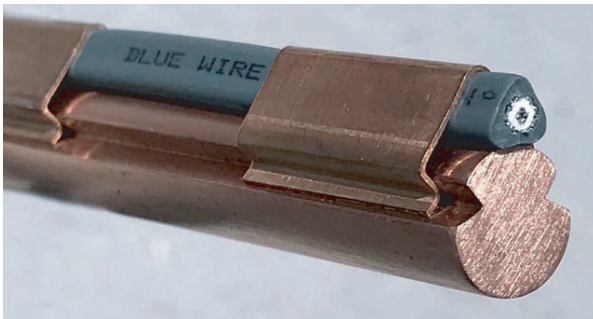


OVERHEAD WIRE DE-ICING

PERMANENT HEATING DE-ICE SOLUTION



Blue Wire is an application developed heating cable solution, powered by the overhead wire system itself. A solution to increase the traffic regularity and reduce cost for expensive ice-remover- vehicle and teams. The system works with all overhead wire systems from 600 to 1,500 V (special system for 15kV and 25kV).



Permanent solution to increase traffic regularity during “icing” weather conditions

Secure early morning exit of trains and trams out of the depot – every morning – on time

Avoid heavy ice-build-up to break down the wire system

Secure pantograph electrical contact after stop on all stations

Reduce cost for “night teams” to remove ice on the OHL

Extend the lifetime of all pantographs

Chemical and workforce free solution

Eliminate costly interruptions of revenue service due to the effect of ice/frost accumulation on the contact wire.

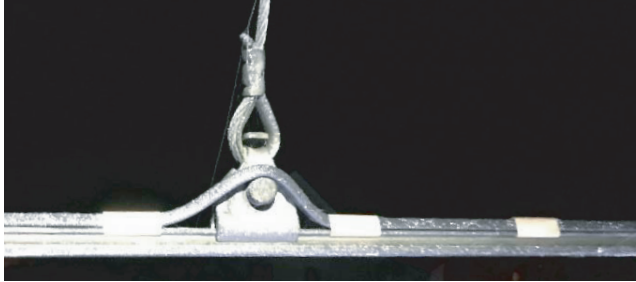
Ice on the contact wire causes tramlines and light rails to lose power and in extreme cases leads to the contact wire / catenary system being brought down.

Arcing caused by the presence of ice leads to excessive wear to the pantograph conductors, all leading to traffic delays and service disruption.

Mechanical removal of ice is manpower and time consuming and mechanically stresses the contact wire.

Heating Cable Construction

The heating system is a multi-layer design. Basically it consists of an electrical insulated constant wattage heater surrounded by a heat transfer material.



The heating cable is secured to the contact wire with phosphor-bronze attachment clips to avoid galvanic corrosion. The heating cable is in a triangular shape. This makes it very easy to mount on top of the contact wire and the shape provides excellent thermal contact to the contact wire. Finally it also makes the fastening clips easy to handle and very efficient to mount.



Heating Cable Height, Weight & Clip Info

The heater is sheathed in a TPE compound versus silicon - silicon can nurture fungus which is picked at by birds damaging the heater

