

# Heating Cable

## C a t a l o g u e



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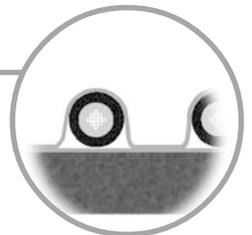
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PVC25	18 - 17.5
PVC30	14.5 - 15.5
PVC35	13 - 14
PVC45	12 - 12.5
PVC55	10.5 - 11
PVC67	9.5 - 10
PVC82	8.5 - 9
PVC100	7 - 7.5

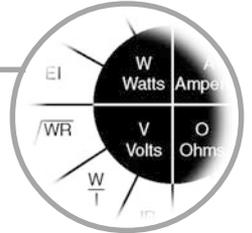
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HEATER OUTPUT		
LENGTH	WATTS	LENGTH
30 - 90	700 - 500	30 - 30
20 - 30	400 - 300	20 - 24
150	180 - 200	14 - 16
1315	15 - 17	255 - 225
1325	11.5 - 14	200 - 165
1335	10 - 11	165 - 150
1345	8.5 - 9.5	150 - 125
1350	8.0 - 9.0	140 - 125
1360	7.0 - 8.0	125 - 115
1370	6.5 - 7.5	120 - 100
1380	6.0 - 7.0	110 - 90
1390	5.5 - 6.5	105 - 90
1400	5.0 - 6.0	90 - 80

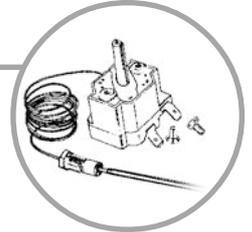
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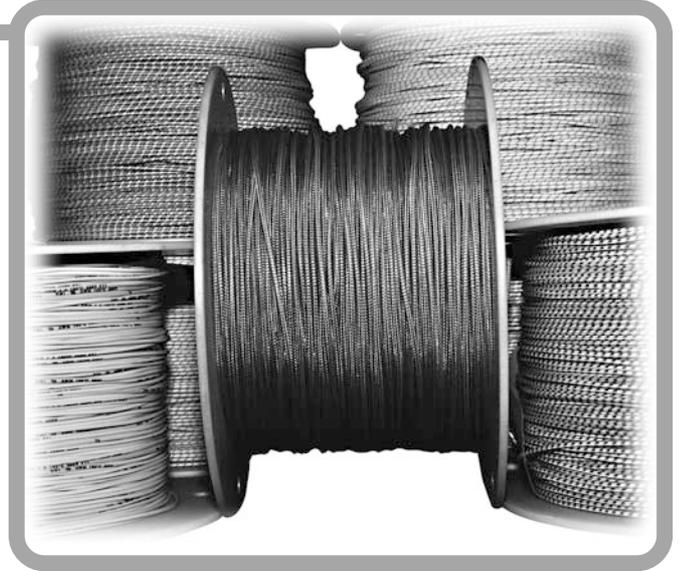
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# General information

## What is insulated heater cable?

Insulated heater cable is an essential component of the refrigeration industry. Its most common use is to remove or prevent condensation and icing of refrigeration and food heating systems.



## How is it used?

Insulated heater cable is used extensively in commercial walk-in cooler and freezer applications. It is usually incorporated around the edges of doors or glass to prevent the formation of condensation or ice. Other common applications include custom food warming cabinets, refrigerated food display units and a variety of other commercial refrigeration systems.

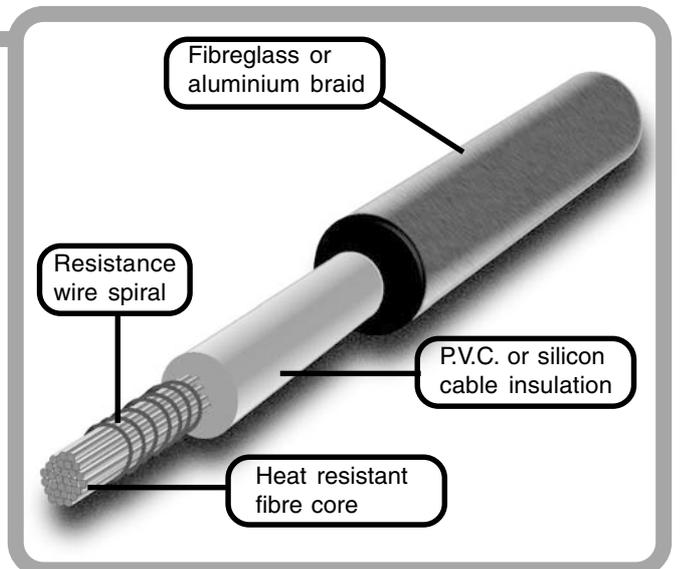


## How is it manufactured?

The cable is manufactured by precisely winding a resistance wire around a core of high strength, heat resistant material. This material has been carefully selected for its low stretch qualities.

