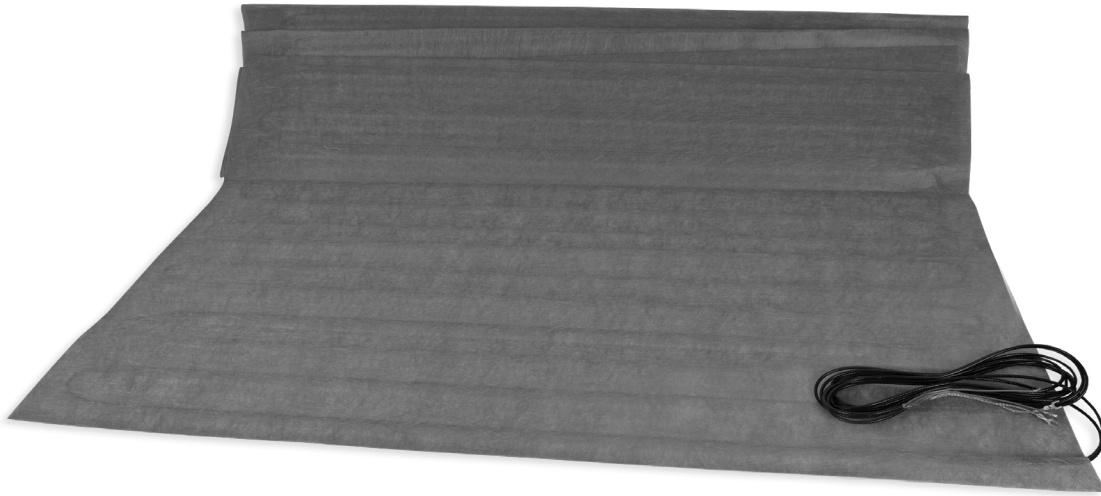


# INSTALLATION GUIDE

## SFM SERIES HEATING CABLE MAT



PERSIA™

  
This unit  
complies with  
CSA and UL  
standards

### WARNING

Before installing and operating this product, the user and/or installer must read, understand and follow these instructions and keep them handy for future reference.

If these instructions are not followed, the warranty will be considered null and void, and the manufacturer deems no further responsibility for this product.

The following instructions must be adhered to in order to avoid personal injuries or property damages, serious injuries and potentially fatal electric shocks.

This product must be installed by a qualified person in accordance with this installation guide. All electric connections must be made by a **qualified electrician**, according to the **electrical** (Canadian Electrical Code Part 1 or National Electrical Code) **and building codes** effective in your region.

Cut off power supply at circuit breaker/fuse before installation or repairs.

**The maximum current rating of the circuit breaker or fuse of the branch circuit supplying this product must be limited to 15 amps.**

This heating cable mat has a usage marking G, W and X and is designed for indoor embedded floor heating applications in which the heating section of the cable, including the cable connection joint, are embedded in a mortar-type layer or thinset, under a floor covering. It is usable in a dry or wet environment. Never use this mat for any other purpose.

The mat must not exceed the size of the room or space where it will be used as a primary heating source. The heating section of the mat must not pass through or be installed in a wall.

A **floor-warming thermostat** along with its specified temperature probe must be installed and connected with this product.

This heating cable mat must be **grounded and connected to a ground fault circuit interrupter (GFCI)**. The GFCI must be a class A (5 mA) for a bathroom or a shower.

A clearance distance of at least 2 inches (50 mm) between the heating cable mat and the surrounding walls must be respected when choosing the mat for your room.

An 8-inch (200 mm) spacing must be maintained between the heating cable mat and all other heat sources.



## WARNING

An 8-inch (200 mm) spacing must be maintained between the heating cable mat and all other heat sources (baseboards, heating duct, fireplaces, luminaires, etc.).

A 6-inch (150 mm) spacing must be maintained between the mat and any plumbing drain or non-heating duct.

Minimum temperature for heating cable mat installation is 0°C.

The minimum radius of curvature of the mat is 13 mm (1/2 inch).

**NEVER CUT THE HEATING CABLES WITHIN THE MAT.** This would change the cable resistance and could lead to a fire.

The mat must be laid flat and must not be folded over itself.

If the installer or user modifies the unit, they will be held responsible for any damage resulting from this modification, and the warranty and the CSA certification will be void.

Never energize the heating cable mat while it is folded. This would lead to overheating that could damage the mat and may cause a fire.

Never install a heating cable mat designed for a 120 V power source on a 240/208 V power source.

During manipulation of the mat, avoid folding the heating cable mat on itself with force – this could damage its sheath and the internal wires.

**Note:** When a part of the product specification must be changed to improve operability or other functions, priority is given to the product specification itself. In such instances, the instruction manual may not entirely match all the functions of the actual product. Therefore, the actual product and packaging, as well as the name and illustration, may differ from the manual. Make sure that the connections have been made safely and securely. Pull on each wire to assure that it is firmly embedded in the connector or terminal block. Failing to follow these instructions may cause a fire hazard.

## THANK YOU FOR CHOOSING THE STELPRO FLOOR HEATING SYSTEM

This guide has been written to guide you during the installation of your floor heating system. It has been prepared according to North American construction standards. Because construction standards vary from one area to another, consult a certified electrician in your region before installing the floor heating system.

The floor heating system is designed to heat a room with a heating cable mat placed under your floor covering. It can heat floor covering materials such as marble, ceramic and porcelain tiles, slate, granite, as well as poured surfaces. Before using the floor heating system under any other floor covering, contact your floor covering manufacturer.

The floor heating system will heat your house regardless of the size or shape of the room. If however the room has a much greater heat loss than normal, like a solarium, or has little free floor space, like a tightly furnished bathroom, you may need an additional heat source. This product is designed for indoor use only, in residential, commercial and institutional buildings. The floor heating system is available in "heat-

ing cable mat sets" of 120 volts and 240 volts (see the SELECTION TABLES). The standard heating density is 12 watts/square foot (129 W/m<sup>2</sup>). The 240-volt models can be electrically supplied at 208 volts, but the heating density will be reduced to 9 watts/square foot (97 W/m<sup>2</sup>).

