizon Systems’ roof snow and ice melting products. ZMesh is designed to be installed under non-conductive roof covering materials like asphalt, composite or shake shingles and single and double membranes. Tuff Cable in Heatizon Invizimelt or Heatizon Heatsink Kit (US Patent # 7,071.446B1) is designed to be installed under conductive materials like metal roof coverings, valley metal, and flashing. Heatizon Systems’ roof snow and ice melting products are designed to manage ice dam potential and reduce snow loads. To achieve maximum wattage output the system must be operating at 96 secondary amps. Note: Complete removal of snow and ice may not occur under extreme weather conditions.

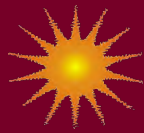
## System Sizing















Performance specifications for each size transformer, each type of heating element, lengths of heating element and for various heating element spacings are located in the “**System Operating Tables**” section of this manual. System Operating Tables can be used to select the proper size system as well as the length and type of heating element needed and the spacing between heating element runs necessary to achieve a given heat density.

## Insulation

Properly installed insulation is always recommended by Heatizon to enhance the efficiency and improve the performance of all Heatizon Systems products.

# WARNINGS



-  Check contents of all boxes immediately upon receipt of your Heatizon shipment and notify Heatizon within 24 hours of any discrepancy or missing part.
-  Read this Installation Manual in its entirety before attempting to install any Heatizon Systems Products.
-  Installation of Heatizon Systems products and associated work must be performed by qualified persons and conform to local building codes, ordinances, trade practices, and in accordance with all applicable sections of the National Electric Code (NEC) or the Canadian Electrical Code (CEC).
-  Risk of fire! Risk of fire possible if installation of system is not completed according to all of the installation instructions contained within this Installation Manual, including but not limited to the warnings and notes throughout. Risk of fire possible if metal or any other conductive material is allowed to come into contact with the Cold Leads and Tuff Cable or ZMesh Heating Element. Risk of fire possible if connections/joints between Cold Leads and Tuff Cable, Colds Leads and ZMesh, Tuff Cable and Tuff Cable, and or ZMesh and ZMesh are not crimped and/or soldered correctly. Risk of fire possible if loose strands of ZMesh or Tuff Cable Heating Element or cuts or other damage to ZMesh or Tuff Cable are not repaired correctly. Colds Leads are conductors, and risk of fire exists any time Cold Leads are not installed per the NEC or CEC. Note: The safety features incorporated into Heatizon Systems products cannot detect cuts in Cold Leads and ZMesh or Tuff Cable Heating Elements. Do not allow ZMesh to cross itself—maintain a minimum of 2” distance between adjacent runs of ZMesh Heating Element. Do not allow Tuff Cable to touch or cross itself.
-  Risk of shock! Make sure all power to your Heatizon Systems product and thermostat is shut off at the electric distribution panel before installing, removing covers, servicing, or working on any of the components of any Heatizon System product.
-  All connections/joints between Colds Leads and Tuff Cable heating element must be embedded into mortar, asphalt, or other acceptable cementitious Heatsink.
-  Knockout openings shall not be used except with devices that are designed to fill such openings.
-  Obtain written approval from Heatizon Systems for applications and installations that are different from those described herein.
-  In order for your Heatizon Systems product to operate correctly, the transformer portion of the Control Unit must be installed so that it can dissipate the heat that it generates
-  Like all electric products, Heatizon Systems products create a magnetic field that may interfere with certain brands of televisions, computer monitors, etc. Unlike Cathode Ray Tubes (“CRT”), Plasma Display Panels (“PDP”) and Liquid Crystal Displays (“LCD”) do not seem to be affected by magnetic fields. In the event magnetic field interference is a concern for you please consult Heatizon Systems or your sales representative prior to making your purchase.
-  Mattresses, Bean Bag Chairs, LoveSacs, Futons, and all other items which have high insulating values should never be placed directly on any surface which has a radiant heating product under it.
-  Never install Heatizon Systems products in space heating or floor warming applications to deliver more than the 15 watts per square foot (or 160 watts/m<sup>2</sup>) recommended by the Radiant Panel Association.
-  “Field installed wiring is to be in compliance with the NEC (NFPA-70) and/or ordinances,” or the CEC, or equivalent, as applicable to installation location.
-  Never install heating element near a wax toilet ring.

Please call Heatizon Systems Technical Support Department at (801) 293-1232 with any questions you have regarding these Design and Installation Instructions and The Customer Information Sheet, or the installation, operation, and maintenance of Heatizon Systems products.

## Roofing Requirements

Element Selection and Applications

<b>Roofing Material</b>	<b>ZMesh Requirements</b>	<b>Tuff Cable Requirements</b>
Shake Shingles	Self-adhesive waterproof underlayment over and, if desired, under ZMesh.	Tuff Cable not recommended (unless the nail pattern is predictable and the Tuff Cables can be missed)
Composite or Asphalt Shingles	Self-adhesive waterproof underlayment over and, if desired, under ZMesh.	Tuff Cable not recommended (unless the nail pattern is predictable and the Tuff Cables can be missed)
Slate or Tile Shingles without Lath or Battens	Self-adhesive waterproof underlayment over and, if desired, under ZMesh.	Tuff Cable not recommended (unless the nail pattern is predictable and the Tuff Cables can be missed)
Metal Roof, Valley Metal, Metal Flashing	DO NOT use ZMesh.	Tuff Cable in a Heatsink Kit or Invizimelt with self-adhesive waterproof underlayment over it. Use only 1, 2, 3, 2x2, or 2x3kVA Transformers. Do not use CBX7 Control Unit.
Membrane or Other Roofs	Self-adhesive waterproof underlayment, Densdeck, Cement Board or similar over ZMesh.	Call Heatizon at (801) 293-1232

