

Stokes

Appliance Parts
Domestic Commercial Industrial



Air Heating

C a t a l o g u e

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This catalogue has been compiled specifically for the air conditioning industry and to bring your attention to the service the industrial division at Stokes Appliance Parts (formally known as Stokes Synertec) can offer.

The following pages illustrate our standard range of products available, including a detailed technical section to help in selecting the most efficient element or system for your given application.

The company has developed from its modest beginnings in 1856, to become the industry leader in the production of heating elements. Our success can be attributed to our technical expertise, manufacturing skill, management know-how, and the excellent support we receive from our many customers throughout Australia and around the world.

The industrial division of Stokes Appliance Parts specialises in the design and supply of finned and unfinned tubular heating elements.

Our products are used across a wide range of domestic and industrial applications and our organisation has the technical capability to help you fulfil your heating requirements with high quality equipment, properly selected and applied.

Stokes can supply fully assembled duct heaters from a comprehensive range of standard elements and flanged terminal boxes.

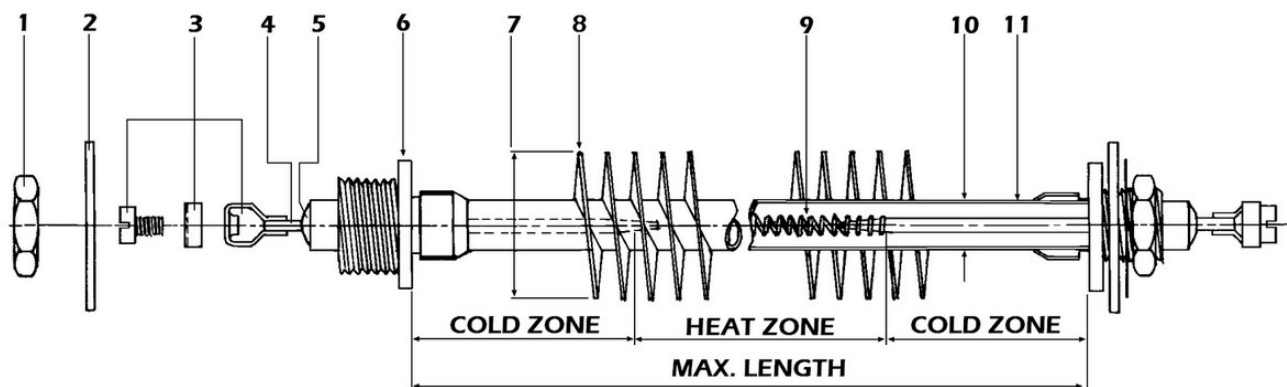


Stokes

Appliance Parts
Domestic Commercial Industrial



FINNED ELEMENT SPECIFICATIONS



1. Brass $\frac{3}{8}$ " BSP Locknut.
2. Stainless steel flat washer.
3. Stainless steel terminal, includes screw and washer.
4. Steel terminal pin.
5. High quality seal to prevent ingress of moisture.
6. Brass press on $\frac{3}{8}$ " BSP bushes
7. Fin diameter - 31.0mm O.D.
8. Continuous wound stainless steel fins assure excellent heat transfer and help prevent fin vibration at high air velocities.
9. Nickel chrome helix wire
10. Heavy duty stainless steel tube sheath (11mm)
11. Stamped Cat. No., wattage and voltage.
12. Cold Zone: Standard length 70mm.

Maximum length: Based on straight length (6500mm).

Maximum operating temperature of standard elements = 100°C in air.

Maximum voltage: 480V

Wattage tolerance: $\pm 10\%$

(All dimensions specified are nominal.)

Please contact Stokes for special wattages, operating temperatures, voltage, forms or lengths.
(Minimum order quantities may apply.)

All product specifications are current at the date of issue of this publication. However, specifications may occasionally change and therefore Stokes advises purchasers to check that this publication correctly describes the products offered.

STAINLESS STEEL FINNED ELEMENTS 11mm SERIES (46.5kW per sq. metre)

Stokes Stainless Steel Finned Elements have been designed for harsh environments.

The element sheath temperature will not exceed 400°C in an ambient temp. of 20°C and a minimum air flow of 1.0m/s
THIS RANGE COMPLIES WITH AS 1668.1 AND AS 3102 (BLACK HEAT)

Typical applications

- Coastal regions
- Computer rooms
- Hospitals
- Clean rooms
- High temperature ovens
- Resistive load banks
- Drying moisture laden air

U FORM

240 volt	CAT No. 220 volt	200 volt	Watts	Dim.A (mm)	Kg.
4061-U	4021-U	4041-U	600	230	.4
4062-U	4022-U	4042-U	750	280	.5
4063-U	4023-U	4043-U	1000	380	.6
4064-U	4024-U	4044-U	1250	430	.75
4065-U	4025-U	4045-U	1500	535	1.0
4066-U	4026-U	4046-U	1750	580	1.0
4067-U	4027-U	4047-U	2000	670	1.25
4068-U	4028-U	4048-U	2250	770	1.4
4069-U	4029-U	4049-U	2500	830	1.5
4070-U	4030-U	4050-U	2750	925	1.75
4071-U	4031-U	4051-U	3000	980	1.8
4072-U	4032-U	4052-U	3500	1165	2.1
4073-U	4033-U	4053-U	4000	1280	2.3
4074-U	4034-U	4054-U	4500	1470	2.6
4075-U	4035-U	4055-U	5000	1580	2.9

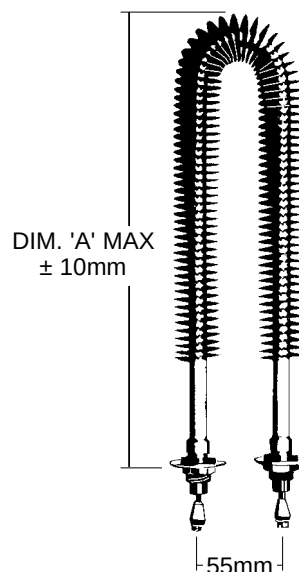
W FORM

240 volt	CAT No. 220 volt	200 volt	WATTS	DIM.A (mm)	Kg.
4062-W	4022-W	4042-W	750	155	.5
4063-W	4023-W	4043-W	1000	205	.6
4064-W	4024-W	4044-W	1250	235	.75
4065-W	4025-W	4045-W	1500	285	1.0
4066-W	4026-W	4046-W	1750	310	1.
4067-W	4027-W	4047-W	2000	365	1.25
4068-W	4028-W	4048-W	2250	400	1.4
4069-W	4029-W	4049-W	2500	435	1.5
4070-W	4030-W	4050-W	2750	480	1.75
4071-W	4031-W	4051-W	3000	510	1.7
4072-W	4032-W	4052-W	3500	600	2.1
4073-W	4033-W	4053-W	4000	660	2.3
4074-W	4034-W	4054-W	4500	755	2.6
4075-W	4035-W	4055-W	5000	810	2.9

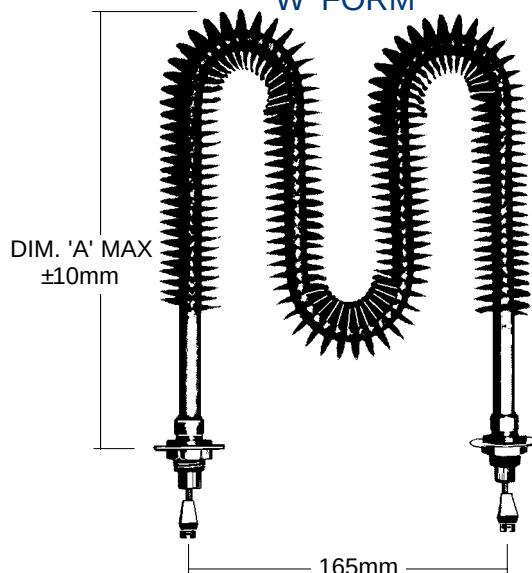
Advantages

- High corrosion resistance
- High temperature operation
(consult factory on operating temp.)
- Universal application

'U' FORM



'W' FORM



STAINLESS STEEL FINNED ELEMENTS 11mm SERIES (46.5kW per sq. metre)

Stokes Stainless Steel Finned Elements have been designed for harsh environments.