To complete the installation, Stelpro provides a temperature sensor with the heating cable mat set. Installation instructions for the mat and temperature sensor are provided further in this guide. It is important to connect the sensor to the heating cable thermostat. Please note that you must install the sensor before the mortar, even if you haven't bought the thermostat yet.

It is also recommended that you install two sensors (the sensor provided with the thermostat and the sensor provided with the mat) in case one of them is damaged during installation.

For custom mats, refer to the codes following the selection tables on page 5.

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## WHAT YOU SHOULD KNOW

### CATALOG NUMBER DESCRIPTION

The SFM series heating cable mat part numbers inform you of the following parameters: dimensions, voltage and wattage.

EXAMPLE: Catalog #: SFM1W0420D084060

Voltage: SFM1: 120 V or SFM2: 240 V

W0420: Power: 420 watts

D084060: 84 inches long by 60 inches wide

**SELECTION TABLE - 120 VOLTS AT 12 W/SQ. FT.**

CATALOG NO.	SIZE FT.	DIMENSIONS (IN.)		AREA	POWER	CURRENT
		LENGTH	WIDTH	SQ.FT.	WATTS	AMPS
SFM1W0095D042027	3.5	42	27	7.9	95	0.8
SFM1W0112D042032		42	32	9.3	112	0.9
SFM1W0147D042042		42	42	12.3	147	1.2
SFM1W0096D048024	4	48	24	8.0	96	0.8
SFM1W0120D048030		48	30	10.0	120	1.0
SFM1W0144D048036		48	36	12.0	144	1.2
SFM1W0168D048042		48	42	14.0	168	1.4
SFM1W0192D048048		48	48	16.0	192	1.6
SFM1W0120D060024	5	60	24	10.0	120	1.0
SFM1W0150D060030		60	30	12.5	150	1.3
SFM1W0180D060036		60	36	15.0	180	1.5
SFM1W0210D060042		60	42	17.5	210	1.8
SFM1W0240D060048		60	48	20.0	240	2.0
SFM1W0300D060060		60	60	25.0	300	2.5
SFM1W0144D072024	6	72	24	12.0	144	1.2
SFM1W0180D072030		72	30	15.0	180	1.5
SFM1W0216D072036		72	36	18.0	216	1.8
SFM1W0252D072042		72	42	21.0	252	2.1
SFM1W0288D072048		72	48	24.0	288	2.4
SFM1W0360D072060		72	60	30.0	360	3.0
SFM1W0432D072072		72	72	36.0	432	3.6
SFM1W0168D084024	7	84	24	14.0	168	1.4
SFM1W0210D084030		84	30	17.5	210	1.8
SFM1W0252D084036		84	36	21.0	252	2.1
SFM1W0294D084042		84	42	24.5	294	2.5
SFM1W0336D084048		84	48	28.0	336	2.8
SFM1W0420D084060		84	60	35.0	420	3.5
SFM1W0504D084072		84	72	42.0	504	4.2
SFM1W0588D084084		84	84	49.0	588	4.9
SFM1W0192D096024	8	96	24	16.0	192	1.6
SFM1W0240D096030		96	30	20.0	240	2.0
SFM1W0288D096036		96	36	24.0	288	2.4
SFM1W0336D096042		96	42	28.0	336	2.8
SFM1W0384D096048		96	48	32.0	384	3.2
SFM1W0480D096060		96	60	40.0	480	4.0
SFM1W0576D096072		96	72	48.0	576	4.8
SFM1W0672D096084		96	84	56.0	672	5.6
SFM1W0768D096096		96	96	64.0	768	6.4
SFM1W0240D120024	10	120	24	20.0	240	2.0
SFM1W0300D120030		120	30	25.0	300	2.5
SFM1W0360D120036		120	36	30.0	360	3.0
SFM1W0420D120042		120	42	35.0	420	3.5
SFM1W0480D120048		120	48	40.0	480	4.0
SFM1W0600D120060		120	60	50.0	600	5.0
SFM1W0720D120072		120	72	60.0	720	6.0
SFM1W0840D120084		120	84	70.0	840	7.0
SFM1W0960D120096		120	96	80.0	960	8.0