The wound element is then insulated and extruded with either vinyl (PVC) or silicone rubber (SRG).

Depending on the application and mechanical protection required, the cable can be either covered with fibreglass or aluminium braid.



# Critical factors

When you are determining the appropriate insulated heater cable for a particular application, a number of critical factors need to be considered:

- Identify the correct resistance (ohms/metre) to provide the desired wattage (heat).
- Select the appropriate insulation material (PVC or silicone rubber) for your application.

## 1. Identifying the correct resistance

All heater cable is manufactured to a set resistance measured in ohms per metre. The resistance value is based on the watts per metre and the voltage available in an application. The amount of wattage (heat) required to effectively prevent condensation or icing will vary according to the application.

All figures provided within this catalogue should be viewed as general recommendations. Different applications will require careful testing to ensure a safe and effective design. Varying ambient conditions, construction and mounting all play important roles in heater selection.

Refer to the **Cable Calculation** section (page 6).

For assistance with selecting the correct heater cable for your application, contact *Stokes Synertec*.

## 2. Selecting the appropriate insulation material

### PVC insulated heater cable

Vinyl (PVC) insulated cable is rated to 105°C and should not exceed the recommended maximum of 9-10 watts/metre.

Generally, 4-8 watts/metre is sufficient to prevent condensation around cabinet doors.

### Silicone rubber insulated cable

Silicone rubber (SRG) insulated cable is rated at 150°C (capable of operating at higher watt densities than PVC) and should not exceed a maximum of 50 watts/metre.

Typical applications include:

- Drain lines at 8.5 watts/metre
- Cool room doors between 25 to 40 watts/metre
- Freezer doors up to 50 watts/metre

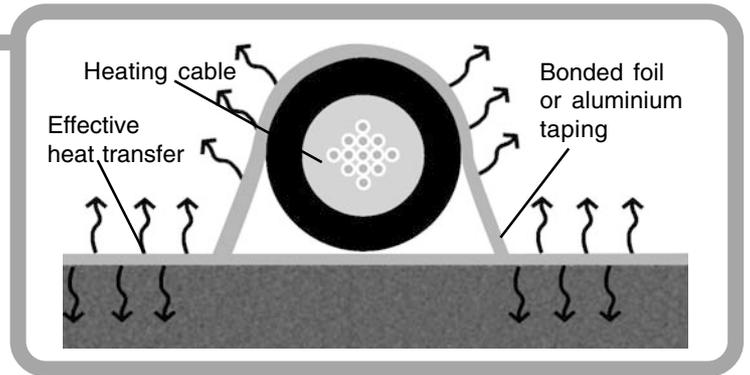
Higher wattages can be achieved, but are dependant on the application and whether the cable insulation temperature can be held below the maximum temperature rating.



# Application suggestions

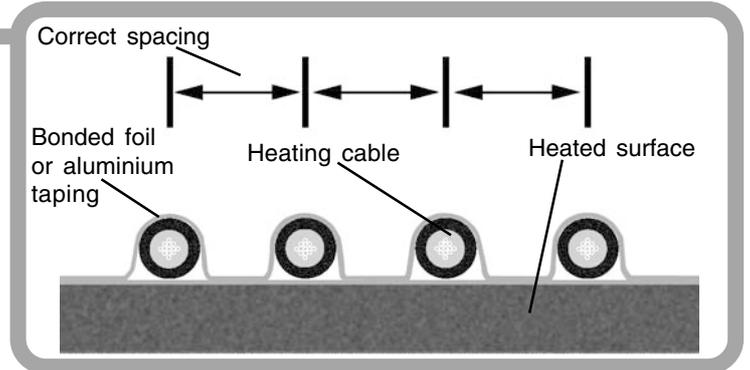
## 1. Effective thermal transfer

Effective thermal transfer between the wire and the surface to be heated is essential for efficient operation.



