



# Data Sheet

# Heating cable

**RS stock number 378-246**

## RS Cut to length heat tracing system

The RS Heater Cable enables any industrial user to have simple and effective heat available to him in an extremely flexible form to suit the most simple or the most unusual application.

Although primarily used for pipe tracing the heater cable has innumerable applications, a number of which are detailed in this Data Sheet.

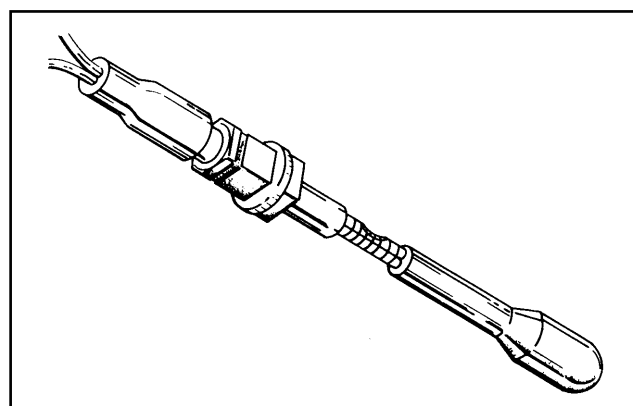
The RS Heater cable enables the user to cut and terminate as simply as any power cable.

In fact, the heater cable is both a power cable and a heating device in one. It is extremely simple to terminate and very flexible with circuit length down to 0.75m, and with suitable series connections in excess of 100m.

The system can be used for both internal and external heating.

## Features

- Cut to any length
- Easy to terminate
- Suitable for internal and external heating applications
- Manufactured to BS 6351.



## Specification

Location \_\_\_\_\_ Non hazardous areas

### Construction

Core \_\_\_\_\_ 2mm<sup>2</sup> copper braid

Electrical Insulation \_\_\_\_\_ silicon rubber

Heater element \_\_\_\_\_ chrome alloy resistance wire

Outer sheath \_\_\_\_\_ PVC extrusion

Dimensions \_\_\_\_\_ 8mm x 5mm

Bus bar interval \_\_\_\_\_ 750mm

### Terminations

Far End Seal \_\_\_\_\_ silicon end cap and sealant

Cold lead end seal \_\_\_\_\_ 2 separate silicon rubber

\_\_\_\_\_ sleeves and silicon sealant

Cold lead \_\_\_\_\_ Up to 700mm silicon insulated

Rating \_\_\_\_\_ 15 watts/m

### Withstand temperature (non-operative)

Maximum \_\_\_\_\_ 100°C

Minimum \_\_\_\_\_ -20°C

Maximum pipe temperature \_\_\_\_\_ 40°C

Supply voltage as standard \_\_\_\_\_ 240V

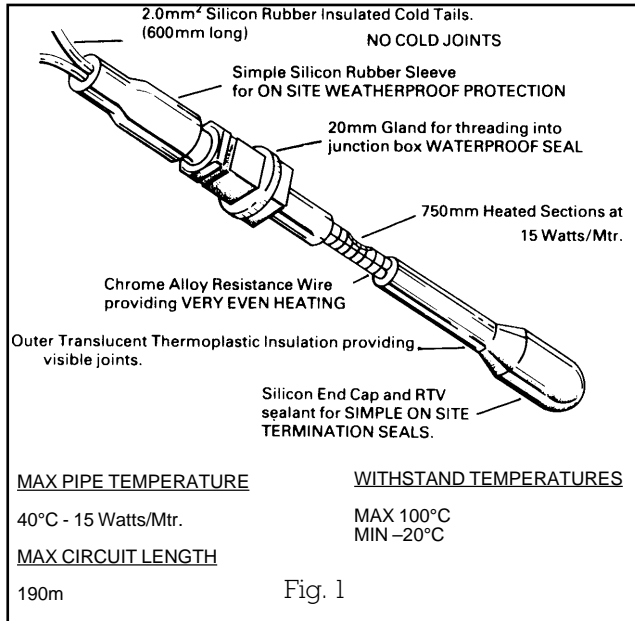


Fig. 1

As each Zone is 750mm, length of heater cable will be 18.75 m with up to 750 mm cold tail.

**Maintain duty**

The graph below should be used to identify the loading required to maintain the temperature of the process material inside the pipeline. Note the thertotape should only be used to maintain pipe temperatures up to 40°C, ie. a 4in bore pipe 7m long is to be traced at 25°C with an ambient of -5°C. The temperature difference is 30°C. From the graph: a loading of 36W/m will be required. Thus total loading required is  $36 \times 7 = 252$  Watts. Length of cable needed =  $\frac{252}{15} = 16.8$  m.

As each Zone is 750mm, length of heater cable will be 17.25m to be spiralled around the pipe, and up to 750mm cold tail.