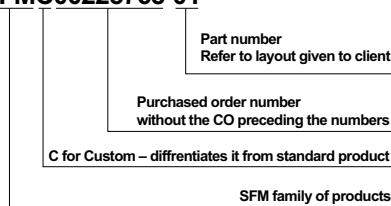
SELECTION TABLE – 240 VOLTS AT 12 W/SQ. FT. AND 208 VOLTS AT 9 W/SQ. FT.								
CATALOG NO.	SIZE	DIMENSIONS (IN.)		AREA	POWER (watts)		CURRENT (amps)	
	FT.	LENGTH	WIDTH	SQ.FT.	240 V	208 V	240 V	208 V
SFM2W0147D042042	3.5	42	42	12,3	147	110	0.6	0.5
SFM2W0144D048036	4	48	36	12,0	144	108	0.6	0.5
SFM2W0168D048042		48	42	14,0	168	126	0.7	0.6
SFM2W0192D048048		48	48	16,0	192	144	0.8	0.7
SFM2W0150D060030	5	60	30	12,5	150	113	0.6	0.5
SFM2W0180D060036		60	36	15,0	180	135	0.8	0.7
SFM2W0210D060042		60	42	17,5	210	158	0.9	0.8
SFM2W0240D060048		60	48	20,0	240	180	1.0	0.9
SFM2W0300D060060		60	60	25,0	300	225	1.3	1.1
SFM2W0180D072030	6	72	30	15,0	180	135	0.8	0.7
SFM2W0216D072036		72	36	18,0	216	162	0.9	0.8
SFM2W0252D072042		72	42	21,0	252	189	1.1	0.9
SFM2W0288D072048		72	48	24,0	288	216	1.2	1.0
SFM2W0360D072060		72	60	30,0	360	270	1.5	1.3
SFM2W0432D072072		72	72	36,0	432	324	1.8	1.6
SFM2W0168D084024	7	84	24	14,0	168	126	0.7	0.6
SFM2W0210D084030		84	30	17,5	210	158	0.9	0.8
SFM2W0252D084036		84	36	21,0	252	189	1.1	0.9
SFM2W0294D084042		84	42	24,5	294	221	1.2	1.1
SFM2W0336D084048		84	48	28,0	336	252	1.4	1.2
SFM2W0420D084060		84	60	35,0	420	315	1.8	1.5
SFM2W0504D084072		84	72	42,0	504	379	2.1	1.8
SFM2W0588D084084		84	84	49,0	588	442	2.5	2.1
SFM2W0192D096024	8	96	24	16,0	192	144	0.8	0.7
SFM2W0240D096030		96	30	20,0	240	180	1.0	0.9
SFM2W0288D096036		96	36	24,0	288	216	1.2	1.0
SFM2W0336D096042		96	42	28,0	336	252	1.4	1.2
SFM2W0384D096048		96	48	32,0	384	288	1.6	1.4
SFM2W0480D096060		96	60	40,0	480	361	2.0	1.7
SFM2W0576D096072		96	72	48,0	576	433	2.4	2.1
SFM2W0672D096084		96	84	56,0	672	505	2.8	2.4
SFM2W0768D096096		96	96	64,0	768	577	3.2	2.8
SFM2W0240D120024	10	120	24	20,0	240	180	1.0	0.9
SFM2W0300D120030		120	30	25,0	300	225	1.3	1.1
SFM2W0360D120036		120	36	30,0	360	270	1.5	1.3
SFM2W0420D120042		120	42	35,0	420	315	1.8	1.5
SFM2W0480D120048		120	48	40,0	480	361	2.0	1.7
SFM2W0600D120060		120	60	50,0	600	451	2.5	2.2
SFM2W0720D120072		120	72	60,0	720	541	3.0	2.6
SFM2W0840D120084		120	84	70,0	840	631	3.5	3.0
SFM2W0960D120096		120	96	80,0	960	721	4.0	3.5
SFM2W1200D120120		120	120	100,0	1200	901	5.0	4.3
SFM2W0432D144036	12	144	36	36,0	432	324	1.8	1.6
SFM2W0720D144060		144	60	60,0	720	541	3.0	2.6
SFM2W0864D144072		144	72	72,0	864	649	3.6	3.1
SFM2W1152D144096		144	96	96,0	1152	865	4.8	4.2
SFM2W1440D144120		144	120	120,0	1440	1082	6.0	5.2
SFM2W1728D144144		144	144	144,0	1728	1298	7.2	6.2

**REQUIRED INSTALLATION TOOLS:**

- Measuring tape
- Wire stripper
- Screwdrivers
- Multimeter/ohmmeter
- 1000 V megohmmeter (megger)
- ¼ in. X ¼ in. square notched trowel
- Latex-modified thinset (Refer to table on page 11)
- Thermostat temperature sensor
- Large bucket
- Mortar and grout mixer (on drill)
- Duct tape
- Wood chisel
- Sponge
- Hammer

**CUSTOM MAT - PRODUCT CODE**

**SFMC00225768-01**



## VALIDATING YOUR FLOOR HEATING CABLE MAT AND THERMOSTAT SELECTION

### AREA TO HEAT AND LAYOUT

Before installing your new floor heating system, make sure you have selected the right heating cable mat. Re-measure the area that will accommodate the mat(s) in your room:

- A clearance distance of at least 2-inch (50 mm) between the heating cable mat and the surrounding walls must be respected when choosing the mat for your room.
- Do not forget to exclude all areas that cannot be heated (cupboards, bathtub, etc.), as well as all areas that you do not want to heat.
- An 8-inch (200 mm) spacing must be maintained between the heating cable mat and all other heat sources (baseboards, heating duct, fireplaces, luminaires, etc.).
- An 6-inch (150 mm) spacing must be maintained between the mat and any plumbing drain or non-heating duct.
- Compare the area to be heated with the total area covered by the selected mat(s). It is better to use a mat that is a bit smaller rather than a mat that is too big, which will cause problems. If more than one mat is used to fit the room, the total current must not exceed the thermostat's capacity. Otherwise, a master thermostat with a relay or a slave thermostat must be used.

In Canada only: The heating cable mat can be installed under the floor covering of a shower floor fabricated on site with a mortar base. The mat can be installed under or over the waterproof membrane, but must be embedded in mortar. Although the code allows both the installation of the mat under or above the waterproof membrane, Stelpro recommends the mat installation under the membrane to minimize water exposure.

In the United States: If the heating cable mat is being installed in a shower floor fabricated on site, it must be located under the waterproof membrane and embedded in the mortar base.

### THERMOSTAT SELECTION

A floor warming thermostat along with its specified temperature probe must be installed and connected with this product. Only a thermostat equipped with a floor sensor maximizes the floor heating system's efficiency and, therefore, your comfort. All other control methods (ambient air only thermostat or switch) are not to be used, since the floor temperature may overheat and cause damage. Stelpro's heating cable mats and thermostats are each supplied with a temperature sensor that needs to be embedded in mortar along with the mat. It is recommended to install both sensors in case one is damaged during the installation of the heating system.

The heating cable mat must be connected to a ground-fault GFCI circuit interrupter, either integrated in the thermostat or panel mounted. For a bathroom or shower, the GFCI circuit must be class A (5 mA). Floor warming or heating cable thermostats supplied by Stelpro have an integrated GFCI built in. The maximum thermostat current must correspond to the sum of mat currents wired to it. The maximum allowable current for a Stelpro floor warming thermostat is 16 amps. Also, the voltage of the branch circuit must correspond to the voltage prescribed for the thermostat. All thermostats wired to the heating cable mat must be certified by a recognized certification agency and wired in accordance with electrical and building codes applicable in your region.

### LOCATION OF THE INSTALLED THERMOSTAT AND TEMPERATURE SENSOR

Make sure the thermostat is installed in the exact same corner of the room as the mat power lead cables:

- The power lead cables are located in one of the corners of standard heating cable mats.
- The mats can be installed in any direction and on any side (top or bottom).
- The standard length of the power lead cables is 10 feet (3 m), which is normally long enough to cross a door from one side to the other, if necessary, and go upwards to the thermostat.