The element sheath temperature will not exceed 400°C in an ambient temp. of 20°C and a minimum air flow of 1.0m/s

THIS RANGE COMPLIES WITH AS 1668.1 AND AS 3102 (BLACK HEAT)

Typical applications

- Coastal regions
- Computer rooms
- Hospitals
- Clean rooms
- High temperature ovens
- Resistive load banks
- Drying moisture laden air

MULTI FORM

240 volt	CAT No. 220 volt	200 volt	Watts (mm)	Dim.A (mm)	Kg.
4065-X	4025-X	4045-X	1500	200	1.0
4066-X	4026-X	4046-X	1750	215	1.0
4067-X	4027-X	4047-X	2000	250	1.25
4068-X	4028-X	4048-X	2250	280	1.4
4069-X	4029-X	4049-X	2500	300	1.5
4070-X	4030-X	4050-X	2750	330	1.75
4071-X	4031-X	4051-X	3000	350	1.8
4072-X	4032-X	4052-X	3500	410	2.1
4073-X	4033-X	4053-X	4000	450	2.3
4074-X	4034-X	4054-X	4500	515	2.6
4075-X	4035-X	4055-X	5000	550	2.9

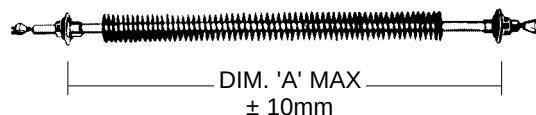
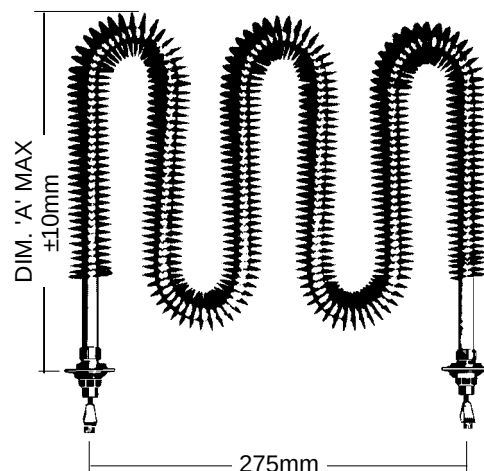
STRAIGHT LENGTH FORM

240 volt	CAT No. 220 volt	200 volt	Watts	Dim.A (mm)	Kg.
4061-10	4021-10	4041-10	600	460	.4
4062-10	4022-10	4042-10	750	560	.5
4063-10	4023-10	4043-10	1000	750	.6
4064-10	4024-10	4044-10	1250	860	.75
4065-10	4025-10	4045-10	1500	1065	1.0
4066-10	4026-10	4046-10	1750	1160	1.0
4067-10	4027-10	4047-10	2000	1340	1.25
4068-10	4028-10	4048-10	2250	1530	1.4
4069-10	4029-10	4049-10	2500	1660	1.5
4070-10	4030-10	4050-10	2750	1845	1.75
4071-10	4031-10	4051-10	3000	1960	1.8
4072-10	4032-10	4052-10	3500	2325	2.1
4073-10	4033-10	4053-10	4000	2560	2.3
4074-10	4034-10	4054-10	4500	2935	2.6
4075-10	4035-10	4055-10	5000	3160	2.9

Advantages

- High corrosion resistance
- High temperature operation
(consult factory on operating temp.)
- Universal application

'MULTI' FORM



NOTE: Straight length elements should be mounted in the vertical plane and rigidly secured at one end to allow the element to expand.

Straight length elements are supplied with an adjustable floating bush.

Please refer to technical specifications on page 6. Note: 200V & 220V for export only.

All product specifications are current at the date of issue of this publication. However, specifications may occasionally change and therefore Stokes advises purchasers to check that this publication correctly describes the products offered.

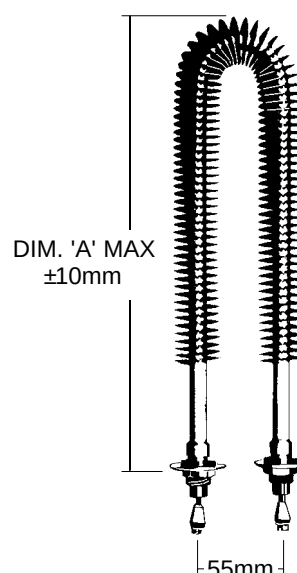
SUPERCEDED FINNED ELEMENTS **11mm SERIES (46.5kW per sq. metre)**

*The mild steel range has been superceded by the Stainless Steel 11mm series.
The tables below are included for cross reference purposes only.*

'U' FORM

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
2310-U	2951-U	2831-U	600	230	.4
2311-U	2952-U	2832-U	750	280	.5
2312-U	2953-U	2833-U	1000	378	.6
2313-U	2954-U	2834-U	1250	430	.75
2314-U	2955-U	2835-U	1500	534	1.0
2315-U	2956-U	2836-U	1750	580	1.0
2316-U	2957-U	2837-U	2000	670	1.25
2317-U	2958-U	2838-U	2250	767	1.4
2318-U	2959-U	2839-U	2500	830	1.5
2319-U	2960-U	2840-U	2750	923	1.75
2320-U	2961-U	2841-U	3000	980	1.8
2359-U	2962-U	2842-U	3500	1164	2.1
2302-U	2963-U	2843-U	4000	1280	2.3
2303-U	2964-U	2844-U	4500	1468	2.6
2304-U	2965-U	2845-U	5000	1580	2.9

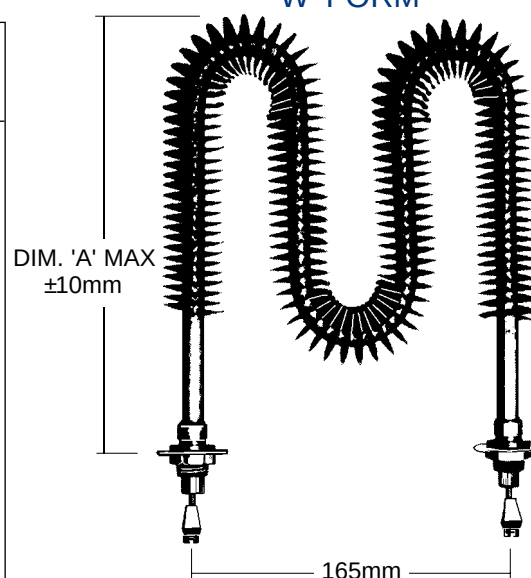
'U' FORM



'W' FORM

240 Volt	CAT. No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
2311-W	2952-W	2832-W	750	155	.5
2312-W	2953-W	2833-W	1000	207	.6
2313-W	2954-W	2834-W	1250	234	.75
2314-W	2955-W	2835-W	1500	285	1.0
2315-W	2956-W	2836-W	1750	309	1.0
2316-W	2957-W	2837-W	2000	354	1.25
2317-W	2958-W	2838-W	2250	402	1.4
2318-W	2959-W	2839-W	2500	434	1.5
2319-W	2960-W	2840-W	2750	480	1.75
2320-W	2961-W	2841-W	3000	509	1.7
2359-W	2962-W	2842-W	3500	600	2.1
2302-W	2963-W	2843-W	4000	659	2.3
2303-W	2964-W	2844-W	4500	753	2.6
2304-W	2965-W	2845-W	5000	809	2.9