Clips are triangular and fit into the messenger groove of the contact wire

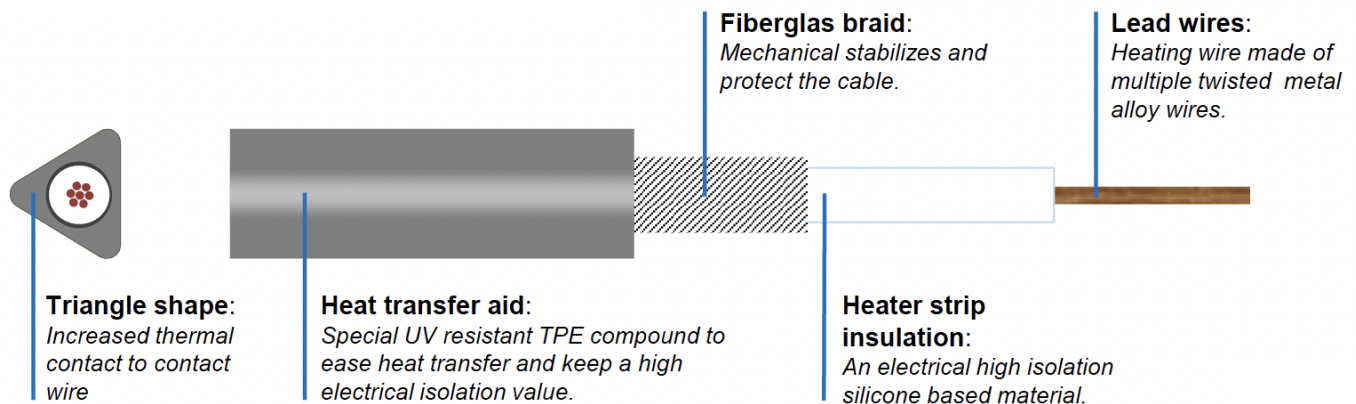
Three clips per ft attach the Heater to the Contact Wire

The clips not only secure the heater to the messenger wire but also act as focused heat transfer to the contact wire

The contact wire is not stressed by weight of the heater & clip combination - it is light weight at 1.07 Ounces per foot including the Heater and 3 Clips

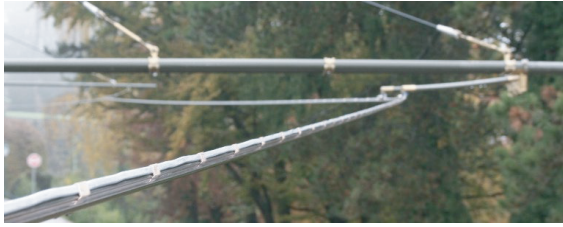
The clips are made of bronze which is 15% more thermally conductive than copper - optimal heat transfer

The clips have a very low height profile at 0.25"



Heating Cable Installation

The heating cable is installed on the contact wire using special clips. The clips are made of phosphor-bronze to avoid galvanic corrosion



The heating cable is in a triangular shape. This makes it very easy to mount on top of the contact wire and the shape provides good thermal contact to the contact wire.

The shape also makes the fastening clips easy to handle and very efficient to mount.

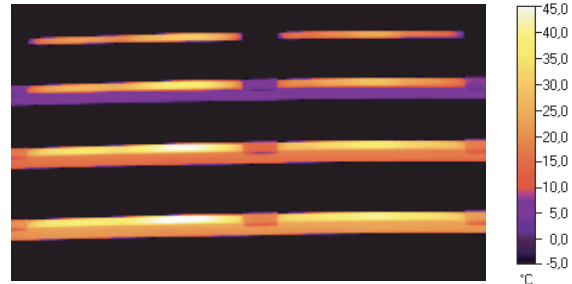


Blue Wire Cable Specifications

Cable type	Circuit length in meter		
	Contact wire voltage (standby)		
	600 V	750 V	900 V
BW-102-017	297	371	446
BW-102-026	240	300	360
BW-102-040	194	242	290
BW-102-062	156	294	233
BW-102-095	126	157	188
BW-102-150	100	125	150
BW-102-240	79	99	119
BW-102-530	53	66	80

Heating Cable Efficiency

Infrared picture of a heating cable on top of the contact wire. The series of pictures shows how fast the wire is heated.



From top: 1, 5, 10 and 15 minutes after turn ON heat

This series of pictures was taken at -5°C, wind speed 2-3 m/sec, 78% RH, Power 28 W/m.

After just 5 minutes the contact wire is above freezing temperature and ready to avoid icing of the wire.

The table shows the nominal length of each type of heating cable to be installed based on the contact wire standby voltage (OHL Voltage without trains).

Dimension: Triangle 7.5 x 7.5 x 7.5 mm
 Weight/m: 95-100 g/m including 8 clips
 Type: Serial constant wattage cable
 Power output: Nominal 24 W/m
 Voltage: Nominal up to 1.000 VDC
 Circuit length: Dynamic design +10% -10% (20 to 30 W/meter)

NIBE ELEMENT
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