## Flooring Requirements

Element Selection and Applications

<b>Sub Floor Material and Floor Covering</b>	<b>ZMesh Requirements</b>	<b>Tuff Cable Requirements</b>
Carpet on Concrete or Wood Subfloor	To protect ZMesh from cuts and traffic wear, 1/8" Particle Board, Plywood, or EHV Underlayment, or 1/4" Cement Board over ZMesh is recommended, but not required.	Tuff Cable should be spaced no closer than 6" between runs for interior applications. Tuff Cable must be imbedded in a Heatsink, such as concrete, thin set mortar, self-leveling concrete or mortar, or light-weight concrete. Do not use CBX7 Control Unit.
Hardwood on Wood or Concrete Subfloor	No Overlayment Required.	
Laminate Flooring on Wood or Concrete Subfloor	Slip Sheet or Foam Underlayment over ZMesh Required.	
Tile on Wood or Concrete Subfloor	Cement Board or Other Non-Metallic Product over ZMesh Required. Do not use metal lath or other electrically conductive material .	
Sheet Vinyl or Vinyl tile on Concrete or Wood Subfloor	1/8" Particle Board or Plywood, or 1/4" Cement Board over ZMesh Required.	

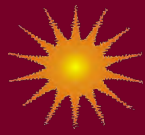
## Snow Melting Requirements

Element Selection and Applications

<b>Snow Melting Application</b>	<b>ZMesh Requirements</b>	<b>Tuff Cable Requirements</b>
Concrete or Asphalt, New Pour	ZMesh Not Appropriate.	Tuff Cable attached to welded wire fabric which is set on chairs or dobies. Insulation recommended.
Concrete, Retrofit	ZMesh Not Appropriate.	Tuff Cable inserted in 1/4" x 1" sawcut grooves; Cuts filled with backer rod and sealant.
Asphalt, Retrofit	ZMesh Not Appropriate.	Tuff Cable inserted in 1/4" x 1" sawcut grooves; Cuts filled with sealant.
Asphalt, Concrete, Pavers or Stone on a Sand Bed	ZMesh Not Appropriate.	Tuff Cable imbedded in 1" of sand under asphalt*, concrete*, or under pavers or stone using PAVER-KIT. Insulation recommended
Deck	ZMesh sandwiched between water tight barrier; Insulation recommended.	Tuff Cable must be imbedded in a heat sink, such as concrete, thin set mortar, self-leveling concrete or mortar, light weight concrete or a Heatizon Heatsink or Invizimelt Kit. Insulation is required.

\*Response time will be longer for these applications

# HEATIZON SYSTEMS LIMITED WARRANTY



## Twenty-five Year Limited Warranty for Heatizon Systems “Tuff Cable” Element (E101), “Z Mesh” Screen Element (E102) and Specified Radiant Panel Heating Components

Heatizon Systems warrants to the original purchaser/end user of the following products that for the periods noted such products shall be free from defects in material and workmanship: Tuff Cable (E101) Heating Element and ZMesh (E102) Heating Element for a period of twenty-five (25) years, the Control Unit for a period of one (1) year, power Transformer for a period of five (5) years, and Activation Device(s) for a period of one (1) year. Such warranty periods shall commence on the date of shipment by Heatizon Systems. If any parts are found to be defective in manufacture during such time period, Heatizon Systems will, at its sole option, replace or repair defective parts.

This Limited Warranty applies only if articles sold hereunder (a) are selected, designed, and installed according to instruction and operation manuals furnished by Heatizon Systems and installed in a “workmanlike manner” according to the building association standards adopted by Heatizon Systems, (b) remain in their originally installed location, (c) are connected to proper power supplies, (d) are not misused or abused, (e) show no evidence of tampering, mishandling, neglect, damage (accidental or otherwise), modifications or repair without the approval of Heatizon Systems, or damage done to the product by anyone other than Heatizon Systems, and (f) are installed in accordance with applicable code requirements. Any warranty claims must be made in writing, no later than one (1) month following expiration of the warranty period, and must be accompanied by the warranted part or component. Any claim not made in such manner shall not be honored by Heatizon Systems.

This Limited Warranty does not cover:

1. The workmanship of any installer of Heatizon Systems radiant panel heating products.
2. Any Heatizon Systems radiant heating products that have a failure or malfunction resulting from improper or negligent operation, installation, accident, abuse, misuse, unauthorized alteration or improper repair or maintenance.
3. Any Heatizon Systems radiant heating products that have had components not purchased from Heatizon Systems integrated into or connected to them.
4. Any labor costs for removal of alleged defective part(s) and/or reinstallation of replacement part(s), transportation to and from Heatizon Systems (if necessary) and any other material necessary to perform the exchange or repair.
5. Any Heatizon Systems heating products that have not been properly registered by completion and return of the Warranty Registration Card attached hereto.

### **DISCLAIMER OF WARRANTIES:**

**This warranty described above is in lieu of all other warranties, express or implied, including but not limited to any implied warranties of fitness for a particular purpose and merchantability. Heatizon Systems expressly disclaims and excludes any liability for losses, expenses, inconveniences, consequential, incidental, indirect, or punitive damages for breach of any express or implied warranty. By installing and/or purchasing Heatizon Systems products, you accept the terms of this limited warranty.**

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.