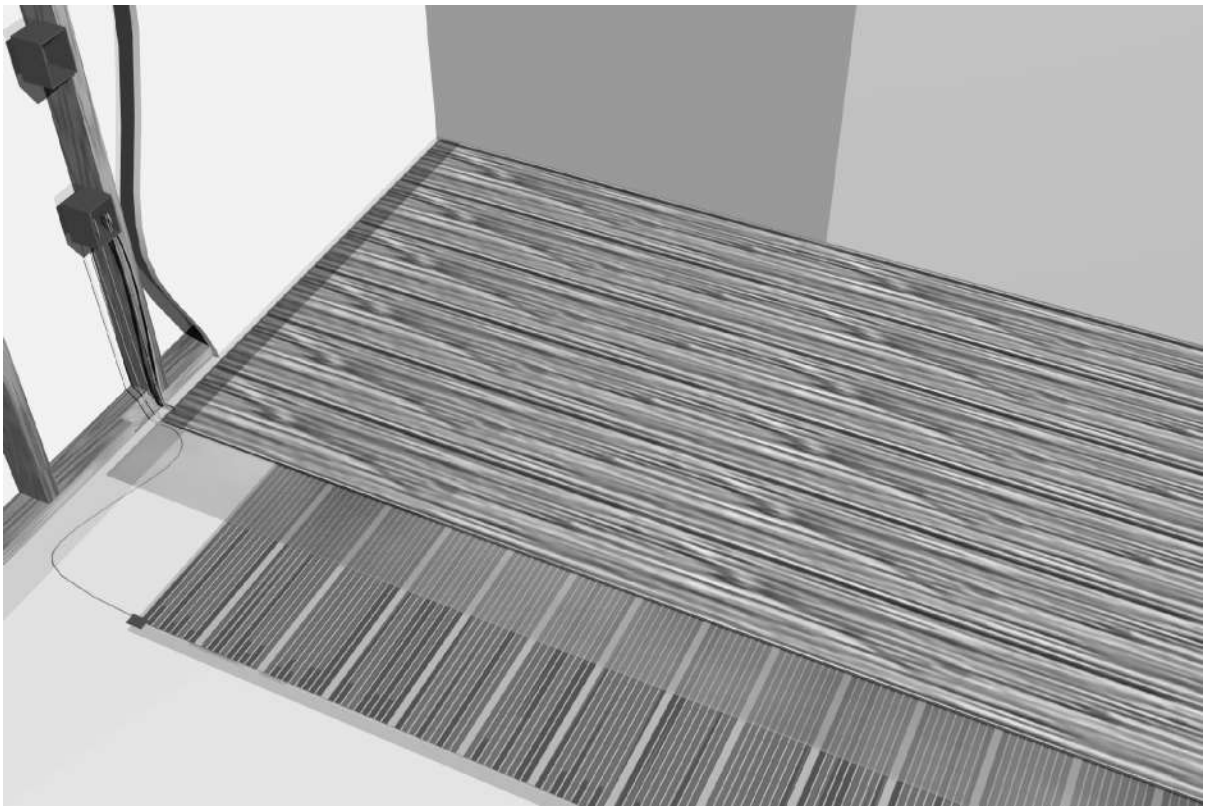
WARMZONE
Premier Radiant Heating

Under Floating Floor Heat



Installation Manual

CM1024 - 01 draft 2012-07-17

INTRODUCTION

The RetroHeat Under Floating Floor Heating System (UFF) is a unique heating system that is installed below laminate flooring materials to create warm, comfortable floors and provide supplementary heat. UFF consists of low heat density film heating panel sets that cover the majority of the open floor area to ensure optimum thermal comfort.

NOTE

Read this entire manual before installing the heating system. The designer and installer must be familiar with all details of the installation and noted concerns.

NOTE

When installed as directed by these installation instructions the completed RetroHeat UFF System will comply with the requirements of European and United States electrical codes.

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



This symbol indicates that a fire hazard may exist if a particular action is not followed.



This symbol indicates that a shock hazard may exist if a particular action is not followed.