**Pipe tracing and design**

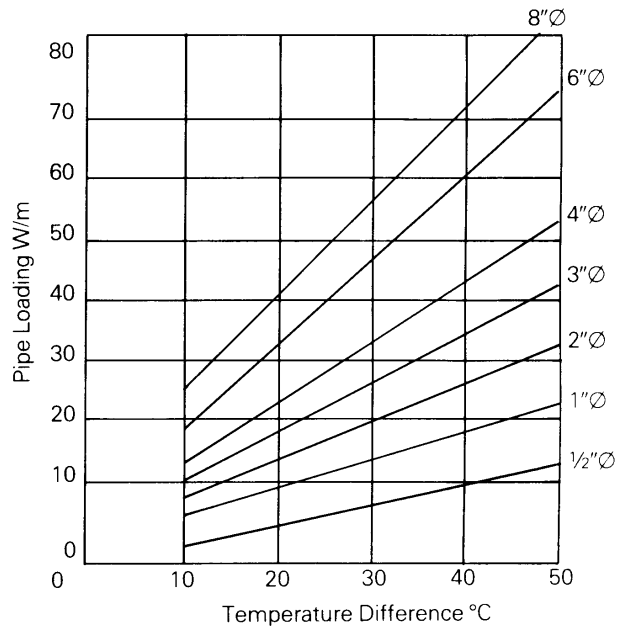
To enable pipes to maintain their required operating temperature, it is not sufficient merely to insulate the pipe through which they flow but the heat loss must be replaced through the pipe surface.

The **RS** heater cable provides a simple economical means of replacing the heat loss either by straight tracing or by spiralling around the pipe and is suitable at temperatures between -20°C and +80°C, which makes it ideal for freeze protection of water pipes. It is also suitable for use at maintaining pipes at up to 40°C.

**Freeze protection**

Table 1 provides details of the loadings required to freeze protect pipelines at differing ambient temperatures. By reading off the spiral ratio chart you can determine the exact quantity of thertotape needed to freeze protect the pipe in question, ie. a 6in bore pipe 13m long has to be frost protected at an ambient temperature of - 10°C. From Table: 21W/m required. Therefore total loading required =  $13 \times 21 = 273$  Watts at 15W/m the length of cable needed =  $\frac{273}{15} = 18.2$  m.

**Low temperature maintaining duty**



The above graph is based upon lin thermal insulation similar to mineral wool with K factor 0.05W/m°C.

		Pipe Dia	mm	15	25	40	50	75	100	150	200
			ins	1/2	1	1 1/2	2	3	4	6	8
Ambient -10°C	Loading W/m			5	7	9	10	12	14	21	26
	Spiral Ratio			1:1	1:1	1:1	1:1	1:1	1:1	1.5:1	1.7:1
Ambient -20°C	Loading W/m			7	10	13	15	19	23	33	42
	Spiral Ratio			1:1	1:1	1:1	1:1	1.3:1	1.6:1	2.2:1	2.8:1

Table 1.

For other insulation thicknesses the loading from the graph should be multiplied by the insulation factors below.

**Insulation factors**

Insulation Thickness	Ins mm	1/2	1	1 1/2	2	3
Factor x heat Loss		2	1	0.6	0.5	0.35

**Plastic pipes**

**Note:** where plastic pipes are to be traced the maximum maintain temperature should be 20°C.

In all cases including freeze protection surface capillary thermostats are to be used (Control Section).

**Installation Section**

**Terminations (RS stock no. 533-639)**

Each termination kit is supplied with comprehensive instructions.

The heater is cut to the exact length required leaving up to 600mm for the cold tail connection at the one end and a 25mm section at the other end to seal off the cable off. The actual joint can be visibly seen and identified through the translucent outer sheath material.

The heater cable has the same loading along its complete length with a bus bar spaced every 750mm; thus we have equal sectional loadings of approximately 11 1/2W every 750mm.

The heater cable is terminated at its far end with the aid of a silicon rubber mould and a small amount of silicon compound applied over the conductors and slid over the heater cable.

At the mains connection the two bus bar connections are split and two separate silicon rubber tubes are slid over the bus bars and cable, providing a perfect seal in conjunction with a suitable nylon compression gland (RS stock no. 542-172).

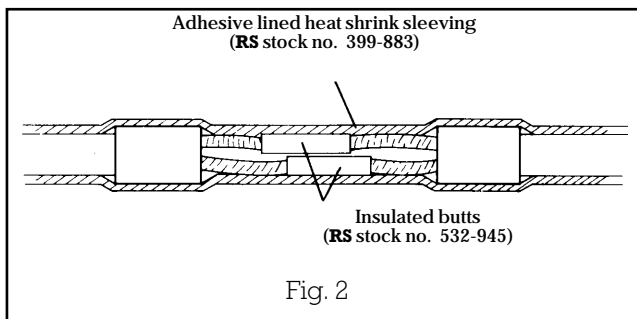


Fig. 2

**In line joints**

Where the 20m length of heating cable is insufficient to complete the heating cable requirements, two lengths can be joined together. The individual bus bars should be crimped with the aid of the insulated butt crimps (RS stock no. 532-945) and then the two sections of cable should be shrunk together with the aid of adhesive lined heat shrink sleeving (RS stock no. 399-883) (figure 2).

