9700682
CONFORMS TO UL
STANDARD 1693

HEATIZON SYSTEMS™

System Description, Design Information, and Requirements

Tuff Cable

Z Mesh

SLC500 Control Box

Activation Device
(M321 or M321RS Shown)

SYSTEM DESCRIPTION

The Heatizon System SLC500 is a low voltage, resistance type heating system, which utilizes **four** primary components:

1. The Heating Element

- **Tuff Cable** (Heatizon Part Number E101) is a durable 10 ga. coated copper cable that is chemical and gasoline resistant. Tuff Cable comes with footage marks, and Heatizon's name on it.
- **Z Mesh** (Heatizon Part Number E102) is a durable 9" and 12" wide, woven 1/32" bronze screen. The Z Mesh 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.

2. The Transformer

Both heating elements can produce up to 12 watts of heat per lineal foot. Z Mesh and Tuff Cable systems are sized with transformers from ½ to 1 kVA.

3. The SLC500 Control Box Kit

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 Control Box continually monitors the system's operation and is self-testing and problem diagnosing. It is engineered to provide simple and problem free operation. One Control Box can energize one area or multiple areas that have been "jumpered" (connected in series) together on the same system. The Control Box operation is controlled by the "Activation Device". Dimensions for the Control Box are: 12" wide 12" high and 6" deep. The SLC500 Control Box Kit includes Control Box, PC Board, Sheet Metal Enclosure, 50' Thermostat Wire, 25' #2 Cold Lead and the Hardware Kit.

4. Activation Device

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

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

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

Z Mesh Applications and Roofing Requirements

Roofing Material	Requirements
Shake Shingles	Ice and Water Shield over and under Z Mesh
Composite or Asphalt Shingles	Ice and Water Shield over and under Z Mesh
Slate or Tile Shingles w/o Lattice	Ice and Water Shield over and under Z Mesh
Metal Roof, Valley Metal, Metal Flashing	Tuff Cable in Heat Sink Recommended
Membrane or Other Roofs	Call Heatizon at 801-293-1232

Z Mesh Applications and Flooring Requirements

Subfloor Material and Floor Covering	Overlayment Required/ Recommended
Carpet on Concrete Subfloor	1/8" Particle Board, Plywood or Cement Board Recommended
Carpet on Wood Subfloor	1/8" Particle Board, Plywood or Cement Board Recommended
Hardwood on Wood or Concrete Subfloor	None Required
Tile on Wood or Concrete Subfloor **	Cement Board or Other Non-Metallic Product Required
Sheet Vinyl or Vinyl tile on Concrete or Wood Subfloor	1/8" Particle Board, Plywood or Cement Board Required

****Cement Board or other non-metallic system may be installed over Z Mesh. Do not use metal lathe or other electrically conductive material.**

DESIGN INFORMATION

TUFF CABLE SYSTEMS

The Heatizon Tuff Cable system is a low-voltage electric radiant heating system.

Installations include:

- C concrete or asphalt
- C light-weight concrete or mortar bed
- C Heatizon Heatsink Kit
- C existing concrete slab or asphalt
- C sand under pavers or concrete

Applications and space between element runs:

- C snow melting (4" to 6")
- C roof de-icing (6")
- C floor-warming (6" for hard surfaces; 6" to 8" for other surfaces)
- C space-heating (Determined by heat loss calculations)

Tuff Cable is designed to be spaced at specific intervals and lengths to produce a specified amount of heat per square foot. Tuff Cable must always be installed in a heat sink.

The heat density per square foot of the Tuff Cable Element system is dependent on the spacing between adjacent runs of Tuff Cable, the length of element, and the size of the transformer. **More details about system sizing can be found in the "System Operating Tables" section of this manual.**

Z MESH SYSTEMS

The Heatizon *Z Mesh* system is a low-voltage electric radiant heating system.

Installations include:

- C under carpet over concrete or wood subfloor
- C under hardwood flooring
- C under tile or marble over wood subfloor or concrete
- C under linoleum/vinyl flooring over concrete or wood subfloor*
- C under non-metalic roofing systems *

* Requires special procedures for installation. Please see specific installation procedures.

Applications and space between element runs:

- C roof de-icing (2")
- C floor-warming (2" for hard surfaces; 3" to 6" for other surfaces)
- C space-heating (determined by heat loss calculations)

Z Mesh is designed to be spaced at specific intervals and lengths to produce a specified amount of heat per square foot.

The heat density per square foot of the system is dependent on the spacing between adjacent runs of *Z* Mesh heating element, the length of the Z Mesh, and the size of the transformer. **More details about system sizing can be found in the "System Operating Tables" section of this manual.**

Z Mesh used in space heating of a sun room under tile.

Snow melting of handicap ramp with Tuff Cable.