General notes direct you to pay special attention to these items.

NOTE

Notes provide short tips for making the installation easier or convey information that falls outside of the direct text of the manual.

IMPORTANT INFORMATION



THE INSTALLATION OF THIS HEATING PRODUCT SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THE REGULATIONS OF THE AUTHORITY HAVING JURISDICTION.



THIS EQUIPMENT SHALL BE INSTALLED ONLY BY QUALIFIED LICENSED ELECTRICIAN.



NOT FOR USE IN WET AREAS SUCH AS BATHROOMS. KITCHENS AND MUDROOMS ARE CONSIDERED DRY LOCATIONS BY THE NATIONAL ELECTRICAL CODE.



HEATING ELEMENTS SHOULD NOT BE INSTALLED AT OR BELOW 32°F (0°C).



ENSURE THAT ALL MATERIALS, INCLUDING LAMINATE FLOORING, VAPOR BARRIER(S), AND UNDERLAYMENT ARE RATED FOR USE IN CONJUNCTION WITH FLOOR HEATING SYSTEMS.



DO NOT FOLD, CUT, OR OTHERWISE ALTER THE HEATING ELEMENTS.



DO NOT INSTALL ELEMENTS UNDER WALLS OR PARTITIONS, OR IN LOCATIONS WHERE THEY WILL BE COVERED BY FLOOR HUGGING FURNITURE OR FIXTURES.



DO NOT PLACE FUTONS, BEANBAG CHAIRS, OR SIMILAR FURNITURE ON HEATED FLOORS.



FOR INDOOR USE ONLY. CONTACT CALORIQUE FOR HEATING SYSTEMS DESIGNED FOR USE OUTDOORS.



ELECTRICAL CIRCUIT SUPPLYING THIS HEATING SYSTEM MUST BE PROTECTED BY GFCI.

INSTALLATION SUMMARY

These are the general steps necessary to install the RetroHeat UFF. Thoroughly read this instruction manual for details of each step involved.

1. Design the system according to Part 1 – System Design.

   Draw out element locations taking into account the Design Clearances, standard sizes of the Heating Panels, and 10' (3m) non-heating lead length.

2. Bring all tools and materials noted in Part 2 – Jobsite Preparation to the jobsite.
3. Install the heating system according to Part 3 – Installation.

   Install the junction box(es) for the control and non-heating lead terminations.

   Install lower vapor barrier (if installing over concrete).

   Install underlayment.

   Install heating elements and route wires to the termination junction box.

   Install the vapor barrier over the heating elements.

4. Inspect the system according to Part 4 – Inspecting / Testing / Completion.

   Visually inspect the heating elements for damage.

   Perform electrical resistance checks on each element.

   Test the system for heating (if power is available).

   Install the laminate flooring and trim.

   Register the heating system's warranty.

5. Enjoy warm, comfortable floors.

PART 1 – SYSTEM DESIGN

The RetroHeat UFF System is made up of 4 major components: the heating panels, the wiring, the control device and the floor structure. These components work together to create a system that will provide comfortable, trouble-free heating. The selection and installation of each component is very important to the system's overall safe operation.

Designing a RetroHeat UFF System is straightforward — the following instructions must be followed to ensure a trouble-free design and to comply with the warranty requirements.



Each room or area must be controlled by its own GFCI protected thermostat / control.

Note

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

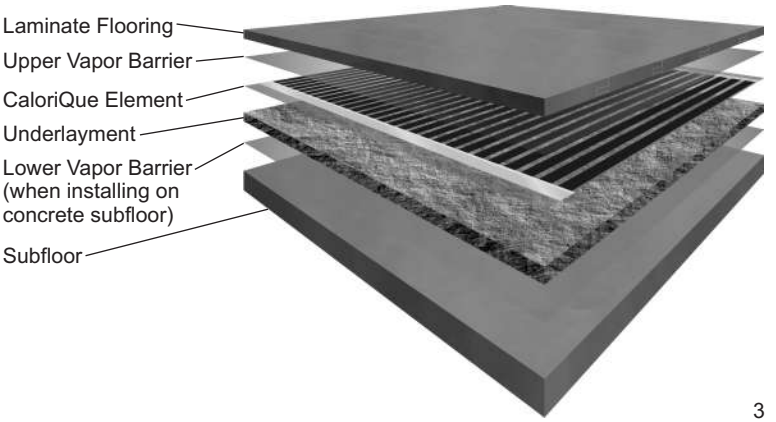
CONTROL DEVICE OPTIONS

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

RetroHeat supplies a floor-thermostat that ensures optimum comfort and energy savings. It also includes a built-in GFCI for added safety.