**Fixing materials**

For freeze protection a suitable PVC insulating tape (RS stock no. 511-910) should be used to fix the heater cable to the pipe concerned.

For processing temperature applications above 20°C we would recommend the use of aluminium foil fixing tape 2 in (50 mm) wide fitted along the line of the heater cable itself. This will aid heat transfer and reduce operating temperature of the heater cable.

**Straight tracing**

The heater cable is fitted to the pipe along its underside, (figure 3). The fixing tape (RS stock no. 511-910) should hold the cable in question against the pipe at 1/2 m intervals.

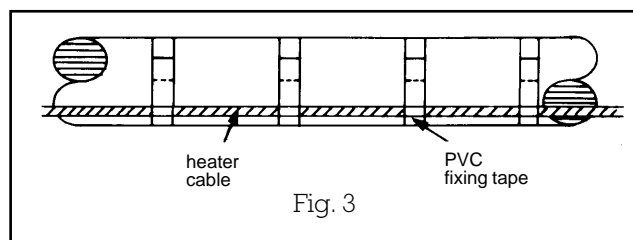


Fig. 3

**Spiralling**

For spiralling the heater cable on to the pipe ensure that even pitch centres are used (this will be where the length of heater cable is in excess of the length of pipe line), (figure 4). For freeze protection the spiral pitch centres are shown in Table 1.

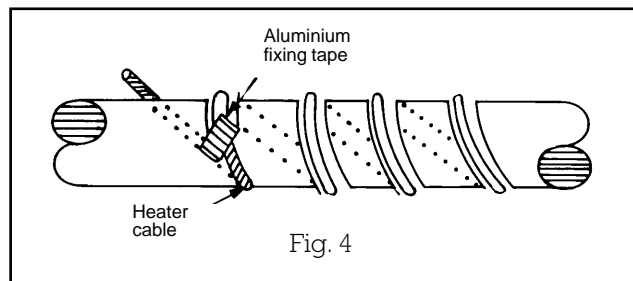


Fig. 4

**Mains connection**

One of the advantages of the RS heater cable system is that one can connect up to the incoming mains by joining into any part of the heater cable at the bus bars. There is therefore a facility to make T-joints with the aid of a suitable junction box and to make connections at any part of the cable.

**Controls**

It is essential that the heater cable is provided with suitable temperature controls. This will ensure:

- a) The heater cable is only switched on when required.
- b) Life of the heater cable is prolonged.
- c) That the heater cable does not overheat.
- d) That energy costs are kept to a minimum.

**Freeze protection**

For freeze protection a straightforward air thermostat is the simplest form of temperature control. Because the heater cable has automatic cold tails, these tails can be wired directly into the thermo-

stat, or alternatively, the air thermostat is positioned separate from the heater and can be inter-wired via a junction box back to the heater.

In all cases the thermostat should be positioned in the coldest location. A suitable thermostat would be **RS** stock no. 333-496 (air thermostat in weather-proof housing) but the temperature must be set to 4°C.

In the case of the tracing of plastic pipes, however, air thermostats should not be used even for freeze protection (refer to capillary thermostats).

### Process temperatures

Where it is necessary to maintain a product at its correct handling temperature, it is essential that a thermostat sensor is directly fitted to the pipe surface, adjacent to the heater cable for straight tracing and beneath the heater cable for spiralling. A capillary thermostat should preferably have a stainless steel capillary and bulb with the switch mechanism in a housing separated from the pipe by a suitable pipe bracket.

This type of thermostat should also be used whenever plastic pipes have to be traced.

### Applications

The number of applications for the heater cable are innumerable. To give an indication of the number of these we are listing below different types of applications within individual industries.

### Application - always beneath 40°C maintenance temperature

Food Processing	Glacial Acetic Acid Caustic Soda Glycerine Vegetable Oils Liquid Glucose
Freeze Protection	Water Lines Sprinkler Systems Hydrant Water Mains Agricultural Lines and Farms Car Wash Plants Industrial Showers Fire Mains
Refrigeration	Cold Room Defrosts Cold Store Doors Defrost Drain Lines
Fuel Oil	High Viscosity Fuel Oils Storage Tanks
General Use	Low Temperature Gas Lines Chemical Lines - 'Glycol' Anti-condensation/prevention
Drink Manufacture	Beer Vats Small Wine Processing
Ancillary Heating	Underfloor Heating Gutter Heating Snow Melting Roof De-icing Seed Propagation Soil Heating Low Temperature Laboratory Projects
Transport	Fuel Lines on Aircraft Diesel Tanker Supply Lines Water Supply Lines on Board Ship.

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