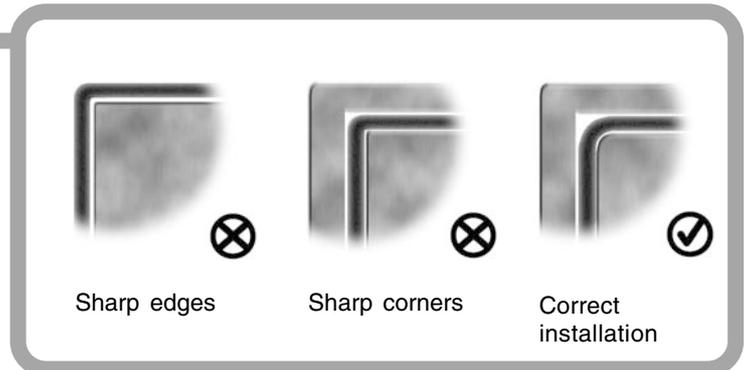
## 2. Securing the cable

Taping the heating wire directly to the surface or bonding it to self-adhesive aluminium foil are two of the most common installation methods. The foil-bonded design ensures correct spacing of the heater wire, effective heat distribution and simplifies installation.



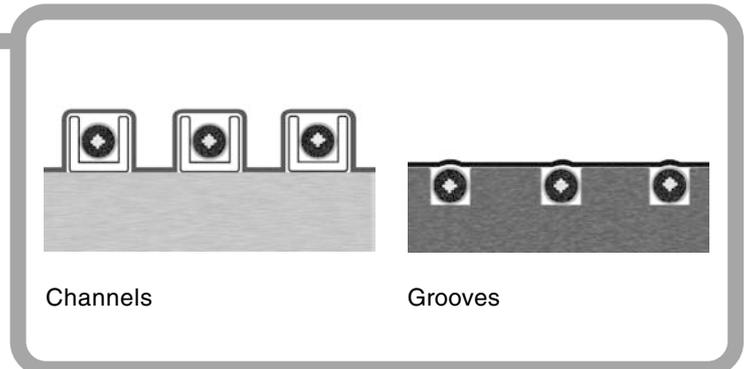
## 3. Avoiding sharp edges & corners

When laying cable in grooves or channels around door perimeters, sharp edges and corners need to be avoided so that the wire is not cut or damaged. Fibreglass or aluminium braid over the wire can be used as protection against surface abrasions and damage.



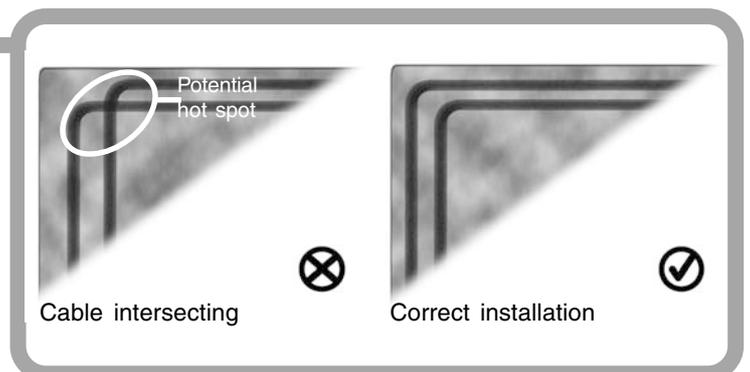
## 4. Channels and grooves

To further reduce the chances of abrasion, metal or plastic channels and grooves in wooden doorframes can be used. Lining with aluminium tape will increase abrasion resistance and reflect heat outwards toward the surface that requires heating.



## 5. Multiple passes of wire

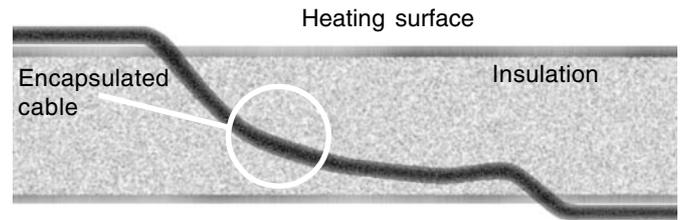
If multiple passes of wire are to be used, it is essential to keep them spaced 6mm apart and not allow them to contact. If the wire intersects itself, hotspots can be created, which can result in burnout.