FLOOR CONSTRUCTION

The UFF System can be installed on any standard subfloor, so long as it is flat, smooth, and free from protrusions such a nails, screws, etc.



DESIGN CLEARANCES

When designing the heating system, care must be taken to ensure that proper clearance is maintained from fixtures which may be part of the floor.

Decorative trim — CaloriQue heating panels must be installed so that they will not be covered, even in part, by decorative trim, baseboards or other structures on the floor. Heating panels which are covered by other structures may overheat.

Wiring — Electrical wiring in the floor, other than that for the heating system, must be at least 2 inches (50 mm) away from the heating panels and/or separated from the heating panels by insulation or the building structure.

Heat Sources — At least 8 inches (200 mm) of clearance must be maintained between heat sources and the CaloriQue heating panels. Heat sources include hot water pipes, stoves, fireplaces, wood stoves, etc.

HEATING PANELS

Note
See Element Specifications on the back cover for available heating element sizes and power ratings.

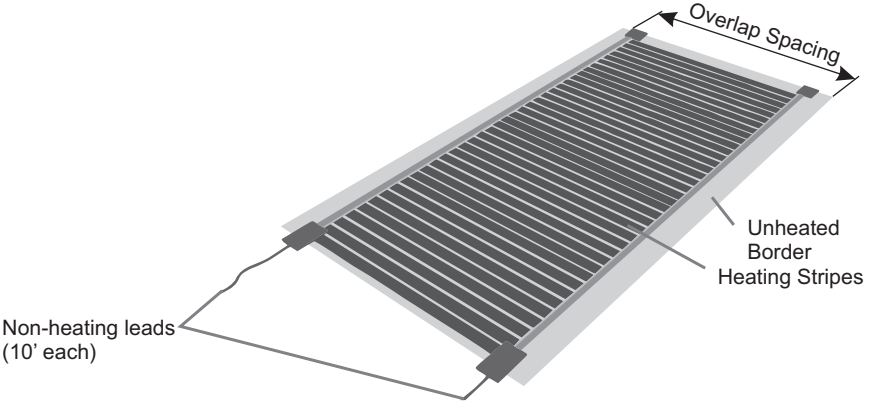
CaloriQue's UFF System is available for use with standard 120 or 240 volt line current.

