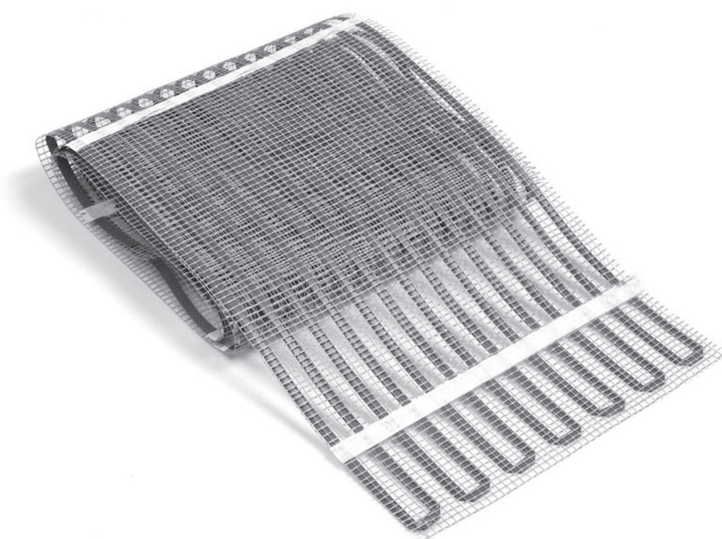
INSTALLATION GUIDE

TruHeat EZ-HEAT Mat In-Floor Heating System



Dear TruHeat Customer,
Thank you for choosing the TruHeat EZ-HEAT underfloor heating mat system. It is designed to be simple to install and cost efficient to operate. This guide provides the information you need for a successful installation. Please follow all instructions carefully for the best possible installation results and for the long-term effectiveness of the product.

We wish you years of safe, comfortable, cost-efficient heating!

Caution A: Supervision & Instruction
This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance y a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Caution B: Avoid Thermal Blocking
In cases where heating mats are placed under floating floors (carpets, laminates, LVT, or parquet) DO NOT place furniture or any other object of which the base fully rests directly on the floor! Doing so can cause damage!

TruHeat Systems Inc. will not be held liable for any damage caused due to thermal blocking.

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Important!

Please read carefully before installing your TruHeat EZ-HEAT mats.

Do not:

- **Do not** **cut parts (Ribbon) of the EZ-HEAT mats in order to change the size. Especially DO NOT cut meter-wide mats in two pieces.**
- **Do not** overlap heating mats.
- **Do not** fold or wrinkle TruHeat EZ-HEAT mats.
- **Do not** place heavy/sharp tools (or any other potentially damaging object) on top of the heating mats.
- **Do not** walk unnecessarily on the heating mats.
- **Do not** install electrical cables or pipes under the floor together with the heating mats.
- **Do not** use cellulose insulation.
- **Do not** install mats when the room temperature is below -5ºC (23ºF).
- **Do not** install underfloor heating mats anywhere except inside buildings.
- **Do not** install mats under walls or partitions, or in areas under heavy cabinets, closets, or fixtures (toilets, sinks, tubs, etc.).
- **Do not** install mats within 3 cm (1 inch) of any heat conductive building part, such as cold water pipes.
- **Do not** install mats within 5 cm (2 inches) of one another (ribbon to ribbon), 10 cm (4 inches) of any wall, or 15 cm (6 inches) of a fireplace or hot water pipe.
- **Do not** connect any other electrical appliance on the same electric fused spur or RCD unit of the heating system
- **Do not** install heating mats under wooden floor, if the wooden floor is thicker than 18 mm (3/4 inch).
- **Do not** put acoustic material between the heating mats and the wooden floor, when installing wooden type floor, with R-value of the acoustic material greater than 0.014 m**2 C/W (0.08ft**2 h F/Btu).
- **Do not** use carpet underlay with thermal resistance greater than 0.8 Tog
- **Do not** install under carpet with thermal resistance greater than 2.0 Tog

Always:

- **Always** cover mats with grounding net in wet areas. Wet areas include saunas, bathrooms, and kitchen areas within 50 cm (20 inches) of sinks or any metallic kitchen appliance.
- **Always** ensure that the electric circuit that supplies electricity to the mat system is equipped with a 30 mA ground fault current interrupter (GFCI) or residual current device (RCD).
- **Always** connect all cold wire leads from the TruHeat EZ-HEAT mats in parallel inside an electrical junction box or boxes.
- **Always** ensure that the total current needed for all mats connected in parallel is not more than 80% of the listed amperage capacity of the electrical junction box and its power supply line and breaker (For advice consult your recommended installer / supplier).
- **Always** provide each room containing the mat system with its own electrical junction box and control thermostat. Each mat's thermostat has a maximum capacity of 15 amps. If the amount of amps is greater than 15 amps, divide the amps over several thermostats, or add a contactor between the mats and the thermostats. (To calculate the amount of Amps in the room see tables in page 15).
- **Always** use insulation under the mats to reduce running costs and warm-up time. Check with your installer to determine the R value of the sub floor insulation layer. If there is no insulation, or if the R value of the insulation layer is lower than 0.1 m^2*°C/W or 1 Tog (0.57 ft^2*h*°F/Btu), please read the insulation instructions on page 5 and act accordingly.
- **Always** wait for thin set/grout to dry properly before operating the system. The drying period is generally 2-14 days depending on manufacturer's instructions.

Note: If you are installing soft type of floor covering (vinyl or linoleum), cover the mats with at least 6mm (1/4 inch) self-leveling flooring cement or latex compound.

Note: All electrical connections must be performed by a fully qualified electrician.

Note: The installer must verify the conformance to all applicable codes or standards.

Getting Started

Before installing your new TruHeat EZ-HEAT in-floor system, be sure you have the following additional parts:

- **Electrical junction box** – used as the connecting junction for the cold leads of the heating mats.
- **Grounding net** – needed only when installing heating mats in wet areas such as bathrooms, kitchens, saunas, etc.
- **Control thermostat** – allows you to control the temperature of the room. The control thermostat must also have a two terminal manual on/off switch. Control thermostats have one or two of the following sensors:
  - Ambient air temperature safety sensor.
  - Floor temperature safety sensor.

  In bathrooms, use thermostat with only floor temperature sensor. You can use the same kind of thermostat for other wet areas such as kitchen, but it is not a must.

  Use thermostat with air and floor temperature sensors for all other installations.

Note: We recommends AUBE digital fully programmable thermostat, which enables you maximum saving and flexibility in creating your weekly heating plans. See page 14 for a list of recommended thermostats in your country.

- **Ground Fault Circuit Interrupter** *or* **Residual Current Device** - Consult your local dealer regarding the applicable GFCI or RCD.
  Feel free to contact a TruHeat representative for additional details regarding the appropriate controls.

- **Hard insulation materials** – used as heat insulator under the heating mats in stone type floors for efficient heating. The material comes in plates, usually made from foamed Polyurethane or Polystyrene and should have Compressive strength of more than 2 Kg/cm^2 (28 PSI). The R value of the material should be in the range of 0.1 - 0.3 m^2*°C/W or 1 - 3 Tog (0.57 - 1.7 ft^2*h*°F/Btu). (See page 14 for a list of recommended hard insulation materials.) (*) See also remark below.
- **Soft insulation material** – used as heat insulator under the heating mats in all non-stone type floors for efficient heating. The material comes in rolls and should have Compressive strength of more than 0.02 Kg/cm (0.28 PSI)^2. The R value of the material should be in the range of 0.1 - 0.3 m^2*°C/W or 1 -3 Tog (0.57 - 1.7 ft^2*h*°F/Btu). (See page 14 for a list of recommended soft insulation materials.) (*) See also remark below.

  (*) Remark: It is common to find insulation materials that are at least 6mm (1/4 inch) in thickness and have Thermal Conductivity of 0.02-0.06 W/m*°C (0.035-0.1 Btu/h*ft*°F), but you can use other thickness and Thermal conductivity as long as the R Value of the material is in the range of 0.1 - 0.3 m^2*°C/W or 1 - 3 Tog (0.57 - 1.7 ft^2*h*°F/Btu).

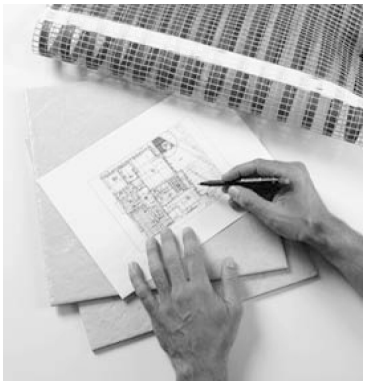
Important Note: When installing insulation material under carpeting, always make sure that the R- value of the insulation is at least the same or greater than the R-value of the carpet.

Step 1: Planning Your Installation

Before installing, draw an installation plan showing the placement of the mats, floor sensor, and junction box or boxes.