# Application suggestions

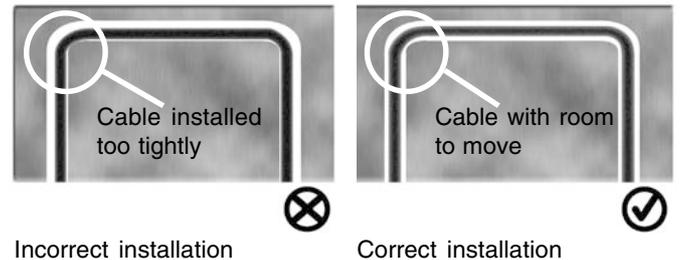
## 6. Keeping the cable clear of obstructions

If the cable exits through the wall of the cooler or freezer unit, care must be taken to ensure it does not become buried or encapsulated in foam or any other type of insulation. This will result in poor heat transfer and could cause overheating and eventual failure.



## 7. Room to move

It is important that the cable is installed with a small amount of slack at the corners of the frame. When the cable is energised, it will move slightly. This “creeping” motion can result in damage if the wire is attached too tightly, or is under tension in a channel.



## 8. Standards

All installation methods must comply with Australian and New Zealand Standard AS/NZS 3000 Section 4.3.8.

## 9. General technical information

### Dimensions:

Depending on the insulation and core diameter (varies with gauges of resistance wire), the cable has a nominal outside diameter of 3 to 3.3mm. Silicone rubber cable is usually supplied with fibreglass insulation to increase resistance to abrasion.

### Resistance:

Ranges from 2 ohms/metre up to 300 ohms/metre are currently available with other ratings available on request.

### Cable length:

Cable is supplied on 100 or 610 metre rolls.

### Manufacturing tolerance to resistance:

± 5% (ie. a cable rated at 10 ohms/metre may vary between 9.5 and 10.5 ohms/metre).

# PVC insulated cable

## Technical information

- PVC insulated cable should not be rated greater than 10 watts per metre.
- Insulation temperature must not be allowed to rise above 105°C.
- PVC heating cable is supplied on 100 or 610 metre rolls.
- There is a tolerance of  $\pm 5\%$  on resistance.
- Cable is usually cut to length (by user) and terminated to suit the given application.

## Table notes

- The information within this table is to be used as a guide in the selection of the appropriate cable for your application. For further assistance with selecting the correct PVC Insulated Cable for your application, contact *Stokes Synertec*.
- Watts per metre recommended maximums are dependent on the application and limitations on the cable reaching its maximum temperature rating.
- If the surface temperature of the cable exceeds the recommended maximum then a longer cable or one with a higher resistance rating is required.

## Calculation examples

- The catalogue suffix indicates the ohms per metre rating. Eg. PVC 55 is rated at 55 ohms/metre.
- PVC 1365 (1365 ohms/metre) at a length of 2.25 metres will produce a resistance of 19 watts at 240 volts.
- PVC 1365 at a length of 2.75 metres will produce a resistance of 15 watts at 240 volts.

CATALOGUE NUMBER	HEATER LENGTH (metres)	WATTS (at 240v)
PVC 20	18 - 19.5	160 - 144
PVC 25	16 - 17.5	144 - 131
PVC 30	14.5 - 15.5	132 - 124
PVC 36	13 - 14	123 - 114
PVC 45	12 - 12.5	107 - 102
PVC 55	10.5 - 11	100 - 95
PVC 67	9.5 - 10	91 - 86
PVC 82	8.5 - 9	83 - 78
PVC 100	8 - 8.5	72 - 68
PVC 123	7 - 7.5	67 - 56
PVC 150	6.5 - 7	59 - 55
PVC 184	6 - 6.5	52 - 48
PVC 225	5.5 - 6	47 - 43
PVC 275	5 - 5.5	42 - 38
PVC 335	4.5 - 5	38 - 34
PVC 410	4 - 4.5	35 - 31
PVC 500	3.5 - 4	33 - 29
PVC 612	3.25 - 3.75	29 - 25
PVC 750	3 - 3.5	26 - 22
PVC 915	2.75 - 3.25	23 - 19
PVC 1120	2.5 - 3	21 - 17
PVC 1365	2.25 - 2.75	19 - 15

Table 1 (PVC insulated cable catalogue)

# Silicone rubber insulated cable

## Technical information

- Silicone rubber insulated cable should not be rated greater than 50 watts/metre.
- Insulation temperature must not be allowed to rise above 150°C.
- Silicone rubber insulated cable is supplied on 100 or 610 metre rolls.
- There is a tolerance of  $\pm 5\%$  on resistance.
- Cable is usually cut to length (by user) and terminated to suit the given application.

