

Technology

STEP Heating Element™ is a patented, thin and flexible semi-conductive polymer element and can be cut to length on site.

STEP Heating Element™ is self-regulating and cannot overheat. The nature of the material automatically reduces or increases its heat output to adjust to temperature changes.

STEP Marine Deicing™ and STEP Marine Radiant Heating™ can be installed on most surfaces, e.g., under decks, in walls, etc. and is designed for a lifetime continuous duty on 24 V AC or DC.

Maintenance

Electro Plastics' deicing and radiant heating systems have no moving parts and require virtually no maintenance.

Efficiency

STEP Heating Element™ is wide and flat giving an optimal heat transfer to steel or aluminum surfaces. The elements are embedded in a heat retention material forming a unique heat retaining system which reduces heat loss. When bonded to metal sheets, heat is transferred and retained in the ship deck, bulkhead or walls.

With this unique and revolutionary technology from Electro Plastics, STEP Marine Deicing™ and STEP Marine Radiant Heating™ use less energy than any know heating system.

STEP
marine™



Installation

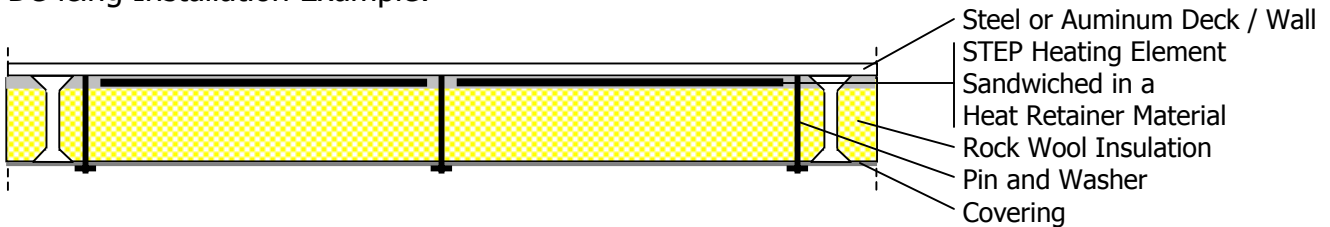
Place the Heating Elements

- Design a layout and calculate the materials needed for the project.
- Be certain that the surface where the elements will be placed is clean and dry.
- Do not place conductive material (e.g. metal pin, etc.) where it would come in direct contact with the black conductive plastic of the element.
- Once layout is determined, cut elements to size with scissors. The maximum strip length per PTC fuse is 10 feet; maximum length per strip of element is 20 feet (this requires jumping two fuses).
- On one end of the element, expose the two embedded bus braids found along the edges by cutting at an angle and removing the excess plastic material (see drawing).
- Connect in parallel each bus braid securely to a stranded tinned copper wire; use two different wire colors to keep track of the wiring polarity.
- Make connections with the recommended crimp tool, tinned copper connectors and approved sealant tape. Using anything else may void the warranty.
- Follow manufacturer's specifications for each type of installation – including deicing on deck, bulkhead or walls, and heating under tile, natural stone, hardwood, laminates or carpet.

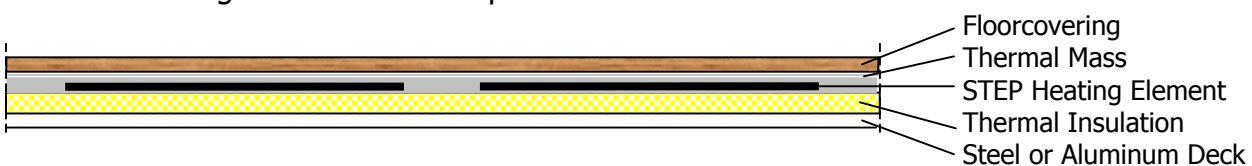
Connect to Terminal Board and Transformer

- Install electrical box to fit the required terminal board(s). Minimize voltage drop by planning wire runs from terminal board to transformer as short as possible.
- The transformer must be installed in a well-ventilated area in accordance with the National Electrical Code and any other applicable codes.
- Connect each strip in parallel to the terminal board and then from the terminal board to the low-voltage side of the transformer. Connect transformer to an on/off switch and to the main line.
- The heating elements must be measured and checked by a certified electrician before being covered. See test procedure.