Watts per Square Foot:12

Widths:24 inches, 36 inches, 48 inches overall

Voltage:120 VAC or 240 VAC

Maximum Total Power:1920 watts at 120 volts / 3840 watts at 240 volts

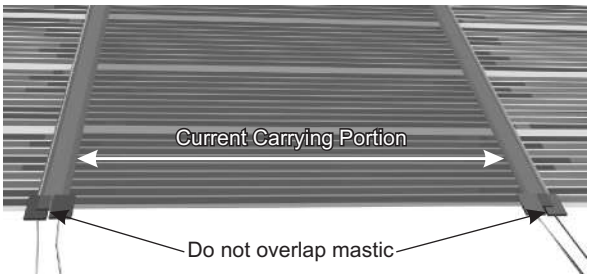


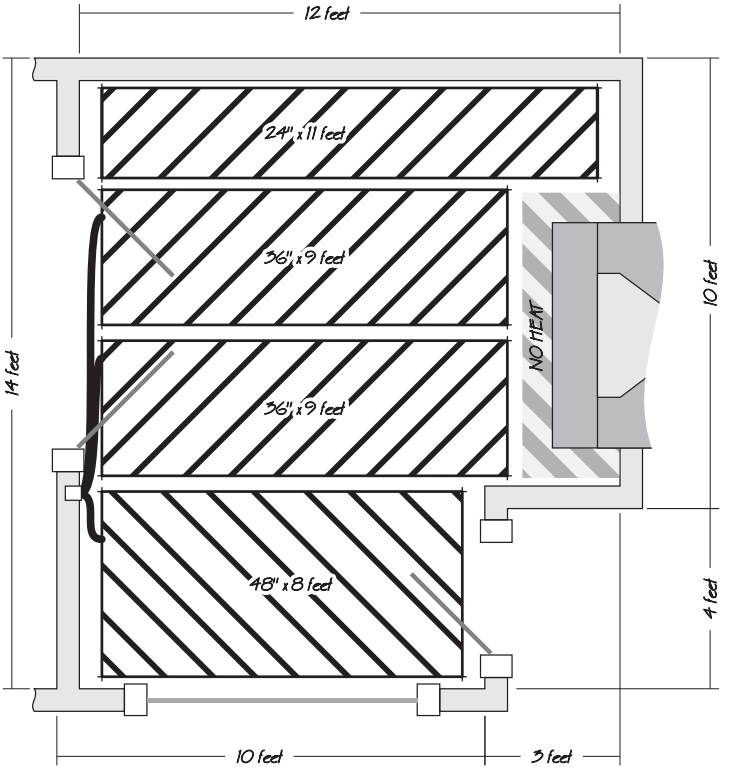
SYSTEM LAYOUT

A sketch of the area to be warmed, including the element locations and associated wiring is suggested to make installation and ordering as smooth as possible. Use the sketch on the following page as an example.

Note that the thermostat is located on an interior wall where it will not be subjected to direct sunlight and that the length of the non-heating leads is taken into account.

Ensure that non-heating leads will not cross over any heating elements.





PART 2 - JOB-SITE PREPARATION

PREPARATION

Before work can proceed, all electrical wiring that will not be accessible after installation of the heating system must be completed. This may require coordinating with the electrical contractor(s).

Before installing the CaloriQue Under Floor Heating System, all of the following must be available at the job-site.

COMPONENTS

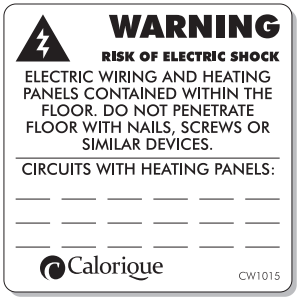
Name	Description
•Heating Panels	The number and type of heating panels needed should be determined ahead of time as outlined in Part 1 – System Design. (See page 4).
•Thermostat	CaloriQue supplies a floor-sensing thermostat with built-in ground fault circuit interrupter (GFCI) that ensures optimum comfort.
Junction Boxes	Two boxes required for each room or area. One box (2x4 inch) required for thermostat; one box (4x4 inch) required for electrical connections.
Romex Wire	#12/2 Romex for connections between the thermostat and floor warming elements.
•Electrical Connectors	If using cut-to-length elements, these connectors are used to power the elements.
•Mastic Tape	3M 2228 mastic tape for insulating the connectors and cut ends of the bus bars if using cut-to-length heating elements.
Duct Tape	Tape must be rated for at least 194°F (90°C).

Note

Your CaloriQue distributor supplies those components marked with the • symbol.

Note

An approved combination floor- and air-sensing thermostat may also be used to control this system. If the thermostat does not have a built-in GFCI then the circuit breaker supplying power to the system must be GFCI equipped.







Laminate flooring materials must be rated for use with electric floor warming systems.

DOCUMENTATION

Name	Part No.	Description
Instruction Manual	CM1024	This document.
•System Labels	CW1011 CW1015	These two labels are an integral part of this heating system and must be installed for the warranty to be in force.
•Check List & Information Card	CL2001	This card must be filled out and sent to CaloriQue.
•Operating Manual	CM1025	The operating manual lists detailed information about the heating system. This manual must remain in the building when the job is done.