'W' FORM

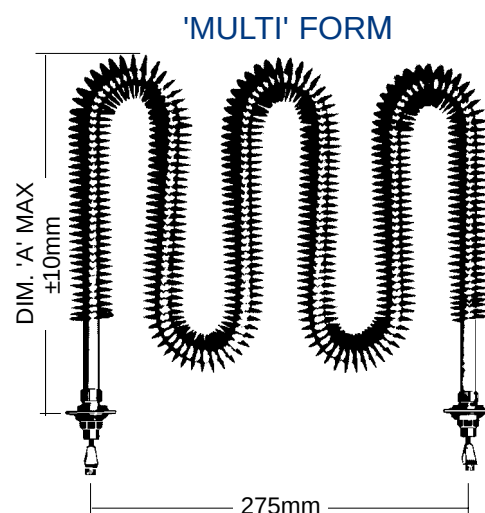


SUPERCEDED FINNED ELEMENTS **11mm SERIES (46.5kW per sq. metre)**

*The mild steel range has been superceded by the Stainless Steel 11mm series.
The tables below are included for cross reference purposes only.*

MULTI FORM

240 Volt	CAT. No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
2314-X	2955-X	2835-X	1500	200	1.0
2315-X	2956-X	2836-X	1750	215	1.0
2316-X	2957-X	2837-X	2000	248	1.25
2317-X	2958-X	2838-X	2250	280	1.4
2318-X	2959-X	2839-X	2500	302	1.5
2319-X	2960-X	2840-X	2750	332	1.75
2320-X	2961-X	2841-X	3000	352	1.8
2359-X	2962-X	2842-X	3500	412	2.1
2302-X	2963-X	2843-X	4000	452	2.3
2303-X	2964-X	2844-X	4500	514	2.6
2304-X	2965-X	2845-X	5000	552	2.9



STRAIGHT LENGTH FORM

240 Volt	CAT. No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
2310-10	2951-10	2831-10	600	460	.4
2311-10	2952-10	2832-10	750	560	.5
2312-10	2953-10	2833-10	1000	753	.6
2313-10	2954-10	2834-10	1250	860	.75
2314-10	2955-10	2835-10	1500	1065	1.0
2315-10	2956-10	2836-10	1750	1160	1.0
2316-10	2957-10	2837-10	2000	1340	1.25
2317-10	2958-10	2838-10	2250	1532	1.4
2318-10	2959-10	2839-10	2500	1660	1.5
2319-10	2960-10	2840-10	2750	1843	1.75
2320-10	2961-10	2841-10	3000	1960	1.8
2359-10	2962-10	2842-10	3500	2326	2.1
2302-10	2963-10	2843-10	4000	2560	2.3
2303-10	2964-10	2844-10	4500	2934	2.6
2304-10	2965-10	2845-10	5000	3160	2.9



STAINLESS STEEL FINNED ELEMENTS 11mm SERIES (60.0kW per sq. metre)

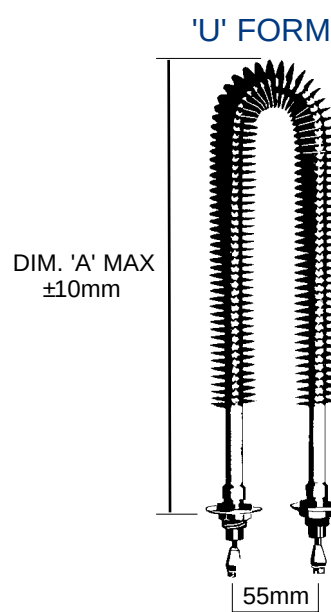
Stokes Stainless Steel Finned Elements have been designed for harsh environments.

The element sheath temperature will not exceed 400°C in an ambient temp. of 20°C and a minimum air flow of 1.5m/s
THIS RANGE COMPLIES WITH AS 1668.1 AND AS 3102 (BLACK HEAT)

Note: Mild Steel versions are superceded and left for cross reference only.

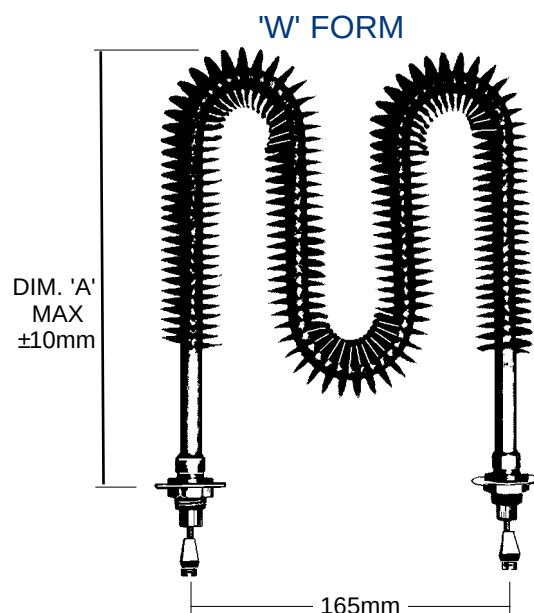
'U' FORM 240 volts

CAT. No.		Watts	Dim.A (mm)	Kg
Mild Steel NLA	Stainless Steel			
4171-U	4471-U	750	228	.4
4172-U	4472-U	1000	283	.5
4173-U	4473-U	1250	348	.6
4174-U	4474-U	1500	408	.7
4175-U	4475-U	1750	460	.8
4176-U	4476-U	2000	528	1.0
4177-U	4477-U	2500	639	1.2
4178-U	4478-U	3000	748	1.4
4179-U	4479-U	3500	860	1.5
4180-U	4480-U	4000	975	1.8
4181-U	4481-U	4500	1110	2.1
4182-U	4482-U	5000	1237	2.3
4183-U	4483-U	6000	1455	2.6



W FORM 240 volts

CAT. No.		Watts	Dim.A (mm)	Kg
Mild Steel NLA	Stainless Steel			
4172-W	4472-W	1000	154	.5
4173-W	4473-W	1250	184	.6
4174-W	4474-W	1500	218	.7
4175-W	4475-W	1750	240	.8
4176-W	4476-W	2000	278	1.0
4177-W	4477-W	2500	334	1.2
4178-W	4478-W	3000	384	1.4
4179-W	4479-W	3500	439	1.5
4180-W	4480-W	4000	500	1.8
4181-W	4481-W	4500	569	2.1
4182-W	4482-W	5000	632	2.3
4183-W	4483-W	6000	738	2.5



STAINLESS STEEL FINNED ELEMENTS 11mm SERIES (60.0kW per sq. metre)

Stokes Stainless Steel Finned Elements have been designed for harsh environments.

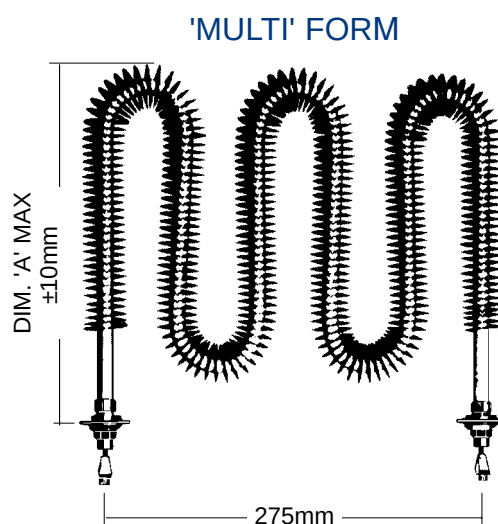
The element sheath temperature will not exceed 400°C in an ambient temp. of 20°C and a minimum air flow of 1.5m/s

THIS RANGE COMPLIES WITH AS 1668.1 AND AS 3102 (BLACK HEAT)

Note: Mild Steel versions are superceded and left for cross reference only.