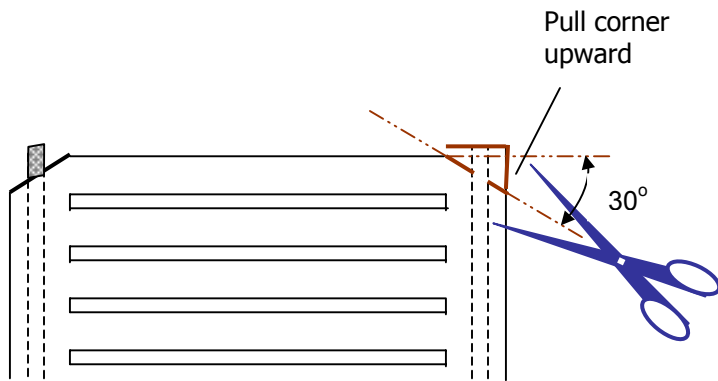
De-icing Installation Example:



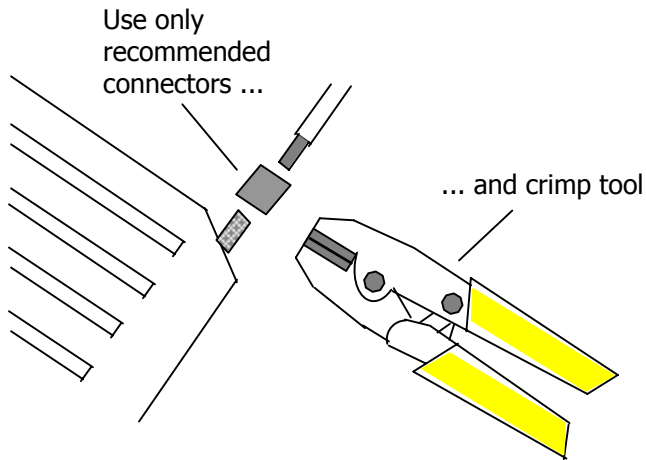
Radiant Heating Installation Example:



Connection



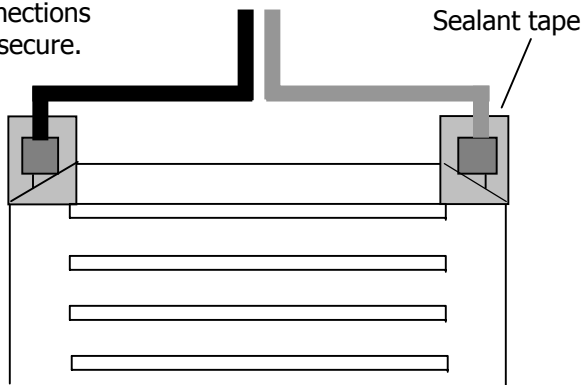
- **To expose the two longitudinal bus braids**, cut the plastic on each side of the braid with scissors or make a score in the plastic, front and back, with a knife. Bend the element where the cut is made and pull off the corners to remove the surplus of plastic. **Make sure that the bus braid is not cut or damaged**; should this occur, re-cut the element and re-strip the bus braids.



- **Connect the bus braid to a supply wire**, 2.5 mm² (#14AWG) or 3 mm² (#12AWG) PVC insulated, stranded tinned copper wire, 105°C, 600V. Crimp the joint using the recommended tinned copper connectors and crimp tool. Using components not recommended by the manufacturer will void the warranty.