FLOORING

Name	Description
Laminate Flooring	Standard laminate flooring. Follow manufacturer's instructions for installation and use with radiant floor warming systems.
Laminate Underlayment	1/16 inch [1.55 mm] underlayment.
Vapor Barrier	7 mil (0.2 mm) polyethylene vapor barrier.

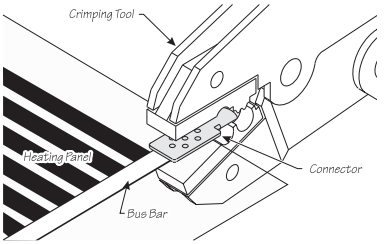
TOOLS

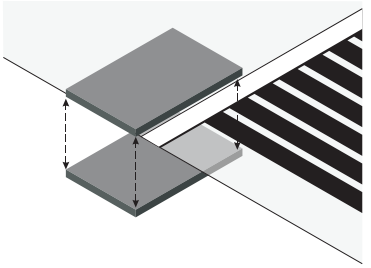
Name	Description
•Crimping Tool	Used to attach connectors to the elements and wires to the connectors. Use only the CaloriQue provided tool. This tool is only necessary if using cut-to-length elements.
Assorted Hand Tools	Conventional electrical wiring and flooring hand tools.
Knife and/or Scissors	Used to cut underlayment and vapor barrier.
Ohm- or Multi-Meter	An accurate ohm or multi-meter will be used during the testing phase to ensure that the system is correctly installed. It is suggested that a digital meter is used rather than an analog (needle) type.

PART 3 - INSTALLATION

PREPARE HEATING ELEMENTS (optional)

If installing cut-to-length elements, you first need to prepare them for use. See illustrations at left.

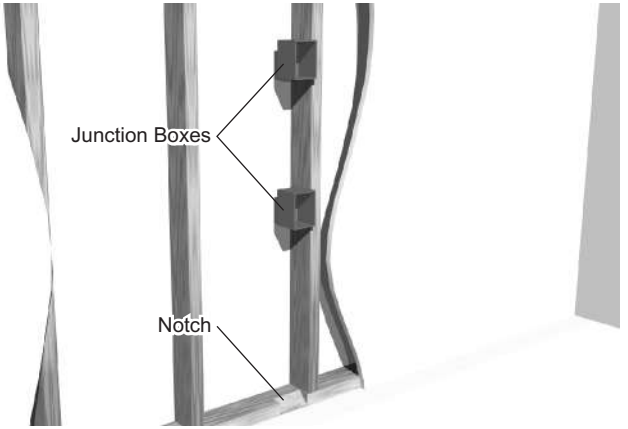




1. CUT ELEMENTS TO LENGTH
   Using the diagram you made earlier, cut the heating elements to length using scissors or a pallet knife. Cut only through the clear area between the heating stripes. NEVER cut closer than 1/4 inch (6.4 mm) to the heating stripes and DO NOT cut into the heating stripes themselves.
2. ATTACH ELECTRICAL CONNECTORS
   Center an electrical connector over one end of the cut silver bus bar. Crimp the connector in place using the flat portion of the CaloriQue crimping tool.
3. Insulate the cut ends of the bus bars opposite the connectors with 3M Mastic tape.

INSTALL JUNCTION BOXES

1. Install a junction box for the control device (thermostat) according to the manufacturer's instructions. This box should be located, unobstructed, on an inside wall so that the device reads accurately.
2. Install a 4x4 inch junction box for making the electrical connections between the elements and the thermostat.
3. Notch or drill the plate directly beneath the junction boxes to allow proper routing of the non-heating leads.



INSTALL HEATING PANELS

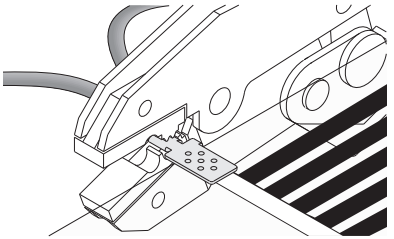
1. If installing over concrete: Using standard practices, unroll and seal the polyethylene vapor barrier over the entire floor surface.
2. Unroll the underlayment foam over the entire floor and seal it according to the manufacturer's instructions.
3. Roll out the elements over the floor surface according to the layout created in Part 1.