MULTI FORM 240 volts

CAT. No.		Watts	Dim.A (mm)	Kg
Mild Steel NLA	Stainless Steel			
4176-X	4476-X	2000	198	1.0
4177-X	4477-X	2500	237	1.2
4178-X	4478-X	3000	273	1.4
4179-X	4479-X	3500	311	1.5
4180-X	4480-X	4000	349	1.8
4181-X	4481-X	4500	394	2.1
4182-X	4482-X	5000	436	2.3
4183-X	4483-X	6000	509	2.6



STRAIGHT LENGTH 240 volts

CAT. No.		Watts	Dim.A (mm)	Kg
Mild Steel NLA	Stainless Steel			
4171-10	4471-10	750	455	.4
4172-10	4472-10	1000	564	.5
4173-10	4473-10	1250	695	.6
4174-10	4474-10	1500	815	.7
4175-10	4475-10	1750	920	.8
4176-10	4476-10	2000	1055	1.0
4177-10	4477-10	2500	1277	1.2
4178-10	4478-10	3000	1495	1.4
4179-10	4479-10	3500	1718	1.5
4180-10	4480-10	4000	1948	1.8
4181-10	4481-10	4500	2220	2.1
4182-10	4482-10	5000	2473	2.3
4183-10	4483-10	6000	2908	2.6



Straight length elements should be mounted in the vertical plane and rigidly secured at one end to allow the element to expand.

Straight length elements are supplied with a floating bush.

Please refer to technical specifications on page 6.

All product specifications are current at the date of issue of this publication. However, specifications may occasionally change and therefore Stokes advises purchasers to check that this publication correctly describes the products offered.

STAINLESS STEEL FINNED ELEMENTS 11mm SERIES (93.0kW per sq. metre)

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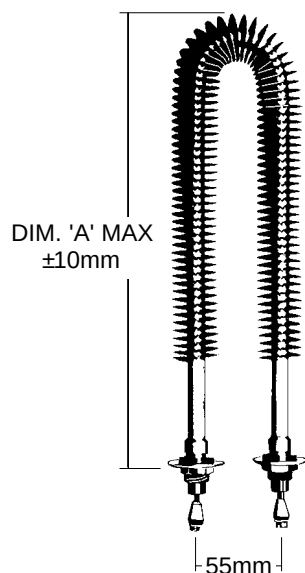
The element sheath temperature will not exceed 400°C in an ambient temp. of 20°C and a minimum air flow of 2.8m/s

THIS RANGE COMPLIES WITH AS 1668.1 AND AS 3102 (BLACK HEAT)

'U' FORM

CAT. No.		Watts	Dim.A (mm)	Kg.
240 Volt	200 Volt			
2321-U	2881-U	1000	230	.5
2322-U	2882-U	1200	230	.5
2323-U	2883-U	1500	280	.6
2324-U	2884-U	2000	380	.8
2325-U	2885-U	2500	430	.9
2326-U	2886-U	3000	536	1.0
2327-U	2887-U	3500	580	1.1
2328-U	2888-U	4000	670	1.25
2329-U	2889-U	5000	844	1.6
2305-U	2890-U	6000	980	1.9

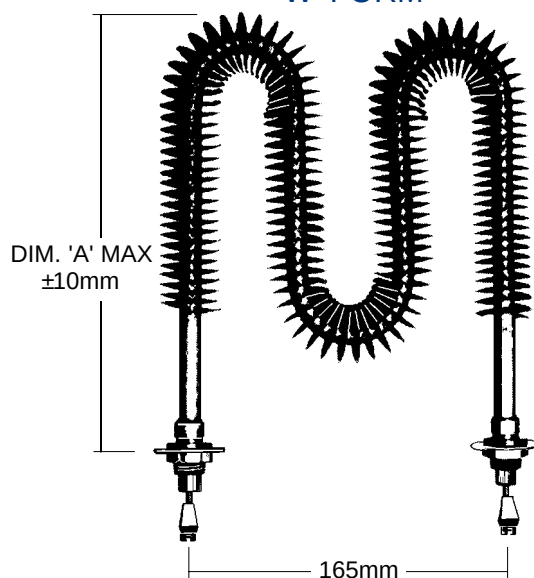
'U' FORM



W FORM

CAT. No.		Watts	Dim.A mm	Kg.
240 Volt	200 Volt			
2323-W	2883-W	1500	155	.6
2324-W	2884-W	2000	209	.8
2325-W	2885-W	2500	234	.9
2326-W	2886-W	3000	287	1.0
2327-W	2887-W	3500	309	1.1
2328-W	2888-W	4000	354	1.25
2329-W	2889-W	5000	440	1.6
2305-W	2890-W	6000	509	1.9

'W' FORM



STAINLESS STEEL FINNED ELEMENTS 11mm SERIES (93.0kW per sq. metre)

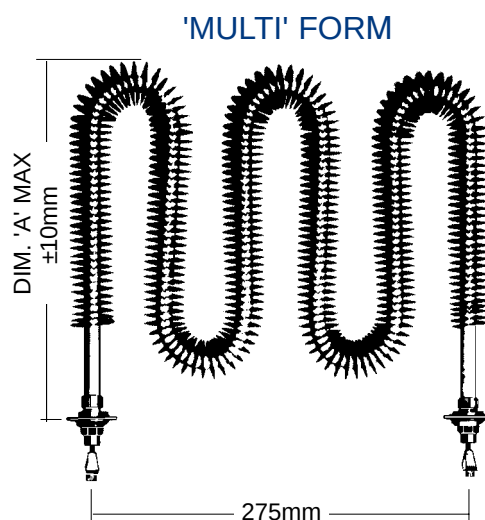
Stokes Stainless Steel Finned Elements have been designed for harsh environments.

The element sheath temperature will not exceed 400°C in an ambient temp. of 20°C and a minimum air flow of 2.8m/s

THIS RANGE COMPLIES WITH AS 1668.1 AND AS 3102 (BLACK HEAT)

MULTI FORM

CAT. No.		Watts	Dim.A (mm)	Kg.
240 Volt	200 Volt			
2326-X	2886-X	3000	200	1.0
2327-X	2887-X	3500	215	1.1
2328-X	2888-X	4000	248	1.25
2329-X	2889-X	5000	306	1.6
2305-X	2890-X	6000	352	1.9



STRAIGHT LENGTH

CAT. No.		Watts	Dim.A (mm)	Kg.
240 Volt	200 Volt			
2321-10	2881-10	1000	460	.5
2322-10	2882-10	1200	460	.5
2323-10	2883-10	1500	560	.6
2324-10	2884-10	2000	760	.8
2325-10	2885-10	2500	860	.9
2326-10	2886-10	3000	1070	1.0
2327-10	2887-10	3500	1160	1.1
2328-10	2888-10	4000	1340	1.25
2329-10	2889-10	5000	1686	1.6
2305-10	2890-10	6000	1960	1.9



Straight length elements should be mounted in the vertical plane and rigidly secured at one end to allow the element to expand.

Straight length elements are supplied with a floating bush.

Please refer to technical specifications on page 6. Note: 200V for export only.

All product specifications are current at the date of issue of this publication. However, specifications may occasionally change and therefore Stokes advises purchasers to check that this publication correctly describes the products offered.

STAINLESS STEEL FINNED ELEMENTS 11mm SERIES (124.0kW per sq. metre)

Stokes Stainless Steel Finned Elements have been designed for harsh environments.