Plan the location of the thermal sensor(s) between two cable runs of the mat, at a distance of at least 24 in. (60 cm) from the wall or centered between walls. The sensor(s) should be installed in an area where the temperature will reflect the overall temperature of the floor. It should therefore not be located in areas likely to alter the temperature measurement, like a doorway, an external heat source, under pieces of furniture or carpet or an area exposed to the sun. Make sure the sensor wire does not overlap the heating cable.

## REQUIRED TESTS AND WARRANTY CARD

### INTRODUCTION – IMPORTANCE OF THE REQUIRED TESTS

Each mat is subject to factory quality control. However, several operations may compromise its integrity, starting from the moment you unpack the mat to the first start up. To ensure the mat quality remains unchanged throughout the installation process and for warranty purposes, electrical tests must be conducted while the mat is still in its box and during two specific subsequent steps. Measurements must be recorded in the warranty card and be compared to initial measurements taken, when the mat was in the box, to enable you to detect any changes related to the electrical property of the heating cables in the mat.

Since it could be very expensive to repair the mat once it is embedded in mortar, it is crucial to detect any breaks that may occur during the installation process as soon as possible. Therefore, it is important to conduct the required ohms readings when prescribed. If the mat's heating cables get damaged during installation, you must call a qualified repair technician referred by Stelpro. To do so, call Stelpro Customer Service or consult the website ([www.stelpro.com](http://www.stelpro.com)). Any installation-related heating cable mat damages are not covered by the warranty.

### CHRONOLOGICAL ORDER OF THE REQUIRED TESTS

FIRST SERIES OF TESTS (1, 2, & 3): while the mat is still in the box

SECOND SERIES OF TESTS (1, 2 & 3): after the installation and adhesion of the mat on the subfloor using thinset mortar

THIRD SERIES OF TESTS (1, 2 & 3): after the top layer of thinset and tiles/stones are installed, or once the self-leveling mortar applied over the mat has completely dried (in the case of laminated or engineered wood installation).

### TESTS 1, 2 & 3

#### TEST # 1: CONDUCTORS' RESISTANCE TEST

This test requires the use of an ohmmeter or multimeter.

**N.B. Since all measuring instruments are different, we recommend you consult the resistance measurement section of your instrument's user guide.**

#### TIPS

Using a manual range multimeter:

The selected range must correspond to the multimeter's lowest ohms range that encompasses the mat's nominal ohms value.

In the example (see FIGURE 1 & 2), a 200 ohms range has been selected to measure a 174.2 ohms mat.

In order to perform the resistance test, you must set your multimeter at the « Ohm » or «  $\Omega$  » setting and take a resistance measurement between the two power leads (see FIGURE 2). If the ohms reading taken on the two power leads varies significantly (10% or more) from the value printed on the mat's tag, it either means the mat has been damaged or the measuring instrument is not set properly (or is simply out of calibration). The ohms measurement must be recorded in your warranty card.

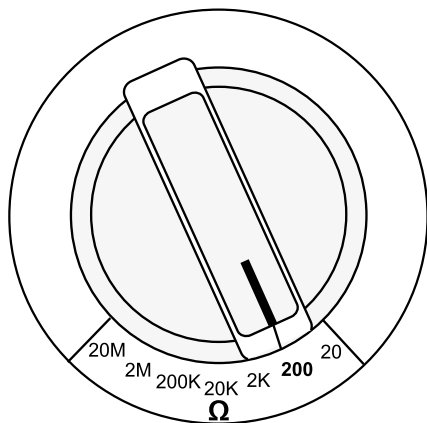


FIGURE 1

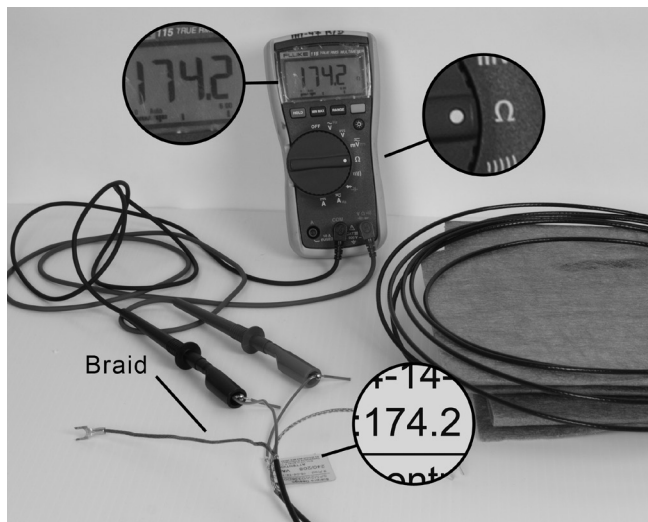


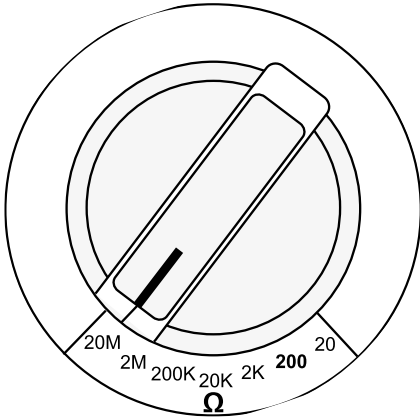
FIGURE 2

**TEST # 2: CONTINUITY TEST BETWEEN THE CONDUCTORS AND THE GROUND BRAIDS**

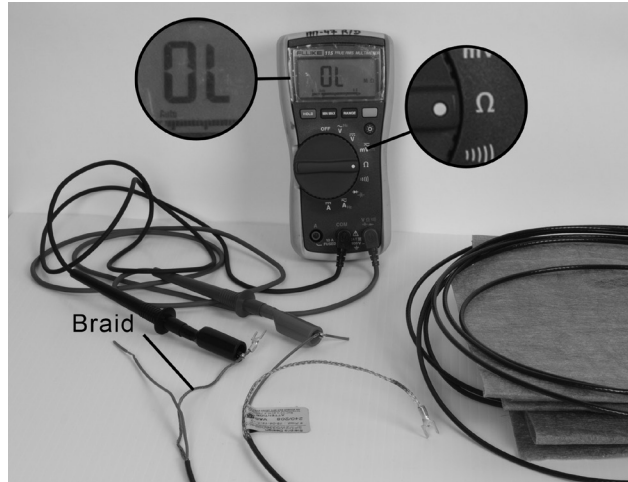
This test requires the use of a multimeter.