CATALOGUE NUMBER	* NORMAL 15 WATTS/METRE APPROXIMATE OUTPUT		* LOW 25 WATTS/METRE APPROXIMATE OUTPUT		* FREEZER 35 WATTS/METRE APPROXIMATE OUTPUT	
	LENGTH	WATTS	LENGTH	WATTS	LENGTH	WATTS
SRG2	38 - 50	760 - 580	30 - 38	960 - 760	27 - 31	1066 - 930
SRG5	24 - 32	480 - 360	20 - 24	575 - 480	17 - 20	675 - 575
SRG10	18 - 22	320 - 260	14 - 16	410 - 360	12 - 14	480 - 410
SRG15	15 - 17	255 - 225	11.5 - 14	335 - 275	10 - 11	380 - 350
SRG25	11.5 - 14	200 - 165	9.0 - 10.5	255 - 220	7.5 - 9.0	307 - 255
SRG35	10 - 11	165 - 150	7.5 - 9.0	220 - 180	6.5 - 7.5	253 - 220
SRG45	8.5 - 9.5	150 - 135	6.5 - 8.0	195 - 160	6.0 - 7.0	213 - 183
SRG50	8.3 - 9.3	140 - 125	6.3 - 7.5	185 - 155	5.5 - 6.5	210 - 177
SRG60	7.8 - 8.3	125 - 115	6.0 - 7.0	160 - 135	5.0 - 6.0	192 - 160
SRG75	6.5 - 7.5	120 - 100	5.0 - 6.0	155 - 130	4.5 - 5.0	170 - 154
SRG100	5.5 - 6.5	105 - 90	4.5 - 5.5	130 - 105	4.0 - 4.5	144 - 128
SRG150	5.0 - 6.0	75 - 65	3.8 - 4.3	100 - 90	3.5	110 - 96
SRG200	4.0 - 5.0	72 - 58	3.3 - 3.8	90 - 75	3.0 - 3.5	96 - 82
SRG300	3.5 - 4.0	55 - 48	2.5 - 3.0	77 - 64	2.3 - 2.5	83 - 77

Table 2 (SRG insulated cable catalogue)

## Table notes

- The table provides average ratings for different temperature requirements of 15 watts/metre, 25 watts/metre and 35 watts/metre.
- **\*Normal** refers to anti-condensation heaters for normal temperature refrigerated doors (drink coolers etc.)
- **\*Low** refers to anti-condensation heaters for low temperature cabinets (frozen food).
- **\*Freezer** refers to heaters that prevent ice build-up around cool room doors etc. It is important to note that higher outputs may be required for this type of application. The maximum operating temperature should not exceed 150°C.

## Calculation example

If you require a cable that is 8.2 metres long to be attached around the edge of a frozen food cabinet to prevent condensation:

- Use cable (catalogue number SRG35) which will produce a resistance of 25 watts/metre when cut to a length of 8.2 metres.
- If the application were a drink cooler door of the same dimensions, you would use SRG60, which would produce a resistance of 15 watts/metre.

# Cable calculations and standard sizes

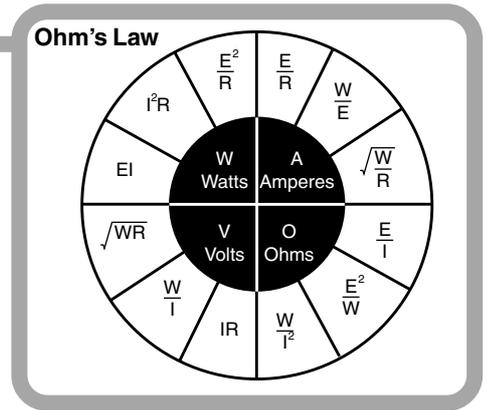
## Cable calculation

To calculate the resistance of the cable required that would run 10 metres with a voltage of 240 volts:

$$R = E^2/W \quad R_m = E^2/Wm \times L^2$$

R = Total Resistance  
E = Voltage  
W = Watts

R<sub>m</sub> = Resistance/Metre  
L = Length in metres  
W<sub>m</sub> = Watts/Metre



## PVC calculation example

For an application using PVC insulation and requiring a cable surface temperature up to 105°C:

- Maximum recommended wattage is 9 -10 watts/ metre.
- 8.5 watts/metre has been used in the calculation to provide a safety factor.
- $R_m = E^2 / Wm \times L^2 = 240^2 / 8.5 \times 10^2 = 68$  ohms/ metre.
- PVC67 is therefore the recommended cable.