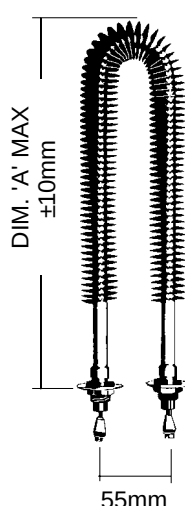
The element sheath temperature will not exceed 400°C in an ambient temp. of 20°C and a minimum air flow of 3.0m/s

THIS RANGE COMPLIES WITH AS 1668.1 AND AS 3102 (BLACK HEAT)

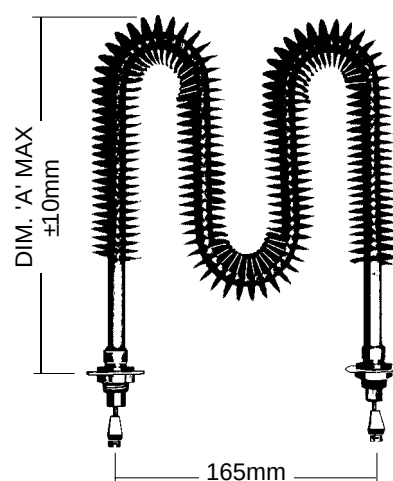
'U' FORM

CAT. No. 240 Volt	Watts	Dim.A (mm)	Kg
2350-U	1000	200	.4
2351-U	1500	230	.5
2352-U	2000	282	.6
2353-U	2500	330	.65
2354-U	3000	400	.7
2355-U	4000	530	1.0
2356-U	5000	670	1.2
2357-U	6000	801	1.4

'U' FORM



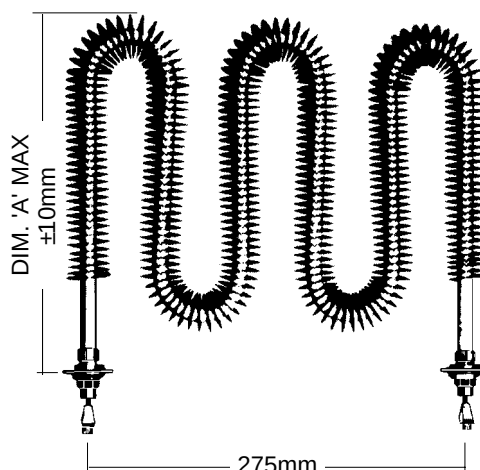
'W' FORM



W FORM

CAT. No. 240 Volt	Watts	Dim.A (mm)	Kg
2352-W	2000	155	.4
2353-W	2500	185	.5
2354-W	3000	219	.7
2355-W	4000	283	1.0
2356-W	5000	353	1.2
2357-W	6000	419	1.4

'MULTI' FORM



MULTI FORM

CAT. No. 240 Volt	Watts	Dim.A (mm)	Kg
2355-X	4000	200	1.0
2356-X	5000	278	1.2
2357-X	6000	320	1.4

Please refer to technical specifications on page 6.

All product specifications are current at the date of issue of this publication. However, specifications may occasionally change and therefore Stokes advises purchasers to check that this publication correctly describes the products offered.

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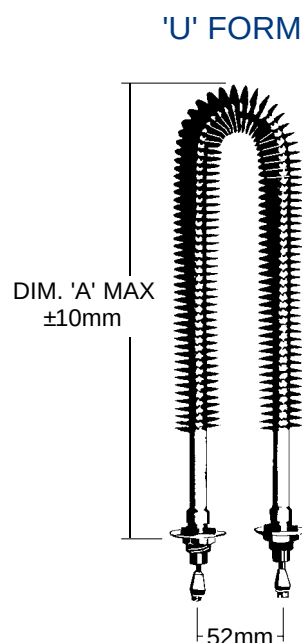
SUPERCEDED FINNED ELEMENTS **8mm SERIES (31.0kW per sq. metre)**

*The 8mm series has been superceded.
The tables below are included for cross reference purposes only.*

Please contact Stokes for assistance with selection of suitable replacement elements for your application.

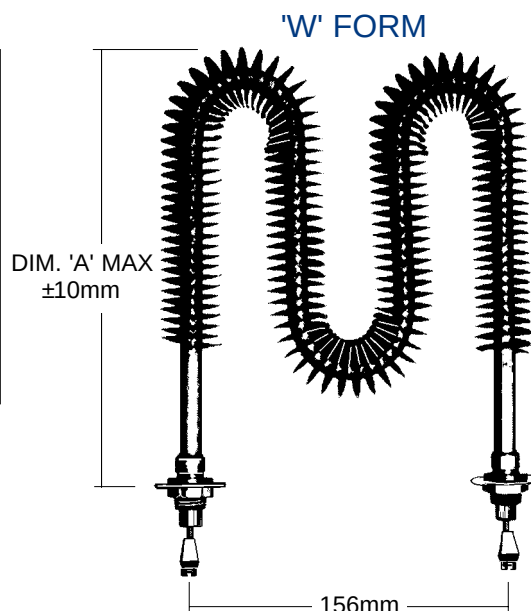
'U' FORM FINNED

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
2761-U	2991-U	2921-U	500	380	.46
2762-U	2992-U	2922-U	750	533	.65
2763-U	2993-U	2923-U	1000	710	.85
2764-U	2994-U	2924-U	1500	1010	1.1
2765-U	2995-U	2925-U	1800	1200	1.2
2766-U	2996-U	2926-U	2000	1327	1.5
2767-U	2997-U	2927-U	2400	1580	1.6



'W' FORM FINNED

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
2761-W	2991-W	2921-W	500	200	.46
2762-W	2992-W	2922-W	750	280	.65
2763-W	2993-W	2923-W	1000	368	.85
2764-W	2994-W	2924-W	1500	520	1.1
2765-W	2995-W	2925-W	1800	616	1.2
2766-W	2996-W	2926-W	2000	680	1.5
2767-W	2997-W	2927-W	2400	806	1.6



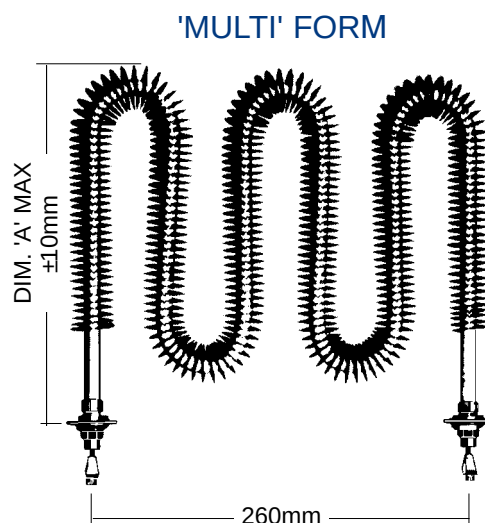
SUPERCEDED FINNED ELEMENTS **8mm SERIES (31.0kW per sq. metre)**

*The 8mm series has been superceded.
The tables below are included for cross reference purposes only.*

Please contact Stokes for assistance with selection of suitable replacement elements for your application.

MULTI FORM

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
2762-X	2992-X	2922-X	750	200	.65
2763-X	2993-X	2923-X	1000	260	.85
2764-X	2994-X	2924-X	1500	360	1.1
2765-X	2995-X	2925-X	1800	424	1.2
2766-X	2996-X	2926-X	2000	467	1.5
2767-X	2997-X	2927-X	2400	550	1.6



STRAIGHT LENGTH

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
2761-10	2991-10	2921-10	500	760	.46
2762-10	2992-10	2922-10	750	1065	.65
2763-10	2993-10	2923-10	1000	1425	.85
2764-10	2994-10	2924-10	1500	2017	1.1
2765-10	2995-10	2925-10	1800	2398	1.2
2766-10	2996-10	2926-10	2000	2652	1.5
2767-10	2997-10	2927-10	2400	3160	1.6



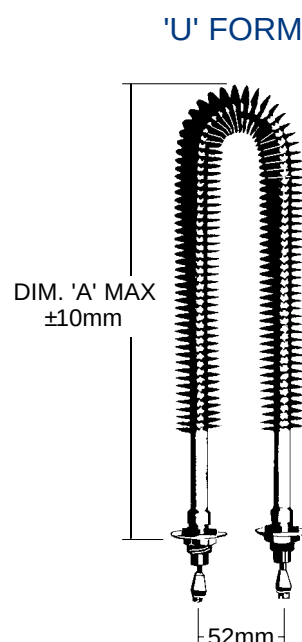
SUPERCEDED FINNED ELEMENTS **8mm SERIES (108.0kW per sq. metre)**

*The 8mm series has been superceded.
The tables below are included for cross reference purposes only.*

Please contact Stokes for assistance with selection of suitable replacement elements for your application.