**N.B. Since all measuring instruments are different, we recommend you consult the resistance measurement section of your instrument's user guide.**

The mat's heating cables are protected by ground braids. An electrical insulator prevents any contact between the braid and the conductor. To verify that there is no continuity between the braid and the conductor, you must perform a resistance test. Select the highest resistance measurement setting on your multimeter to begin and diminish as required, see Figure 3, or select "Ohm" or " $\Omega$ ", if your multimeter has autoranging. Measure the resistance between one of the braids and one of the two power leads (see Figure 4). If there is no continuity or no contact between the two (if the test is successful), the multimeter will display either "OL" for "over load" or "I" for "infinity," depending on the instrument used. If the test fails, neither "OL" nor "I" will be displayed and you will have a number reading. The test result must be recorded on your warranty card.



**FIGURE 3**



**FIGURE 4**

**TEST # 3: INSULATION RESISTANCE TEST (CAPACITY OF THE CABLE ELECTRICAL INSULATOR TO PREVENT CURRENT LEAKAGE)**

**CAUTION: HIGH VOLTAGE TESTING**

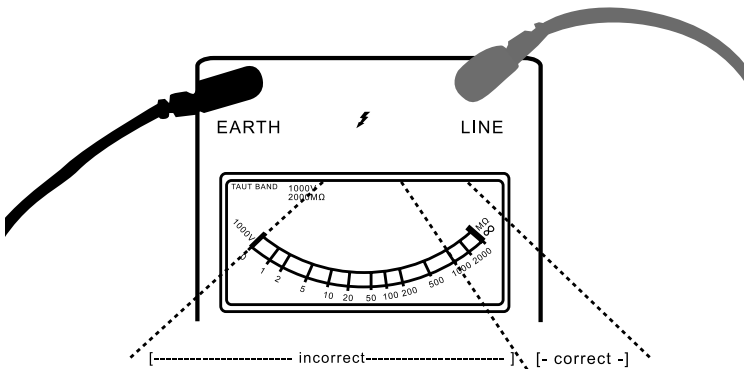


This test requires the use of a 1000 V megohmmeter.

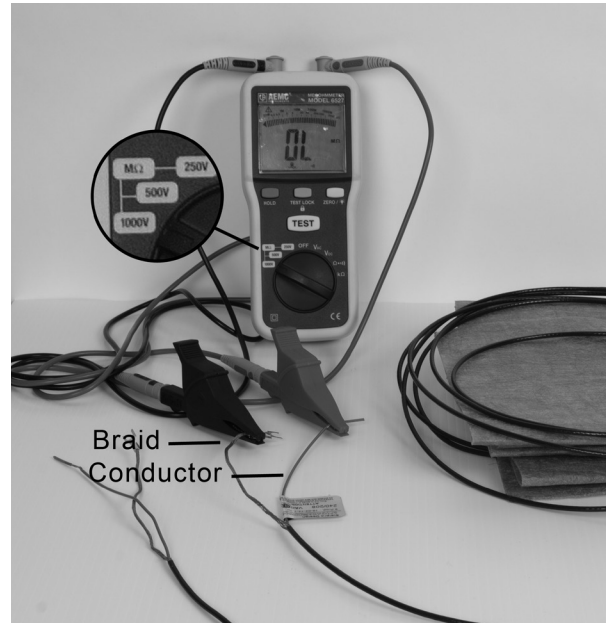
**N.B. Since all megohmmeters are different, we recommend you consult your instrument's user guide.**

This test is meant to detect very small breaks throughout the conductor insulation of each mat's heating cable. These breaks often remain undetected during the continuity test, since they are not necessarily short circuits between each conductor and the ground braid. Even though they are small, these breaks are likely to cause a current leakage to ground. Such a leakage is usually detected by the mandatory ground fault circuit interrupter "GFCI" (thermostat with integrated GFCI or panel-mounted GFCI). When an exceeding current leakage is detected, the GFCI trips the circuit, disabling the floor heating system.

In order to perform the insulation resistance test using a megohmmeter (Mohm logo), you must take an insulation measurement between one of the braids and one of the two power leads. (See FIGURES 5 & 6 below.) Make sure the applied voltage of the megohmmeter is set at 1000 V. The insulation resistance measurement must be equal to or greater than 1 Gigaohms (1 Gigaohms = 1 G ohms = 1000 M ohms = 1000 Megaohms). The insulation resistance measurement must be recorded on your warranty card.



**FIGURE 5**



**FIGURE 6**



## GETTING STARTED – SUBFLOOR PREPARATION

### PLYWOOD SUBFLOORING TIPS

#### SURFACE PREPARATION

The plywood surface must be clean, solid and dry. Remove any dust, oil, grease, paint, wax, sealant or any other substance that could impede adequate adhesion. Also, the plywood surface must be free of any debris, protruding nails, screw heads, etc. that may damage the mat's heating cable.

#### PLYWOOD SUBFLOOR STRENGTH AND STRENGTHENING

Each plywood sheet must be secured with screws spaced 8 in. (203 mm) apart on its center and 6 in. (150 mm) apart on its perimeter. Plywood sheets must be spaced 1/4 in. (6.3 mm) from each other to allow room for material expansion.

In order to eliminate all risks of damage to the mat heating cables resulting from floor covering cracks, it is important to ensure sufficient subfloor rigidity.

Floor joists spaced 16 in. apart or less require a plywood subfloor thickness of at least 1 1/4 in. (2 x 5/8 in. sheets). If floor joist spacing exceeds 16 in., the plywood sheets must be strengthened to achieve a total thickness of 1 7/8 in. (3 X 5/8 in.).

Metal lathes, concrete boards and others products can also be used to strengthen a subfloor. Seek the advice of a floor covering specialist to ensure the subfloor is properly strengthened.