Roof de-icing with Z Mesh under asphalt shingles.

SPACE HEATING

Heatizon Systems products can 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 in a Heatsink and Z Mesh products are suitable for installation under most floor coverings.

FLOOR WARMING

Heatizon Systems products can be used in conjunction with a primary heat source to provide warm floors or supplemental heat. Floorwarming applications typically require 7 to 15 Watts per square foot. Heatizon Systems Tuff Cable in a Heatsink and Z Mesh products are suitable for installation under most floor coverings.

SNOW-MELTING\ROOF DE-ICING

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 a snow-melting/roof de-icing system. Heatizon Systems has proven products with long track records for all of your snow-melting/roof de-icing needs.

ELECTRICAL SERVICE REQUIREMENTS

- **½ and 1 kVA systems** - operate on a 120 volt supply require a single pole with a 15-amp minimum breaker. .

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.

CUSTOMER INFORMATION

WARNING: The installation of all Heatizon Systems products must be done in accordance with the instructions provided in the Heatizon Systems Installation Instructions or Installation Manual and the Sales Agreement. After you have completely read the installation manual, Heatizon Systems encourages you to call our Technical Support Department at (801) 293-1232 with any comments or questions you have regarding our products or the installation and operation thereof. All work must be done by a qualified person and conform to local building codes, ordinances, trade practices and in accordance with all applicable sections of the National Electric Code (NEC).

Heatizon Tuff Cable System

● *Tuff Cable in concrete* – All concrete forms, insulation, chairs or dobies and remesh are to be in place prior to installation of Heatizon's Tuff Cable. Heatizon recommends 6"x6" - 4 gauge remesh for 6" spacing and 4"x4" – 4 gauge remesh for 4" spacing. The Tuff Cable is to be installed so that it will be 1.5 to 2 inches below the finished surface. Tuff Cable is to be installed prior to the concrete pour. Do not attempt to raise the Tuff Cable during the concrete pour. Caution must be exercised such that the Tuff Cable is not damaged before, during or after the concrete pour. Never run the Tuff Cable through cold/expansion, crack control, saw cut or any other joints regardless of whether the joints are created prior to, during or after the pour. Heatizon does not warrant damage to the Tuff Cable caused by actions of others, including but not limited to, saw cutting of expansion or control joints, core cutting or any other penetration of concrete, movement of concrete, cracking of concrete, abuse of the Tuff Cable prior to the pour, etc.

● *Tuff Cable in mortar, asphalt, or Heatsink roof application* – Tuff Cable must always be imbedded completely in asphalt, concrete, a mortar bed or Heatsink Kit regardless of which floor covering or roofing material is going over it. Heatizon Systems manufactures a Heatsink Kit that should be used whenever Tuff Cable is used for roof deicing and snow melt. Tuff Cable should never be installed in open-air applications.

Heatizon Z Mesh System

● *Z Mesh is not insulated* – Electrically conductive materials, other than nails or screws that are not in anyway also touching any other electronically conductive material, must never come in contact with the Z Mesh. Any time electrically conductive materials are allowed to come in contact with the Z Mesh a risk of fire will result. Examples of electrically conductive materials include, but are not limited to, metal thresholds, metal lathe, metal carpet strips, metal fasteners for metal roofing, drip edge, valley metal, any other metal object, etc. Once the Z Mesh is installed, it should be covered as soon as possible to avoid damage.

● *Z Mesh under tile, marble, etc.* – Z Mesh is to be installed under thinset mortar, Durarock, Wonderboard or Hardi Backerboard. Z Mesh should not be installed when metal lathe is used in the flooring installation.

● *Z Mesh on concrete and wood sub-floors* – Z Mesh is suitable for installation under most floor coverings. Heatizon Systems recommends an overlayment be installed over the Z Mesh prior to the installation of the floor covering anytime a danger of cutting or damage to the Z Mesh exists, or may exist in the future.

To avoid danger of fire, NEVER cut Z Mesh. If Z Mesh is cut, use Heatizon Systems approved methods and materials to immediately repair damage.

Heatizon Roof De-icing System

● *Z Mesh under non-metal roof* – One layer of ice and water shield layer must be installed on the sub roof prior to the installation of the Z Mesh and a second layer must be installed over the Z Mesh. As stated above under the section headed "Heatizon Z Mesh System" electrically conductive materials must not come in contact with the Z Mesh or a risk of fire will result. Examples of some electrically conductive materials commonly used on roofs include valley metal, drip edge, metal roofing material, etc. Z Mesh is not recommended for use under metal roofing material.

● *Z Mesh over drip edge* – One layer of ice and water shield must be installed under the drip edge and a layer of EPDM over the drip edge and under the Z Mesh as shown in Heatizon's diagram labeled "Eave Detail with Z Mesh Over Drip Edge." A final layer of ice and water shield must cover all Z Mesh. Nails cannot be placed through the drip edge and Z Mesh simultaneously.