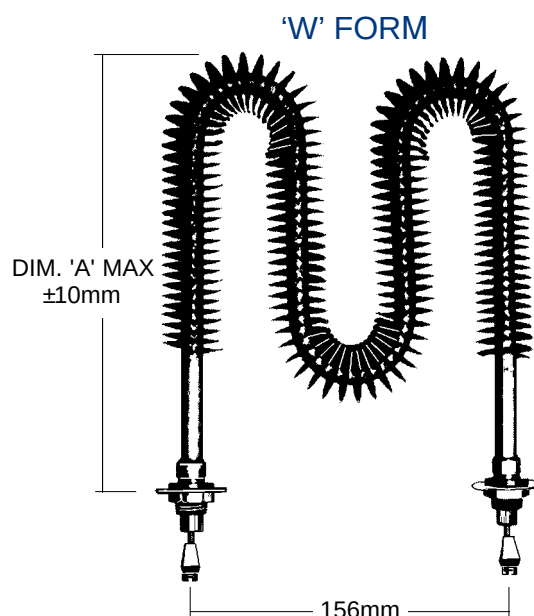
'U' FORM

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
3321-U	2971-U	2981-U	600	210	.26
3322-U	2972-U	2982-U	900	222	.27
3323-U	2973-U	2983-U	1200	273	.28
3324-U	2974-U	2984-U	1500	330	.35
3325-U	2975-U	2985-U	1800	380	.46
3326-U	2976-U	2986-U	2000	420	.52
3327-U	2977-U	2987-U	2400	495	.56
3328-U	2978-U	2988-U	3000	603	.65
3329-U	2979-U	2989-U	3600	710	.87
3330-U	2980-U	2990-U	4800	915	.99
3320-U	2940-U	2950-U	6000	1175	1.3



'W' FORM

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
3323-W	2973-W	2983-W	1200	153	.28
3324-W	2974-W	2984-W	1500	180	.35
3325-W	2975-W	2985-W	1800	200	.46
3326-W	2976-W	2986-W	2000	222	.52
3327-W	2977-W	2987-W	2400	260	.56
3328-W	2978-W	2988-W	3000	315	.65
3329-W	2979-W	2989-W	3600	368	.81
3330-W	2980-W	2990-W	4800	476	.99
3320-W	2940-W	2950-W	6000	600	1.3



SUPERCEDED FINNED ELEMENTS **8mm SERIES (108.0kW per sq. metre)**

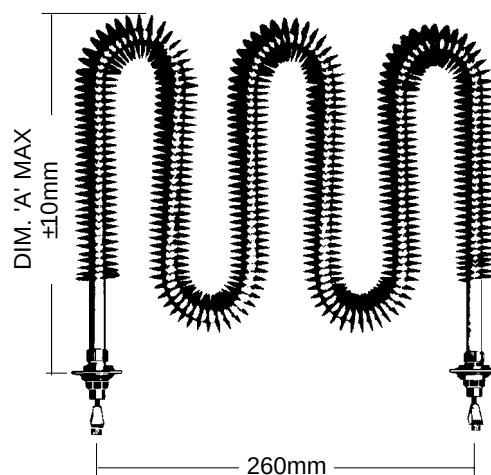
*The 8mm series has been superceded.
The tables below are included for cross reference purposes only.*

Please contact Stokes for assistance with selection of suitable replacement elements for your application.

MULTI FORM

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
3328-X	2978-X	2988-X	3000	220	.65
3329-X	2979-X	2989-X	3600	260	.81
3330-X	2980-X	2990-X	4800	329	.99
3320-X	2940-X	2950-X	6000	417	1.3

'MULTI' FORM



STRAIGHT LENGTH

240 Volt	CAT.No. 220 Volt	200 Volt	Watts	Dim.A (mm)	Kg.
3321-10	2971-10	2981-10	600	440	.26
3322-10	2972-10	2982-10	900	440	.27
3323-10	2973-10	2983-10	1200	544	.28
3324-10	2974-10	2984-10	1500	658	.35
3325-10	2975-10	2985-10	1800	760	.46
3326-10	2976-10	2986-10	2000	836	.52
3327-10	2977-10	2987-10	2400	968	.56
3328-10	2978-10	2988-10	3000	1204	.65
3329-10	2979-10	2989-10	3600	1420	.87
3330-10	2980-10	2990-10	4800	1852	.99
3320-10	2940-10	2950-10	6000	2350	1.3



8MM UNFINNED TUBULAR AIR HEATING ELEMENTS General purpose Series (46.5kW per sq. metre)

APPLICATION:

Stokes Incoloy Sheathed Unfinned Elements are designed for:

- High-temperature air ducts
- Recirculating ovens
- Industrial processing equipment
- Processes requiring heated air
- For use in corrosive airheating processes
- Load or discharge resistors

GENERAL DESCRIPTION:

Power Density: 46.5 kW/m² (30 W/in²) on element sheath.

Construction: The Stokes Tubular Element is made of a corrosion resistant alloy and has a diameter of 8.00mm (.320"). Each element has brazed brass bushes $\frac{3}{8}$ " BSP x $\frac{1}{2}$ " long, galvanised washers, locknuts and 2 BA screwed terminals.

Operating Temperatures: Maximum permissible sheath temperature when operating is 650°C.

Minimum air velocity of 2 metres/sec. recommended.

The element sheath temperature will not exceed 400°C air with an ambient temp. of 20°C and an air flow of 3m/s

'U' FORM

CAT. No.		Watts	Dim.A (mm)	Kg.
240 Volt	200 Volt			
2201-U	2861-U	500	215	.15
2202-U	2862-U	750	325	.23
2203-U	2863-U	1000	425	.27
2204-U	2864-U	1250	535	.36
2205-U	2865-U	1500	635	.4
2206-U	2866-U	1800	765	.5
2207-U	2867-U	2000	855	.7
2208-U	2868-U	2500	1065	.8
2209-U	2869-U	3000	1275	.9
2210-U	2870-U	4000	1836	1.0

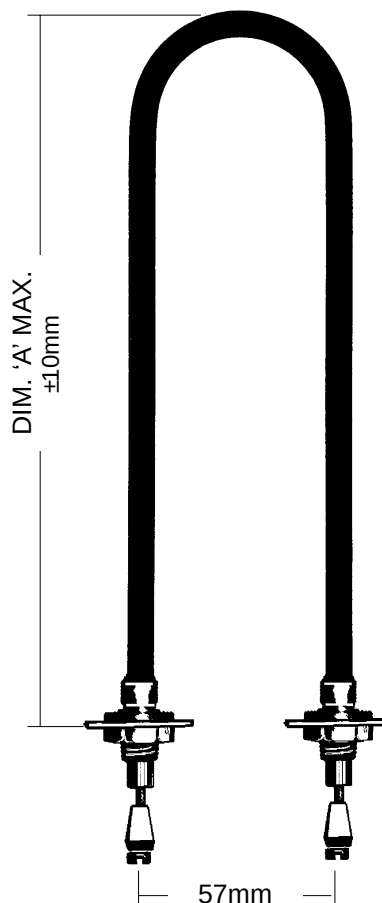
INSTALLATION:

For duct mounting, bushings are designed to provide rigid leak proof support.

Heaters should be evenly spaced with alternate rows staggered. For bush mounting 18mm clearance holes are required.

For temperatures exceeding 60°C, electrical connections should be made with correct heat resisting cable.