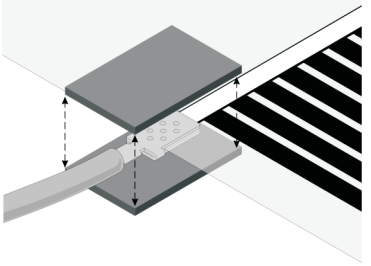


Take care not to damage the heating elements while they are on the floor. Do not drop tools or other objects on the heating panels and avoid unnecessary walking in heated areas before the finished flooring has been applied.

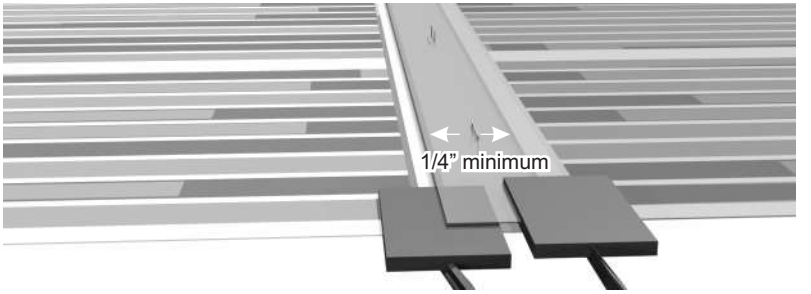
Elements may be overlapped ONLY as shown in the figure at right. Under no circumstances may current carrying portions of the elements overlap. When overlapped properly, the elements will be spaced by their nominal width (24", 36", 48).

Nail or staple only through the clear border on the sides of the element. Do not staple closer than 1/4 inch (6.4 mm) to any current carrying portion of the element, which includes the silver colored bus bars.



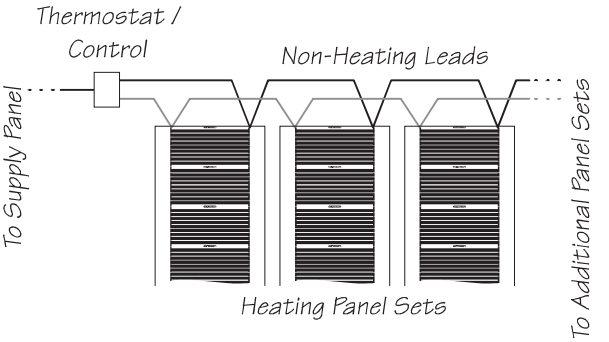


4. Firmly attach the heating elements to the floor. If installing over a wooden subfloor, nail or staple the elements in place. If installing over a concrete subfloor, tape the elements in place using duct tape.



CONNECT THE ELEMENTS - Cut-to-Length

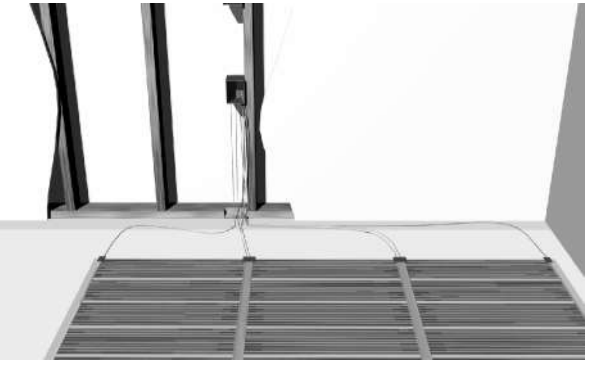
If using cut-to-length elements you must now add wires to the electrical connectors. Wiring the elements in parallel (as shown below) makes the final connections much easier.



1. Strip the non-heating lead wires (s) that will be attached to the connector. Strip about 1/4 inch / 6 mm.
2. Insert the wire(s) into the barrel section of the connector.
3. Crimp the wires in place using the barrel crimping section of the crimping tool as shown in the following figure.
4. Insulate the connector with two pieces of mastic tape as shown.
5. Repeat for all of the heating panel sets.