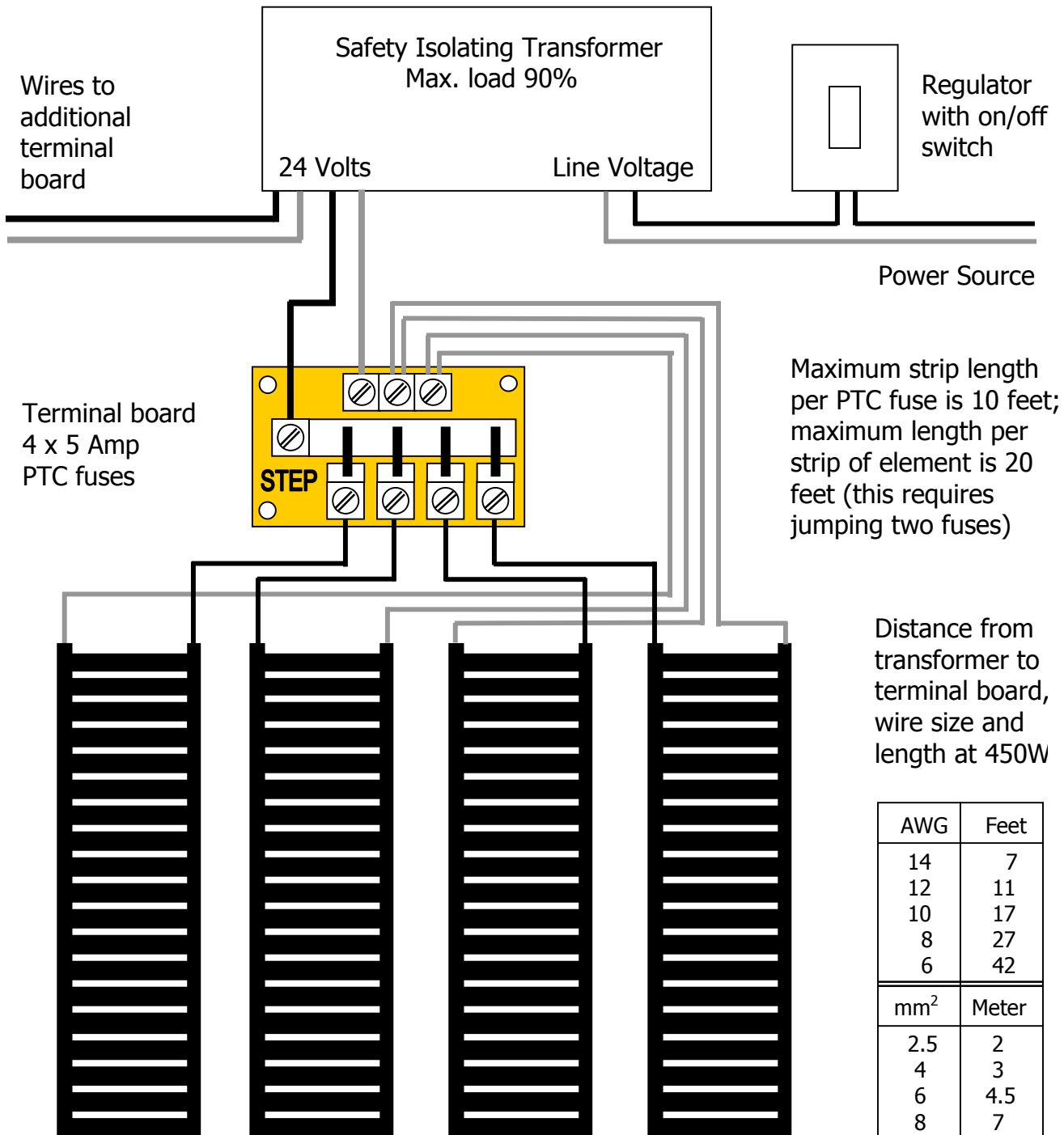
Important:

Check that connections are secure.



- **To differentiate the polarities supplied to the element**, use two different wire colors, i.e., black and white. Insulate the connections using recommended sealant tape. Fold tape and press together overlapping element, connector and wire to form a flat, and smooth splice.

Wiring Diagram



Transformer Size	Max. Current 24 V	Current Primary		No. of T.B.	Area covered	
		120 V	230 V		ft ²	m ²
250 VA	10 A	2 A	1 A	1	20-27	2-2.5
500 VA	20 A	4 A	2 A	1	41-55	4-5
750 VA	30 A	6 A	3 A	2	62-83	6-7.5
1000 VA	40 A	8 A	4 A	2	83-110	8-10
1500 VA	60 A	12 A	6 A	3	104-138	10-12.5



**Parts
and
Tools**

STEP Heating Element
STEP Transformer
STEP Terminal Board(s)

STEP Connector Pack
TCu Wires #12AWG
STEP Crimp Tool

Marine Deicing and Radiant Heating

Application	Deicing		Heating	
Typical Installation	Deck, Bulkhead, Walls		Cabins, Common Areas	
Type of Element	MAR-23-2-36W		MAR-30-2-32W	
Element Width	9"	23 cm	12"	30 cm
Watts @ 50°F (10°C)	12 W/ft	40 W/m		
Watts @ 68°F (20°C)			9.8 W/ft	32 W/m
Installation on 24 Volts				
Element Spacing	4"	10 cm	4"	10 cm
Element Length	0.9 ft/ft ²	3 m/m ²	0.75 ft/ft ²	2.5 m/m ²
Wattage per Area	10.8 W/ft ²	120 W/m ²	7.3 W/ft ²	79 W/m ²
Minimum Wattage	8 W/ft ²	86 W/m ²	5.4 W/ft ²	58 W/m ²
Components per 1000VA Transformer				
Heating Element	75 ft	22.8 m	92 ft	28 m
Terminal Board	2 pcs	2 pcs	2 pcs	2 pcs
Connector Kit	40 pcs	40 pcs	40 pcs	40 pcs
Wire 12AWG-B	200 ft	61 m	200 ft	61 m
Wire 12AWG-W	200 ft	61 m	200 ft	61 m
Area Covered	83-110 ft ²	8-10 m ²	122-160 ft ²	11-15 m ²



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