'U' FORM



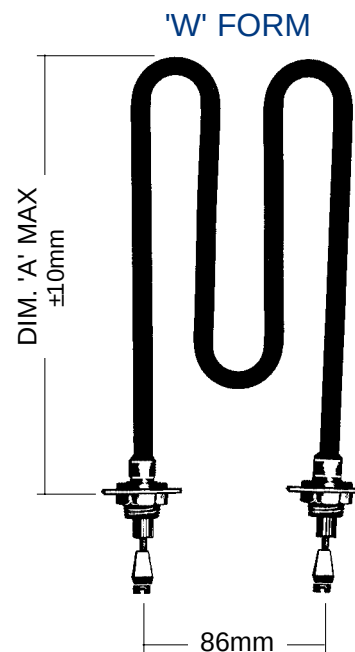
NOTE: Please contact Stokes for special wattages, lengths and forms.

NOTE: 200 Volt series are for export only.

8MM UNFINNED TUBULAR AIR HEATING ELEMENTS General purpose Series (46.5kW per sq. metre)

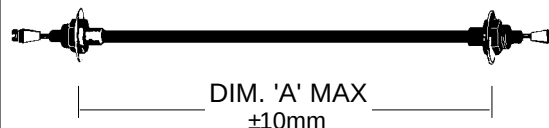
'W' FORM

CAT. No.		Watts	Dim.A (mm)	Kg.
240 Volt	200 Volt			
2201-W	2861-W	500	125	.15
2202-W	2862-W	750	180	.23
2203-W	2863-W	1000	230	.27
2204-W	2864-W	1250	285	.36
2205-W	2865-W	1500	335	.4
2206-W	2866-W	1800	400	.5
2207-W	2867-W	2000	445	.7
2208-W	2868-W	2500	550	.8
2209-W	2869-W	3000	635	.9
2210-W	2870-W	4000	935	1.0



STRAIGHT LENGTH

CAT. No.		Watts	Dim.A (mm)	Heated Length	Kg.
240 Volt	200 Volt				
2201-10B	2861-10B	500	455	345	.15
2202-10B	2862-10B	750	675	560	.23
2203-10B	2863-10B	1000	875	760	.27
2204-10B	2864-10B	1250	1095	985	.36
2205-10B	2865-10B	1500	1295	1185	.4
2206-10B	2866-10B	1800	1555	1445	.5
2207-10B	2867-10B	2000	1735	1620	.7
2208-10B	2868-10B	2500	2155	2050	.8
2209-10B	2869-10B	3000	2575	2470	.9
2210-10B	2870-10B	4000	3475	3365	1.0



NOTE: Straight length elements should be mounted in the vertical plane and rigidly secured at one end to allow the element to expand.

Straight length elements can be supplied with a floating bush at one end.

8MM UNFINNED TUBULAR AIR HEATING ELEMENTS Low Temperature Series (31.0kW per sq. metre)

APPLICATION:

Stokes Incoloy Sheathed Unfinned Elements are designed for:

- High-temperature air ducts
- Recirculating ovens
- Industrial processing equipment
- Processes requiring heated air
- For use in corrosive airheating processes
- Load or discharge resistors

GENERAL DESCRIPTION:

Power Density: 31 kW/m² (20 W/in²) on element sheath.

Construction: The Stokes Tubular Element is made of a corrosion resistant alloy and has a diameter of 8.15mm (.320"). Each element is fitted with mounting bushes $\frac{3}{8}$ " BSP x $\frac{1}{2}$ " long, galvanised washers, locknuts and 2 BA screwed terminals.

Operating Temperatures: Maximum permissible sheath temperature when operating is 650°C.

Minimum air velocity of 1 metres/sec. recommended.

The element sheath temperature will not exceed 400°C air with an ambient temp. of 20°C and an air flow of 3metres/sec.

'U' FORM

'U' FORM

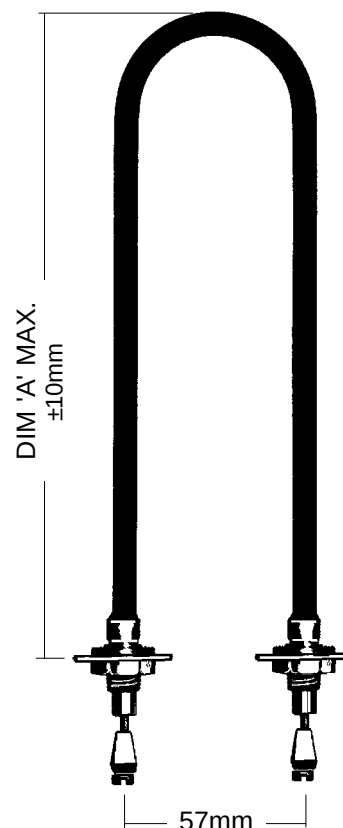
240 Volt	CAT. No. 200 Volt	Watts	Dim.A (mm)	Kg.
2211-U	2871-U	500	325	.23
2212-U	2872-U	750	485	.32
2213-U	2873-U	1000	635	.4
2214-U	2874-U	1250	805	.7
2215-U	2875-U	1500	955	.78
2216-U	2876-U	1800	1145	.82
2217-U	2877-U	2000	1275	.9
2218-U	2878-U	2500	1595	1.0

INSTALLATION:

For duct mounting, bushings are designed to provide rigid leak proof support.

Heaters should be evenly spaced with alternate rows staggered. For bush mounting 18mm clearance holes are required.

For temperatures exceeding 60°C, electrical connections should be made with correct heat resisting cable.



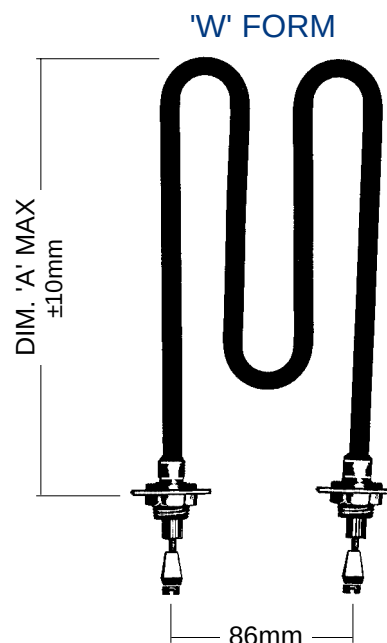
NOTE: Please contact Stokes for special wattages, lengths and forms.

NOTE: 200 Volt series are for export only.

8MM UNFINNED TUBULAR AIR HEATING ELEMENTS Low Temperature Series (31.0kW per sq. metre)

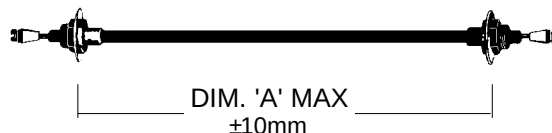
'W' FORM

CAT. No.		Watts	Dim.A (mm)	Kg.
240 Volt	200 Volt			
2211-W	2871-W	500	180	.23
2212-W	2872-W	750	260	.32
2213-W	2873-W	1000	335	.4
2214-W	2874-W	1250	420	.7
2215-W	2875-W	1500	495	.78
2216-W	2876-W	1800	590	.82
2217-W	2877-W	2000	655	.9
2218-W	2878-W	2500	815	1.0



STRAIGHT LENGTH

CAT. No.		Watts	Dim.A (mm)	Heated Length	Kg.
240 Volt	200 Volt				
2211-10B	2871-10B	500	675	560	.23
2212-10B	2872-10B	750	995	880	.32
2213-10B	2873-10B	1000	1295	1185	.4
2214-10B	2874-10B	1250	1635	1530	.7
2215-10B	2875-10B	1500	1935	1830	.78
2216-10B	2876-10B	1800	2315	2215	.82
2217-10B	2877-10B	2000	2575	2470	.9
2218-10B	2878-10B	2500	3215	3115	1.0



NOTE: Straight length elements should be mounted in the vertical plane and rigidly secured at one end to allow the element to expand.

Straight length elements can be supplied with a floating bush at one end.