### CONCRETE SUBFLOORING TIPS

#### SURFACE PREPARATION

The concrete surface must be clean, solid and dry. Remove any dust, oil, grease, paint, wax, sealant or any other substance that could impede adequate adhesion. Also, the surface must be free of any debris, protruding nails, screw heads, etc. that may damage the mat's heating cable.

#### CURING PERIOD

Before installing the heating cable mat, the curing period of the concrete must be completed (typically 28 days). If needed, ask the concrete manufacturer to confirm the exact curing period of their product.

### MEMBRANES

Waterproof membranes can be used in bathrooms, showers and other locations. They are typically unaffected by the heat produced by the mat. However, it would be safer to check with the membrane manufacturer to ensure their product is compatible with a radiant floor heating system and learn how to install the membrane with such a system.

## HEATING CABLE MAT INSTALLATION

### FIRST SERIES OF TESTS

With the mat still in the box, perform the first series of tests as described in the REQUIRED TESTS AND WARRANTY CARD, TESTS 1, 2 & 3 section. Measured values must be recorded on your warranty card. If a break or damage is detected during the series of tests, the mat should be returned to the original place of purchase.

### HEATING CABLE MAT INSTALLATION TIPS

- Avoid applying excessive pressure on the mat while folded on itself.
- Avoid dropping objects onto the mat.
- During installation, make sure your shoes are free of any hard debris that could damage the mat heating cables.
- Be very careful not to trip over the mat. Tripping may cause self injury and could damage the mat heating cables.
- The mat installation must not be performed at a temperature below freezing point (0°C).

### STEP-BY-STEP MAT INSTALLATION

#### ROUTING THE POWER LEADS TO THE THERMOSTAT ELECTRICAL BOX

Make sure the supply branch circuit is not energized. Unfold the mat and dry fit it to the room, placing the power leads at the corner where the thermostat needs to be. Make sure the power leads are long enough to reach the thermostat location. Cut a hole in the wall for a junction box at the desired location. The calculations for the choice of circuit breakers or the location of the thermostat must be determined by an electrician in keeping with your local electrical code.

At floor level, directly below the thermostat box, make a "U" shaped groove in the base of the wall (sole plate) to accommodate the entrance

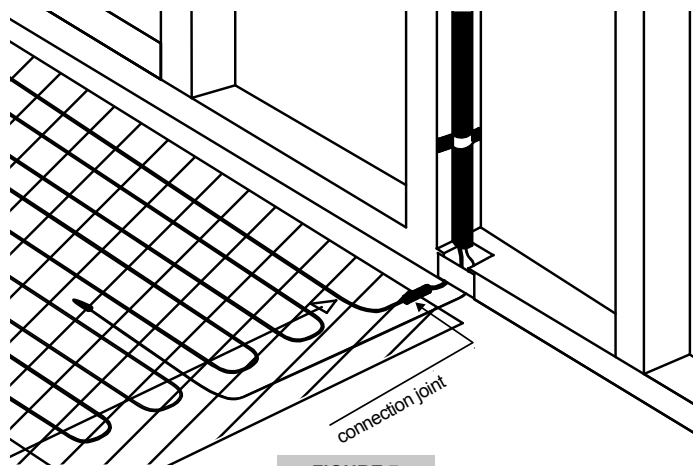


FIGURE 7

of the power leads. (See FIGURE 7.) Determine the length of conduit needed between the inlet knockout of the junction box and the base of the wall (sole plate) at approximately 38 to 50 mm (1 1/2 - 2 in.) vertical to the floor. It is unnecessary to include an elbow at the base of the lead, unless it is required by the electric codes in your area. (See FIGURE 7.) Do not route the power leads to the electrical box for now. This step should be done after the mat is fixed to the floor.

#### PREPARING THE LOCATION OF THE POWER LEAD FACTORY SPLICES

Place the mat on the floor to determine where the power lead factory splices will be located. Carefully move the mat around to have an even clearance around the perimeter of the room. The factory splices must not be installed inside the wall. Mark the location of the splices on the floor. With the appropriate tool, make a groove large enough in the floor to house the cable splices. This is done to ensure the cable splices are at the same level as the rest of the mat and to limit the amount of mortar needed to hide the whole mat. Note: Groove depth can vary from 1/8 in. (3 mm) to 3/16 in. (4.5 mm). (See FIGURE 8.)



FIGURE 8

#### FIXING THE MAT TO THE SUBFLOOR

Prepare the latex-modified thinset mortar mixture according to the manufacturer's instructions. See table on the next page for information on the materials that can be used. Fit the mat correctly in the room, maintaining the clearances from the walls and any other obstructions. Make sure the power lead factory splices are at the exact spot where the groove was done earlier. It is best to fix the mat to the subfloor by workable sections with the thinset mixture.

Fix the mat to the subfloor, starting on the side where the factory splices are located. To do so, unroll the mat from that side of the room towards the center – enough for a workable section. Start spreading the thinset on that section of the floor using a 1/4 X 1/4 in. (6 X 6 mm) square notched trowel, but temporarily keep a free path along the wall opposite the one with the thermostat, to be able to terminate through there and leave the room. Unroll the mat over the glued section and press it into the thinset by first securing the factory splices into the groove. Press the mat firmly into the thinset with a lightweight roller or grout float. Make sure the mat is flat on the floor and leveled without any folds or bumps. (See FIGURES 9 & 10.)

Roll the remaining portion of the mat that is not glued to the subfloor over this secured section, and repeat the above thinset application procedures, while temporarily maintaining a free path along a wall. Continue doing the same with the remainder of the mat(s), unrolling one workable section at a time and pressing it into the thinset.

Uncoil the power leads and, together with the temperature sensor wire, route them towards the junction box, passing through the base of the wall (sole plate) and the electrical conduit.

Fix the temperature sensor to the mat using duct tape. Place and tape the tip of the sensor in the middle of two runs of heating cables. Run the sensor cable between mat heating cable runs and along the edges of the mat (see FIGURE 11). Tape it at a few places to secure it to the mat. Pull the extra sensor cable, if any, back to the junction box.