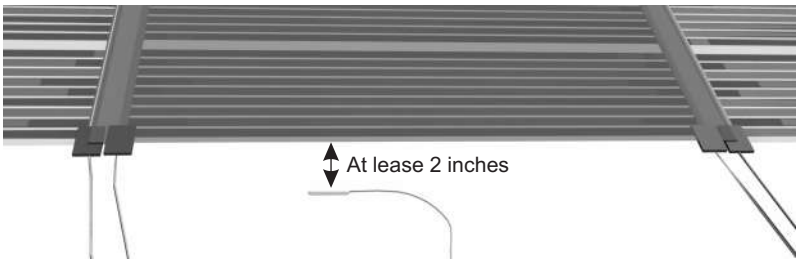
CONNECT THE ELEMENTS - Both

Route the wires to the junction box provided for the thermostat.



INSTALL THERMOSTAT FLOOR SENSOR

1. Tape the floor sensor to the underlayment in an area at least 2 inches (5mm) from any heated (black) part of the heating panels.
2. Route the sensor lead to the thermostat junction box.
3. Unroll and seal a layer of polyethylene vapor barrier over the floor surface, including the elements and wiring.



The vapor barrier will not protect the heating elements from damage. Exercise caution before and during flooring installation to avoid damaging the heating elements.

PART 4 - INSPECTION / TESTING / COMPLETION

A visual and electrical check must be performed on the heating panels prior to activation. The heating test may be required by the laminate manufacturer based on the type of subfloor being used (i.e. concrete). Always check with your laminate manufacturer for any restrictions and/or requirements that they have concerning the use of their product in conjunction with floor warming systems.

VISUAL INSPECTION

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

ELECTRICAL TEST

A resistance check across the supply leads using an accurate ohm meter must be made to detect any short or open circuits. Use the following formulas to determine the acceptable resistance values:

	120 Volts	**240 Volts**
high resistance limit =	$\frac{15{,}840}{\text{installed watts}}$	$\frac{63{,}360}{\text{installed watts}}$
low resistance limit =	$\frac{13{,}680}{\text{installed watts}}$	$\frac{54{,}720}{\text{installed watts}}$

Check the resistance readings with the listing to the right. After any remedies have been performed for open or short circuits, if any, retest the system.

Resistance Readings

Between High & Low Limits:

Good: System is connected properly. No action is necessary.

Higher than High Limit:

Open Circuit: Check all electrical connections and fix as necessary.

Zero (0):

Short Circuit: Check the path that the wiring is taking and make sure that no wires are pierced or otherwise damaged. Elements with damaged non-heating leads must be replaced.

Note
Ensure that the breaker that will supply power to the heating panels has been turned off before making electrical connections.

TEST FOR HEATING

1. Install control device and connect to electrical panel box.

   Install and wire the control device according to manufacturer's instructions in the junction box added at the beginning of Part 3 — Installation.

2. Wire the heating panels to the control according to the manufacturer's instructions using the 12/2 Romex wire.
3. Turn on the breaker and adjust the thermostat so that it is calling for heat.
4. After the system has been on for several minutes, run your hand over the heating panels to ensure that they are warm.

   Note that the panels will not become hot, but will generate a low, comfortable warmth. If the area is cold during installation it is likely that the panels will not seem warm so you will have to rely on the electrical tests.

   If the elements do not become warm, double-check all wiring and re-perform the electrical tests above (after turning off power at the breaker).

COMPLETE THE INSTALLATION

1. Install the flooring according to the manufacturer's instructions.
2. Attach system labels: The small label (CW1011) must be attached to each thermostat controlling a heated floor. The large label (CW1015) must be attached to the breaker box and the circuit number of each circuit breaker controlling a heated floor noted.
3. Re-perform the electrical testing noted above to ensure that the elements have not been damaged during the installation process. If they have been damaged, follow the guidelines noted to remedy the situation.
4. Turn on power at the breaker box, set the thermostat and enjoy warm, comfortable floors.