● *Z Mesh near conductive materials* – The drip edge, flashing, and valley metal and the screws or other attachments securing the drip edge, flashing or valley metal to the roof must not penetrate the Z Mesh or a risk of fire will result. A continuous continuity check should be made between any and all electronically conductive material or metal being placed over Z Mesh and one of the cold leads of the Heatizon system. The circuit should always be open.

● *Metal Roof* – Tuff Cable is recommended whenever metal roofing or other electronically conductive material is to be used or greater heat density is required. When Tuff Cable is installed in a roofing application it should always be imbedded in Heatizon Systems ¼ inch thick Heatsink kit. Prior to the Tuff Cable being installed, the roofing contractor must place ¼ inch thick sleepers in all areas where the roof will be attached to the sub-roof.

General

● *Electrical Requirements* – Floorizwarm AC, Floorizwarm DC and SLC500 products require a single pole, 120 V power supply with 20 amp breaker and with proper conductors run from the breaker to each Control Unit. Heatizon Systems CBX products sized ½ and 1kVA can operate on 120V, single pole, 15 amp breaker or 240V, double pole, 15 amp breaker. Heatizon Systems CBX products sized 2kVA and 3kVA require a 2-pole, 208/240V, 20 amp breaker with proper conductors run from the breaker to each Heatizon Control Unit and products sized 4kVA, 5kVA, 6kVA, 2x2kVA and 2x3kVA require a 2-pole, 208/240/277V, 30 amp breaker with proper conductors run from the breaker to each Control Unit. Heatizon Systems products requiring 208/240/277 V do not use a Neutral.

● *Insulation* – Properly installed insulation is always recommended by Heatizon to enhance the efficiency and improve the performance of your Heatizon Systems product.

● *Continuity Check* – A continuous continuity check should be conducted on the Tuff Cable or Z Mesh Screen and all electrically conductive material prior to, during the pouring of concrete, installation of floor coverings or roofing materials, and immediately prior to energizing all Heatizon System products. The circuit should always be open. It is highly recommended that an alarm buzzer, (available for purchase from Heatizon Systems), or other warning device be used at all times the danger of damaging or shorting the heating element to something conductive is present.

● *Element Test* – Always complete a Heatizon Systems "After Installation Element Test Form" immediately following the installation of the Tuff Cable or Z Mesh, and again just prior to energizing your Heatizon Systems product.

● *Magnetic Field* – 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 your sales representative about the Heatizon Systems DC Alternatives, prior to making your purchase.

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 end users of the following products that for the periods noted such products shall be free from defects in material and workmanship: Tuff Cable Element (E101) and Z Mesh Screen Element (E102) for a period of twenty-five (25) years, the control unit for a period of one (1) year, and power transformer for a period of five (5) years. 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, accidental damage, 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 heating products.
2. Any Heatizon Systems heating products that have a failure or malfunction resulting from improper or negligent operation, accident, abuse, misuse, unauthorized alteration or improper repair or maintenance.
3. Any Heatizon Systems 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 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.

WARNING

Z Mesh Element Roof De-Icing Information

This information must be communicated directly to anyone who will come into contact with the Z Mesh after it has been installed. Heatizon Systems requires that a copy of this page be given to the Roofing Contractor, and that other copies by staples on top of the Z Mesh immediately after its installation. Copies stapled on top of the Z Mesh must be removed prior to covering the Z Mesh.

A Heatizon roof-de-icing system has been installed on this project. Here are the steps you need to take to insure that the Heatizon System is not damaged:

Z Mesh Heating Element must be sandwiched between Ice and Water Shield. Stop! If Ice and Water Shield has not yet been installed under and over the Z Mesh Element, do not apply roofing material directly on top of the Z Mesh element.

Z Mesh Heating Element must not come in contact with any electrically conductive materials. The roofing contractor is responsible for insuring the Heatizon Z Mesh Element is not damaged and does not come into contact with any conductive material.

- Drip edge, flashing or any other conductive material must not penetrate, connect to or come in contact with Z Mesh Element.
- Screws, nails, attachments or any other connectors securing the drip edge, flashing, or other conductive material must not penetrate, connect to, or come in contact with Z Mesh Element.
- Do not cut, fold, twist, or alter the Z Mesh Element in any way.

Z Mesh Heating Element should have a continuous continuity check performed during installation of roofing materials. A Roof Alarm is available for purchase or rent to assist the roofing contractor in performing this continuity check. The circuit must always be open. See RoofAlarm instructions for more detail.

Z Mesh Heating Element has been tested for continuity and correct readings have been recorded. The Roofing Contractor is responsible for any penetration, cutting or other damage done to the Z Mesh Element.