TruHeat EZ-HEAT mats should cover at least 65%-80% of the floor area of your room to be used as a primary heat source; the more coverage, the less time needed to heat the area. The heating mats are available in several convenient sizes. Choose the combination of heating mats that best enables you to cover the recommended 65% - 80% of your room.

Plan to use the larger heating mats as much as possible and to use smaller mats only as gap fillers.

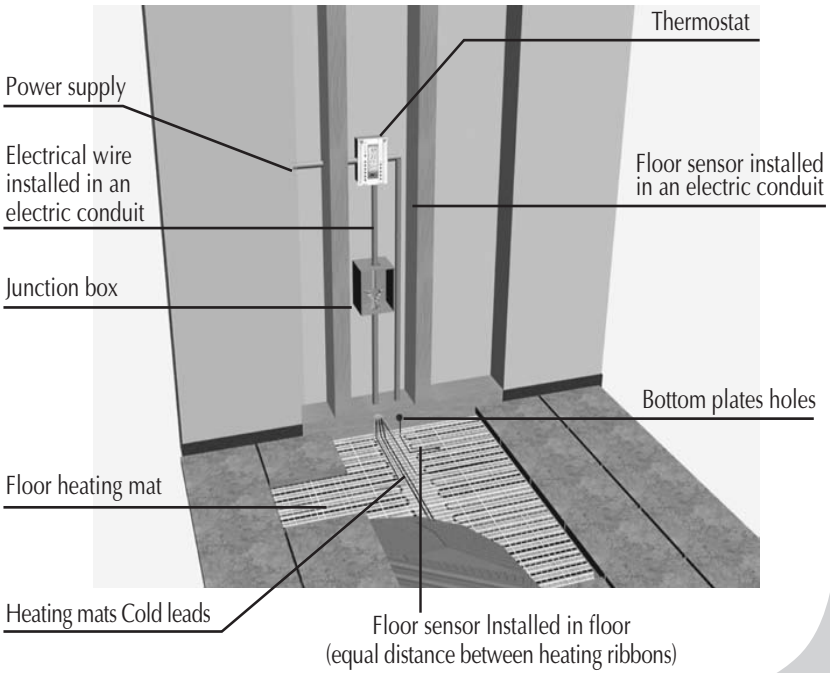


Note: The mats are supplied with 5 meters (16 feet) of electrical cold leads. If this is not enough, ask your electrician to extend the cold leads.

Step 2:

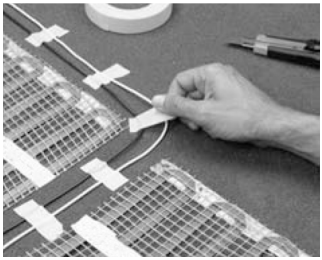
Laying Out Your Heating Mats

1. Clean all debris from the floor base.
2. If installing the heating mats under:
   - **Stone type and glued type floors** – Under stone type and glued-type floors (Carpet, wood, vinyl or linoleum - with adhesive) use a flexible tile adhesive to secure a hard insulation material on top of the floor base. (See page 14 for a list of recommended hard insulation materials.)
   - **All other flooring types** – Use a soft insulating material which can simply be placed on the floor or secured with tape or carpet adhesive. (See page 14 for a list of recommended soft insulation materials.)
3. Clean all debris from the surface of the grout or insulating material.
4. Roll out heating mats on top of the insulating material with the heating ribbon facing down and the fiberglass net facing up. It is recommended to leave a gap of about 10 cm (4 inches) from the wall to the heating mats, and a gap of about 5 cm (2 inches) between each mat (ribbon to ribbon). Ensure that each heating mat is completely flat. Make sure that the cold leads of the mats are on the side of the mat that is closest to the location of the electrical junction box (*See step 3 – Making the Electrical Connection).*



5. Your mats have double-sided adhesive tape on the mat edges. Stretch the mats and secure the mats to the floor with the tape. Where required additional tape can be used.
Apply glue between the heating wires (Apply only on the fiberglass net - do not glue the heating wires).

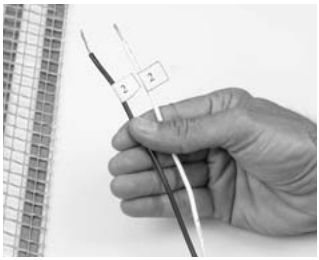
6. Place the cold leads of the mats between the mats toward the junction box. Try to place the cold leads so that they do not cross each other.



Important! Ensure that the cold leads of the mats do not cross over the mats.