Once all cables are in place, fix a metal striker plate to the base of the wall (sole plate) to protect the electric cables in the groove.

#### SECOND SERIES OF TESTS

As described in the REQUIRED TESTS AND WARRANTY CARD, TESTS 1, 2 & 3 section, conduct the second series of tests when the mat has been secured to the floor, before covering it with mortar. Measured values must be recorded on your warranty card. If a break or damage is detected, the installation should be stopped and the mat should be repaired before continuing the installation.

#### ROUTING THE MAT POWER LEADS AND TEMPERATURE SENSOR CABLE TO THE ELECTRICAL BOX

Once the mat is fixed to the subfloor and the second series of tests is done and positive, route the mat power leads and the temperature sensor cable to the electrical box through the conduit. Before doing this, make sure the power is cut off at the circuit breaker or fuse. Do not connect them to the thermostat or power supply cable at this time.

See table below for information on the materials that can be used depending on the type of floor covering.

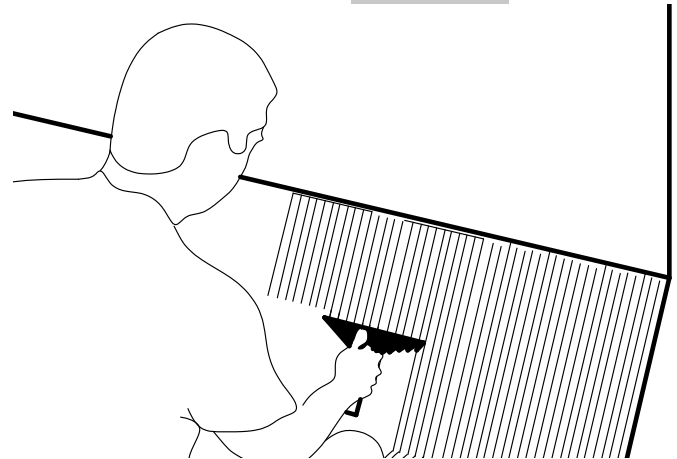


FIGURE 9



FIGURE 10

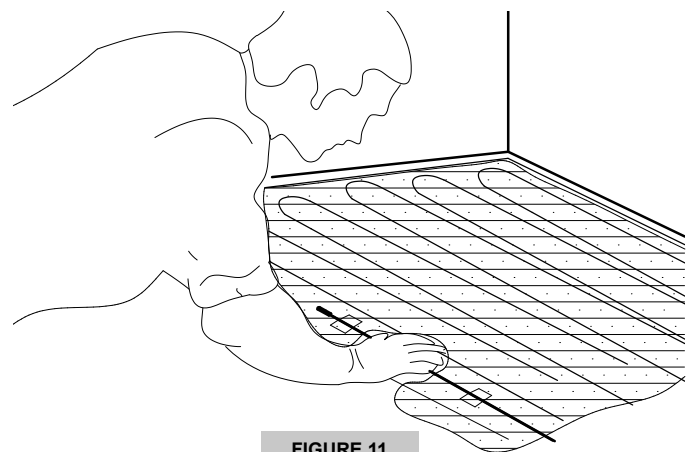


FIGURE 11

## FLOOR COVERING INSTALLATION

### TILE AND STONE

Apply a thin layer of acrylic/latex modified thinset mortar over the mat using a 1/4 X 1/4 in. (6 x 6 mm) square notched trowel according to the manufacturer's instructions (if you are not very experienced in the application of tile and stone, you can first cover the mats with a self-leveling mortar). Start on the side furthest from the door and proceed by workable sections. Install the tiles or stones according to the manufacturer's instructions.

Proceed by cleaning the grout lines using a sponge. Do not use any sharp tools, as these may damage the heating cables within the mat. (See FIGURE 12.)

### LAMINATED OR ENGINEERED WOOD

For these types of flooring material, the mat must first be covered by a smooth layer of acrylic/latex modified thinset mortar or a self-leveling mortar compound, at a minimum thickness of 1/4 in. (6 mm). Stelpro recommends using a self-leveling compound because it is easier to apply. Applying a smooth and levelled layer of thinset without waves is difficult, unless done by an experienced installer skillful with a trowel. With thinset, use a smooth trowel to spread and level the material layer. With self-leveling mortar compound, a smooth trowel or a window wiper on a stick may be needed to help spread and level the material. In all cases, follow the manufacturer's instructions for both the mixture and the curing period before installing the flooring material.

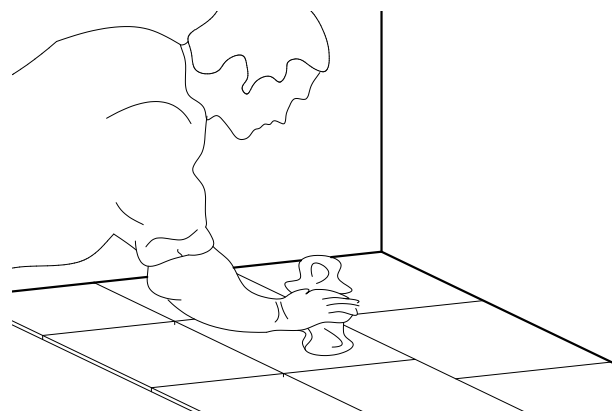


FIGURE 12

Install the laminated or engineered wood according to the manufacturer's instructions, along with the recommended vapor barrier or underlay, as applicable.

### MORTAR SELECTION FOR USE UNDER AND OVER THE HEATING CABLE MAT\*

USAGE: SPECIFIC MORTAR PRODUCTS	FOR USE UNDER THE HEATING CABLE MAT	FOR USE OVER THE HEATING CABLE MAT		GROUT	STANDARDS
		TILE AND STONE	LAMINATED OR ENGINEERED WOOD		
Polymer-modified mortar or thinset***	YES	YES	YES	---	ANSI A118.4 (A)
Self-leveling mortar	NO	NO	YES	---	N/A**
Polymer-modified grout	---	---	---	YES	ANSI A118.6 (A) or A118.7 (A)
Epoxy grout	---	---	---	YES	ANSI A118.3

TTMAC: Terrazzo, Tile & Marble Association of Canada

ANSI: American National Standards Institute

\* For each of these mortar products, you must check with the manufacturer to ensure compatibility of their product with floor heating systems and your subfloor type. Also, the product must be applied in accordance with their recommendations.