## SRG calculation example

For an application using silicone rubber insulation and requiring a cable surface temperature up to 150°C:

- Maximum recommended wattage is 50 watts/metre
- 40 watts/metre has been used in the calculation to provide a safety factor.
- $R_m = 240^2 / 40 \times 10^2 = 14.4$  ohms/metre.
- SRG15 is therefore the recommended cable.

P.V.C. Ohms / Metre	Silicone Rubber (SRG) Ohms / Metre
PVC 20	SRG 15
PVC 25	SRG 25
PVC 30	SRG 35
PVC 45	SRG 45
PVC 55	SRG 60
PVC 67	SRG 75
PVC 82	SRG 80
PVC 100	SRG 100
PVC 123	SRG 150
PVC 150	SRG 200
PVC 184	SRG 250
PVC 225	SRG 300
PVC 275	SRG 400
PVC 335	SRG 500
Above 335 Ohms / Metre available on request	Above 500 Ohms / Metre available on request

Table 3 (standard lengths)

# Auxillary elements, controls & accessories

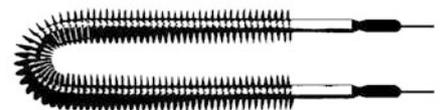
Stokes Synertec also supplies an extensive range of auxillary elements, controls and accessories for commercial refrigeration applications.



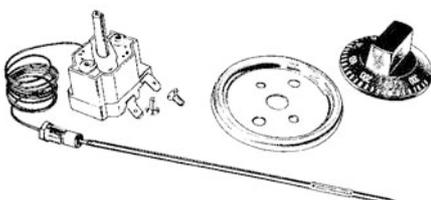
Digital temperature controls



Pan heaters



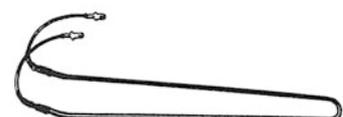
Finned elements



Capillary thermostats



Transformers



Defrost elements

## **GUARANTEE**

Stokes Synertec guarantee electric heating elements manufactured by it to be free from defects in workmanship and materials. Its obligations pursuant to this guarantee are limited to the repair or replacement of any such element which proves defective within the guarantee period, or at Stokes Synertec's option refund of purchase price. The repair, replacement or refund should be effected upon the defective element being returned freight pre-paid to the Registered Office of Stokes Synertec or to the offices of its accredited Electrical Agents.

Stokes Synertec shall not be responsible for the cost of removing any defective element or reinstalling the repaired or replacement element.

(Where Stokes Synertec supplies goods not of Stokes Synertec's manufacture the customer shall only be entitled to any such benefits as Stokes may receive under any guarantee given to it in respect thereof.)

## **GUARANTEE PERIOD**

Twelve (12) months from the date of sale by Stokes Synertec or twenty-four (24) months from the date of manufacture by Stokes, whichever period shall expire first.

## **CONDITIONS**

This guarantee shall not apply-

- (a) If notice of the defect has not been given to Stokes Synertec within the guarantee period.
- (b) To consequential damage arising out of the alleged failure of the elements supplied.
- (c) If the heating element has been-
  - (i) subject to misuse, abuse, negligence or accident;
  - (ii) subjected to conditions giving rise to sheath corrosion;
  - (iii) installed, maintained or operated otherwise than in the manner for which it has been designed.
  - (iv) operated on an electrical supply, the voltage of which varies more than 10% from the rated voltage applicable to the element.
  - (v) used for any duty or subjected to any abnormal operating condition varying from that for which it was supplied by Stokes Synertec.

Orders will only be accepted and all sales shall proceed subject to Stokes Synertec's general condition of sale, copies of which are available on request.

# *Innovation by design*