7. Since the cold lead connector is slightly thicker than the rest of the mat, create a slight groove in the insulation board under the connector to ensure that the heating mat lays flat. If any cold leads cross, create a groove for the cold leads at the point at which they cross.

8. Mark each pair of cold leads coming from the same mat with a number. Place a small sticker with the number of each pair of leads close to the end of the lead.



Step 3:

Making the Electrical Connections

Note: All electrical connections must be performed by a fully qualified electrician.

Important! Tightly screw all connections to ensure good electrical contacts.

1. Install the electrical junction box or boxes above floor level according to local safety and building regulations and codes. Place the following label on the electrical junction box or boxes indicating that an underfloor heating system is installed in the room.

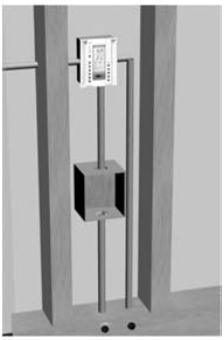
2. Install the control thermostat as far as possible from any heat sources or heat sinks such as fireplaces, direct sunlight, windows, doors, or anything that could possibly affect proper temperature readings. The suggested placement is 1.5 m (5 feet) above floor level.

Note:

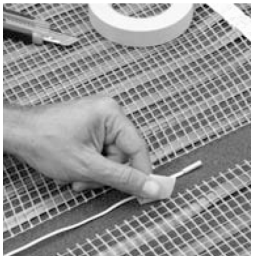
- In bathrooms only, use a thermostat with only a floor temperature safety sensor. You can use the same kind of thermostat for other wet areas such as kitchen, but it is not a must.
- For all other installations, use a thermostat with both an ambient air temperature sensor and floor temperature safety sensor.

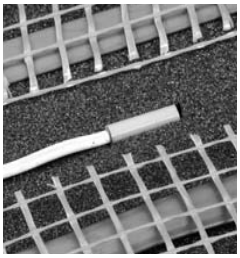
See page 14 for a list of recommended thermostats in your country.

3. Install an electric conduit to the junction box and thermostat as in the following diagram.



4. Connect the floor temperature safety sensor to the thermostat through a conduit, and install between two heating ribbons, at least 50 cm (20 inches) from the wall.





Note: Make sure that the sensor does not touch any of the heating ribbons.

5. Measure the resistance of the heating system and record the value. Verify that the values you measure are in line with the resistance value that is printed on mat sizing chart on page 15.

6. Measure the insulation values with a Megger tester and record the value. Make sure there is no insulation problem.

7. If you are installing the heating mats in wet areas *(Wet areas include saunas bathrooms, and kitchen areas within 50 cm (20 inches) of sinks or any metallic kitchen appliance)*:

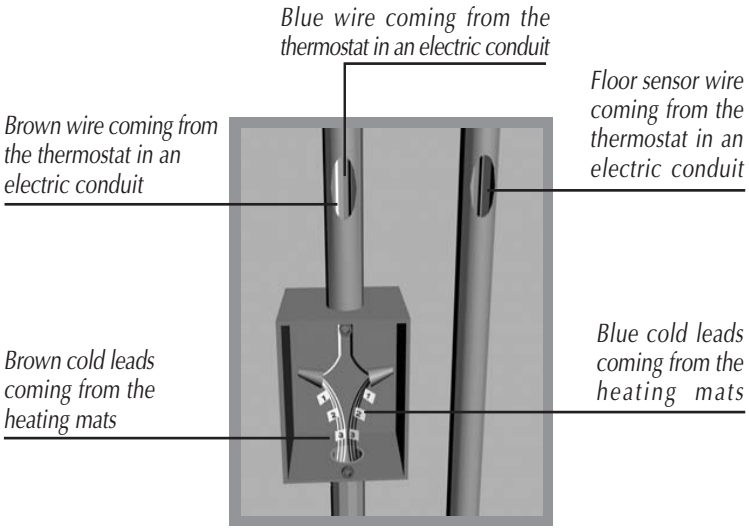
a. Spread the grounding net on top of the heating mat. The electrical wire of the grounding net should coincide with the heating mat cold lead. If necessary, tape the grounding net to the heating mats to ensure that the net does not move.

b. Route the electrical wire of the grounding net to the same electrical junction box as the cold leads of the heating mats.

c. In the electrical junction box, connect the electrical wires of the grounding to the ground lead (green/yellow) of the power supply of the house.