Note
The flooring manufacturer may require that the heating system be turned on for a period of time (perhaps several days) to help dry out particular types of subfloor. Always follow the manufacturer's instructions about this drying out period and ensure that no damage can occur to the heating panels during this period.

Note
Install baseboards or trim around the perimeter of the room. This will ensure that the floor will not lift, exposing the Calorique elements. The laminate manufacturer's instructions will have information about installing the baseboard or trim to allow the floor to float properly.

DOCUMENTATION

The Check List & System Registration Card records vital information about the installation you have just made — fill out all requested information. The bottom copy is returned to CaloriQue to register the installation, the other two copies are for the homeowner and the installing contractor respectively.

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

Specification Charts

24" Elements			120	240
			Amps@	Amps@
Panels	Length	Power	120 volts	240 volts
1	1'-0.6"	22	0.18	0.09
2	2'-1.2"	44	0.37	0.18
3	3'-1.8"	66	0.55	0.28
4	4'-2.4'	88	0.73	0.37
5	5'-3"	110	0.92	0.46
6	6'-3.6"	132	1.10	0.55
7	7'-4.2"	154	1.28	0.64
8	8'-4.8"	176	1.47	0.73
9	9'-5.4"	198	1.65	0.83
10	10'-6"	220	1.83	0.92
11	11'-6.6"	242	2.02	1.01
12	12'-7.2"	264	2.20	1.10
13	13'-7.8"	286	2.38	1.19
14	14'-8.4"	308	2.57	1.28
15	15'-9"	330	2.75	1.38
16	16'-9.6"	352	2.93	1.47
17	17'-10.2"	374	3.12	1.56
18	18'-10.8"	396	3.30	1.65
19	19'-11.4"	418	3.48	1.74
20	21'-0"	440	3.67	1.83

Specification Charts

36" Elements			120	240
			Amps@	Amps@
Panels	Length	Power	120 volts	240 volts
1	1'-0.6"	33.38	0.28	0.14
2	2'-1.2"	66.76	0.56	0.28
3	3'-1.8"	100.14	0.83	0.42
4	4'-2.4'	133.52	1.11	0.56
5	5'-3"	166.9	1.39	0.70
6	6'-3.6"	200.28	1.67	0.83
7	7'-4.2"	233.66	1.95	0.97
8	8'-4.8"	267.04	2.23	1.11
9	9'-5.4"	300.42	2.50	1.25
10	10'-6"	333.8	2.78	1.39
11	11'-6.6"	367.18	3.06	1.53
12	12'-7.2"	400.56	3.34	1.67
13	13'-7.8"	433.94	3.62	1.81
14	14'-8.4"	467.32	3.89	1.95
15	15'-9"	500.7	4.17	2.09
16	16'-9.6"	534.08	4.45	2.23
17	17'-10.2"	567.46	4.73	2.36
18	18'-10.8"	600.84	5.01	2.50
19	19'-11.4"	634.22	5.29	2.64
20	21'-0"	667.6	5.56	2.78

48" Elements			120	240
			Amps@	Amps@
Panels	Length	Power	120 volts	240 volts
1	1'-0.6"	47	0.39	0.20
2	2'-1.2"	94	0.78	0.39
3	3'-1.8"	141	1.18	0.59
4	4'-2.4'	188	1.57	0.78
5	5'-3"	235	1.96	0.98
6	6'-3.6"	282	2.35	1.18
7	7'-4.2"	329	2.74	1.37
8	8'-4.8"	376	3.13	1.57
9	9'-5.4"	423	3.53	1.76
10	10'-6"	470	3.92	1.96
11	11'-6.6"	517	4.31	2.15
12	12'-7.2"	564	4.70	2.35
13	13'-7.8"	611	5.09	2.55
14	14'-8.4"	658	5.48	2.74
15	15'-9"	705	5.88	2.94
16	16'-9.6"	752	6.27	3.13
17	17'-10.2"	799	6.66	3.33
18	18'-10.8"	846	7.05	3.53
19	19'-11.4"	893	7.44	3.72
20	21'-0"	940	7.83	3.92

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