\*\* N/A: Standard not available. Check with the manufacturer to ensure product compatibility with the floor heating system.

\*\*\* A polymer-modified mortar can be obtained using one of these two methods: by adding water to a polymer-modified mortar or by adding a liquid additive containing polymers to a non-polymer-modified mortar.

### THIRD SERIES OF TESTS

Once the mortar embedding the mat is dry, perform the third series of tests as described in the REQUIRED TESTS AND WARRANTY CARD, TESTS 1, 2 & 3 section. Measured values must be recorded on your warranty card. During the series of tests, if a break or damage is detected, you must call a qualified repair technician referred by Stelpro to complete the repair. To do so, call Stelpro's Customer Service or consult our web site ([www.stelpro.com](http://www.stelpro.com)). Any installation-related mat damages are not covered by the warranty.

### ELECTRICAL POWER SUPPLY AND THERMOSTAT CONNECTIONS

The initial start-up of the floor heating system must be delayed until the end of the curing period (typically 28 days) of the mortar. Refer to the manufacturer's specifications for the required curing times. If this step is not respected, the mortar adhesive properties will be compromised, reducing floor covering adhesion and strength.

### PREPARATION BEFORE THE CONNECTION

- Ensure the circuit is not energized.
- The CSA identification tag of the heating cable mat must be in the junction box. Do not remove it from the cable.
- The wiring of the mat to the thermostat or relay must be done according to the thermostat/relay manufacturer's instructions.
- Connect the ground wire (copper braided wire) to the junction box.
- The floor heating system must be connected to a ground-fault circuit interrupter "GFCI", either integrated in the thermostat or panel mounted. If the floor heating system is located in a bathroom or shower, the GFCI must be Class A (5 mA rating).

Place the gray warning label (as shown below), supplied with the installation guide, on the electric panel board beside the branch circuit supplying the floor heating system. Place the other gray warning label in the warranty book.



## OPERATING TIPS

Do not place pieces of furniture, carpets or rugs over the thermostat sensor because it would compromise the efficiency of the floor heating system.

The heat generated by the floor heating system may modify the latex, rubber or vinyl backing of some carpets. The backing may stain the floor covering or even stick to it. We therefore do not recommend these types of material as floor covering.

Futons, mattresses, large floor-level furniture, etc. should not be placed directly onto the heated floor. They prevent heat diffusion and may be damaged by accumulated heat.

## LIMITED WARRANTY

This limited warranty is offered by Stelpro Design Inc. ("Stelpro") and applies to the following product made by Stelpro: SFM series. **Please read this limited warranty carefully.** Subject to the terms of this warranty, Stelpro warrants its products and their components against defects in workmanship and/or materials for the following periods from the date of purchase: **25 years (heating cable)**. This warranty applies only to the **original purchaser**; it is non-transferable and cannot be extended.

### CLAIM PROCEDURE

If at any time during the warranty period the unit becomes defective, you must cut off the power supply at the main electrical panel and contact 1) your installer or distributor, 2) your service center or 3) Stelpro's customer service department. In all cases, you must have a **copy of the invoice** and provide the **information written on the product nameplate**. Stelpro reserves the right to examine or to ask one of its representatives to examine the product itself or any part of it before honoring the warranty. Stelpro reserves the right to replace the entire unit, refund its purchase price or repair a defective part. Please note that repairs made within the warranty period must be authorized in advance in writing by Stelpro and carried out by persons authorized by Stelpro.

Before returning a product to Stelpro, you must have a Stelpro authorization number (RMA). To obtain it, call the customer service department at: **1-800-363-3414** (electricians and distributors - French), **1-800-343-1022** (electricians and distributors - English), or **1-866-766-6020** (consumers). The authorization number must be clearly written on the parcel or it will be refused.

### CONDITIONS, EXCLUSIONS AND DISCLAIMER OF LIABILITY

This warranty is exclusive and in lieu of all other representations and warranties (except of title), expressed or implied, and Stelpro expressly disclaims and excludes any implied warranty of merchantability or implied warranty of fitness for a particular purpose. Stelpro's liability with respect to products is limited as provided above. Stelpro shall not be subject to any other obligations or liabilities whatsoever, whether based on contract, tort or other theories of law, with respect to goods or services furnished by it, or any undertakings, acts or omissions relating thereto. Without limiting the generality of the foregoing, Stelpro expressly disclaims any liability for property or personal injury damages, penalties, special or punitive damages, damages for lost profits, loss of use of equipment, cost of capital, cost of substitute products, facilities or services, shutdowns, slowdowns, or for other types of economic loss or for claims of a dealer's customers or any third party for such damages. Stelpro specifically disclaims all consequential, incidental and contingent damages whatsoever.

This warranty does not cover any damages or failures resulting from: 1) a faulty installation or improper storage; 2) an abusive or abnormal use, lack of maintenance, improper maintenance (other than that prescribed by Stelpro) or a use other than that for which the unit was designed; 3) a natural disaster or an event out of Stelpro's control, including, but not limited to, hurricanes, tornadoes, earthquakes, terrorist attacks, wars, overvoltage, flooding, water damages, etc. This warranty does not cover any accidental or intentional losses or damages, nor does it cover damages caused by negligence of the user or owner of the product. Moreover, it does not cover the cost of disconnection, transport, and installation.

The warranty is limited to the repair or the replacement of the unit or the refund of its purchase price, **at the discretion of Stelpro**. Any parts replaced or repaired within the warranty period with the written authorization of Stelpro will be warranted for the remainder of the original warranty period. This warranty will be considered null and void and Stelpro will have the right to refuse any claims if **products have been altered** without the written authorization of Stelpro and if the nameplate numbers have been removed or modified. This warranty does not cover scratches, dents, corrosion or discoloration caused by excessive heat, chemical cleaning products and abrasive agents. It does not cover any damage that occurred during the shipping.

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