8. In parallel, feed the cold leads of each mat to the electrical junction box. Make sure that you can see the sticker with the numbers of the leads. If necessary, shorten the leads, but make sure the sticker with the leads' numbers are affixed to the shortened lead.

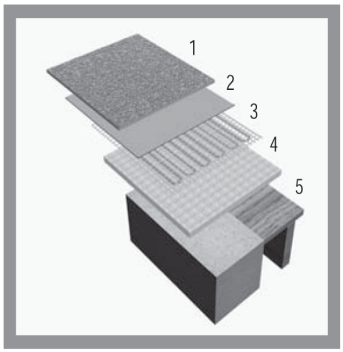
9. Expose the conductor in each lead.
10. Connect all leads of the same colour.
11. Insert each coloured lead to one connector in the junction box.
12. Connect the same colour cold lead between the thermostat and the connector in the junction box.



13. Connect the wires to the control thermostat according to the Typical Wiring Diagram on page 12.
14. Switch on the heating system (see the directions in your thermostat manual) for half an hour to ensure that the system is working properly. It is important to check each entire system to ensure each mat is heating.
15. Switch off the heating system (see the directions in your thermostat manual).
16. When the mats are cool, lay down your floor covering. If you are installing a glued type of floor covering (carpet, wood, vinyl or linoleum), first cover the mats with at least 1/4 inch (6mm) self leveling flooring cement. (You can also use similar materials,like Latex based self leveling compound, as long as they have the same or better Thermal conductivity as the self leveling flooring cement). Consult your local construction material dealer regarding the right material for your type of floor.

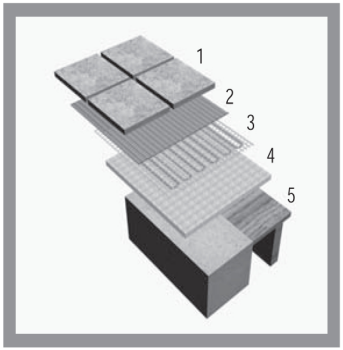
Important! If you are installing a glued type of floor covering, or using thin-set or grout or tile adhesive, do not switch on the heating system again until the glue, thin-set, or grout or tile adhesive is dry. Consult the manufacturer of the material used to determine the amount of drying time needed.

Installation Examples



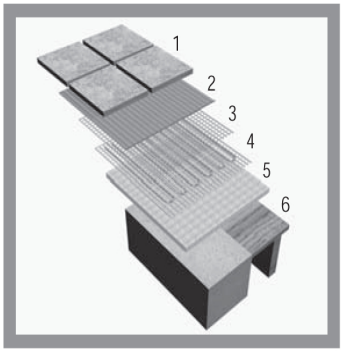
Under glued type carpet, wood, vinyl or linoleum in dry surroundings(**)

1. Carpet, wood, vinyl or linoleum (with adhesive)
2. Self leveling flooring cement or latex compound of at least 1/4 inch (6mm) thickness
3. Heating mat
4. Hard or soft insulation material
5. Floor slab (wood or concrete)



Under tiles in dry surroundings

1. Tiles
2. Thin-set/Grout /Tile adhesive
3. Heating mat
4. Hard insulation material
5. Floor slab (wood or concrete)



Under tiles in wet surroundings

1. Tiles
2. Thin-set/Grout/Tile adhesive
3. Grounding net
4. Heating mat
5. Hard insulation material
6. Floor slab (wood or concrete)

Installation Examples

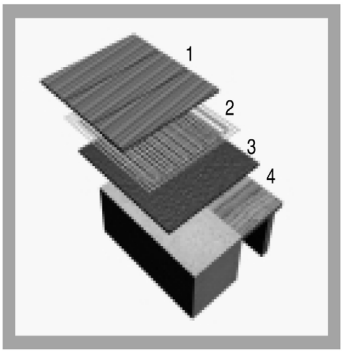
Remarks:

(*) In wet surroundings, ensure the heating mat has a grounding net installed directly above it.

(**) Please check local building codes and regulations and act according to them if they contradict the instructions above.

(**) Do not use carpet underlay with more then 0.8 Tog.

(**) Use a Hessian backed carpet with a lower than 2.0 Tog. Always ensure that the Tog value of the insulation is at least the same as the carpet.

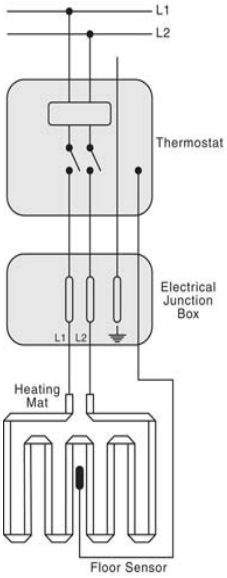


Under Floating type wood, laminate, parquet flooring in dry surroundings

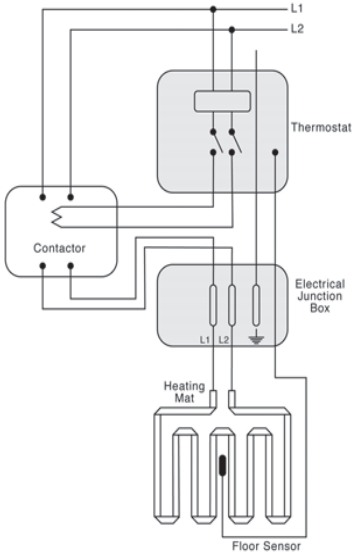
1. Wood, lamiante, parquet (non-adhesive)
2. Heating mat
3. Soft insulation
4. Floor slab (wood or concrete)

Typical Wiring Diagram

Option A - for circuits less than 15 amps



Option B - for circuits greater than 15 amps



List of Recommended Materials

Recommended Thermostats

All of TruHeat's thermostats are fully programmable and able to switch upto 15A. Our thermostats have many features compared to others on the market and can be either Air only, Floor only or Air and Floor sensing combined.

- Switches up to 15A (Dual Voltage)
- Combination of Air/floor/Air & floor sensors
- 7 Day Programmable
- Stylish slim design
- Energy efficient (comfort, economy and vacation mode)
- Has full manual override facility. ·
- Large illuminated LCD screen (blue backlight) ·
- WiFi option

Recommended Hard Insulation Material

When hard insulation material needed, you can use *Polyurethane foam panels*. The Compressive strength and Thermal conductivity of this material are in line with the recommendations for hard insulation material. You can also use at least 6 mm thick (1/4 inch) Marmox® or similar construction boards (See page 5 for hard insulation material recommendation).

For other insulation material please consult with your local construction material dealer.

Standard Mat Sizes & Resistance Values

120-240 Volts, 7 watts per sqft family:

WIDTH (IN.)	LENGTH (FT.)	WATTS	RESISTANCE RANGE 120V	RESISTANCE RANGE 240V
20	3.3	77	392-479	N/A
	4	96	313-383	N/A
	5	114	221-270	N/A
	6.5	133	181-222	783-957
	8	151	138-168	587-718
	10	173	118-144	441-539
	11.5	191	105-128	400-489
	13	210	90-109	363-444
	14.5	227	76-92	318-388
	16.5	248	70-86	275-336
	18*	266	N/A	257-315
	19.5*	227.5	N/A	236-288
	21.3*	245	N/A	205-250
	23*	269	N/A	210-256

WIDTH (IN.)	LENGTH (FT.)	WATTS	RESISTANCE RANGE 120V	RESISTANCE RANGE 240V
40	3.3	77	181-222	783-957
	5	116	108-132	441-539
	6.5	151	90-109	327-400
	8	182	70-86	275-336
	10*	231	N/A	236-288
	11.5*	266	N/A	210-256
	13*	301	N/A	179-219
	14.5*	338	N/A	151-185
	16.5*	420	N/A	140-172

Mats marked with (*) are not availabe in 120v

120-240 Volts, 14 watts per sqft family:

WIDTH (IN.)	LENGTH (FT.)	WATTS	RESISTANCE RANGE 120V	RESISTANCE RANGE 240V
20	3.3	77	163-200	399-441
	4	93	137-168	534-618
	5	116	112-137	445-516
	6.5	151	79-96	321-393
	8	186	70-86	253-309
	10	233	56-69	199-240
	11.5	266	49-60	187-224
	13*	302	N/A	154-183
	14.5*	336	N/A	146-172
	16*	372	N/A	131-153
	18*	420	N/A	130-151
	19.5*	448	N/A	107-123
	21.3*	490	N/A	92-107
	23*	532	N/A	100-116

WIDTH (IN.)	LENGTH (FT.)	WATTS	RESISTANCE RANGE 120V	RESISTANCE RANGE 240V
40	3.3	154	79-96	321-393
	5	231	56-69	207-241
	5.5	257	49-60	N/A
	6.5*	301	N/A	155-183
	8*	364	N/A	131-153
	10*	462	N/A	107-124
	11.5*	532	N/A	100-115
	13*	602	N/A	103-126

Mats marked with (*) are not availabe in 120v

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