DUCT HEATERS

DUCT INSERT ASSEMBLIES

GENERAL INFORMATION

Stokes assemblies are designed to be inserted in a rectangular hole cut in the side or bottom of an air duct. When larger ducts are used multiple assemblies can be inserted from both sides.

Our comprehensive range of standard terminal boxes and elements can be combined in any desired manner within the limitations set out in this catalogue. This modular design concept enables a small number of standard components to be assembled into many thousands of air duct insert assemblies.

Element supports are supplied where required to ensure the units will withstand vibration levels encountered in airconditioning systems and to prevent sagging of elements. High limit and pressure switches can also be incorporated into the assemblies. If required internal wiring is also available as an optional extra.

We recommend for all duct heating a minimum air velocity of 1 m/s and a maximum of 6 m/s.



APPLICATIONS

- **COMFORT HEATING:** Designed to be installed in new or existing ducts for complete or supplementary heating in central and airconditioning systems.
- **FORCED AIR HEATING:** Installation for process and comfort air heating.
- **PROCESS AIR HEATING:** Can be used for complete air heating, make up air, baking, preheating, recirculating, oven heating, drying and other processes requiring heated air.

Other applications include load or discharge resistors, blower type unit heaters, defrost heaters etc.

CUSTOM BUILT DUCT INSERTS or COMPLETE DUCT SECTION UNITS

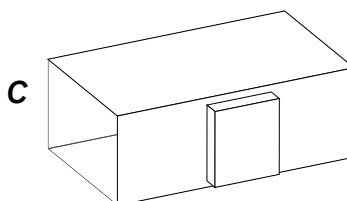
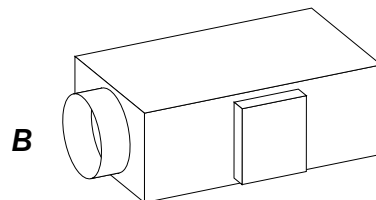
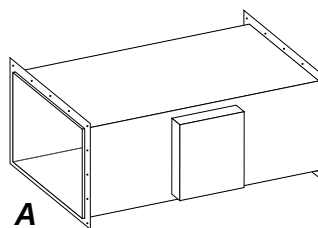
Stokes can manufacture custom built finned and unfinned inserts to your required ratings, duct sizes and air flows other than those listed as our standard range.

Also units that are to be used in corrosive air or gases can be designed using our alloy sheaths, and are also suitable for high temperature or high pressures.

These drawings illustrate typical ductwork supplied by Stokes, fully insulated to AS 1668.1 and AS 3102.

- Square or rectangular with flanges
- Circular or Oval duct
- Raw ends

(Contact us for special requirements.)



DUCT HEATERS

INSTALLATION & ORDER DETAILS

OVERSIZED DUCTS

In installations where duct dimensions exceed the insert heater assembly size, the area beyond the heater could be filled with perforated or expanded metal of 50% open area. This action will maintain a uniform air velocity across the face of the duct. (fig 1.)

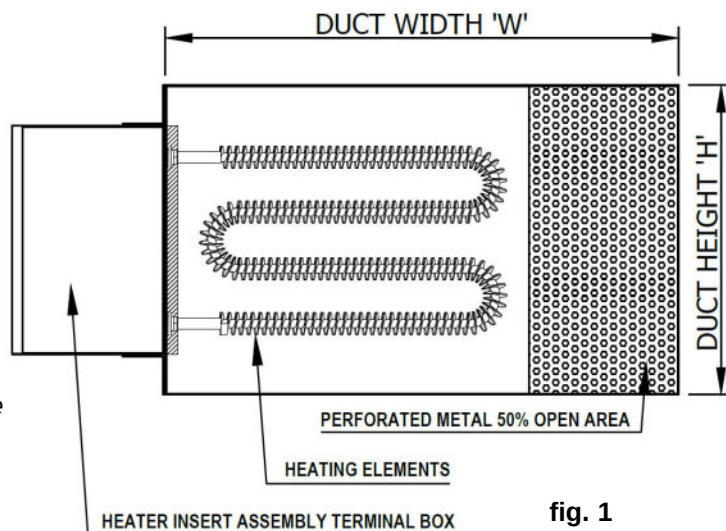


fig. 1

HIGH TEMPERATURE WIRE & BUS BAR

Due to the high temperatures encountered at the terminals of air heating elements, high temperature cable should be incorporated.

A. High Temp. Cable (Glass insulated nickel conductor)

- (i) 2.5mm² 50/0.25 (12 Amp.)
- (ii) 4.0mm² 56/0.30 (15 Amp.)

B. Glass Braided Silicon Insulated Cable (150-200°C)

- (i) 1.5mm² 30/0.25 (15 Amp.)
- (ii) 2.5mm² 50/0.25 (20 Amp.)

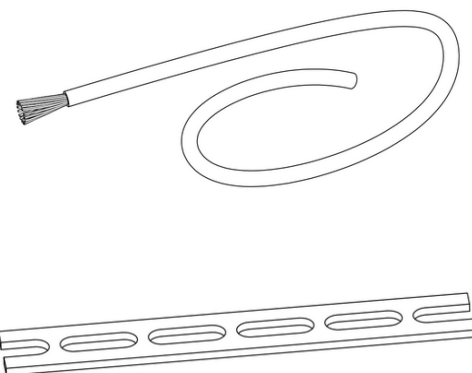
C. Slotted Brass Bus Bar

Cat. No. U-2306-04

The brass bar is perforated with slots 5mm x 13mm positioned centrally.

Gap between slot 3 mm.

Max. rating = 65 Amps., Conductor Temp. 90°C



INFORMATION REQUIRED TO ORDER

1. Duct size and entry for insert. Refer to diagram fig. 2.
2. State element series to be fitted or standard specified.
3. Total KW required.
4. Nominate number of control steps and whether wiring is single phase or three phase.
5. Airflow rate nominated.
6. If you require elements pre wired with bus bar.
7. Nominate controls required to be fitted to assemblies, or supplied separately. (Refer to control section on pages 30-32.)

*AS1668 Part 1 Australian Standards state that the following must comply.

The casing of an electric duct heater shall be internally insulated, for a distance of not less than 250mm upstream and downstream of the heater, with a non-combustible material of thermal conductance not greater than 30W/m² at 100°C. The insulation shall be secured to the casing so that it remains in position under all operating conditions.

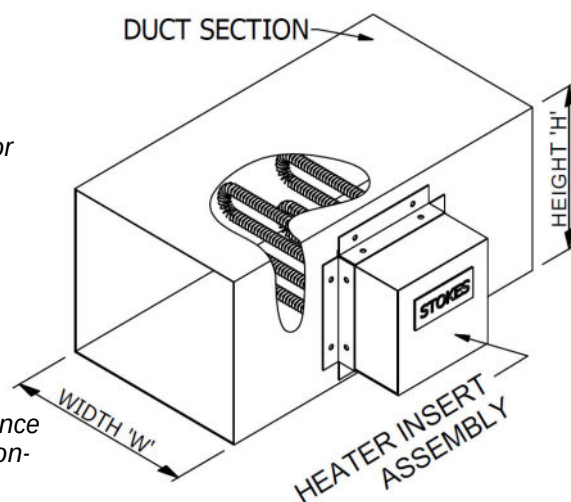


fig. 2

TERMINAL BOXES

TERMINAL BOX COMES COMPLETE WITH SLIP ON FLANGE

STANDARD TERMINAL BOX SPECIFICATIONS

- Constructed from 22 gauge galvanised steel material. (Standard)
- Spot welded construction.
- 150 mm deep, 40 mm wide mounting flanges. (Slip on)
- Removeable cover including identification plate.
- Face of box is lined with 5 mm thick, asbestos free insulation board.

NON STANDARD BOXES

Boxes can be manufactured to special dimensions other than those listed, contact us for more detail. Also available in Zinc anneal and Stainless Steel.

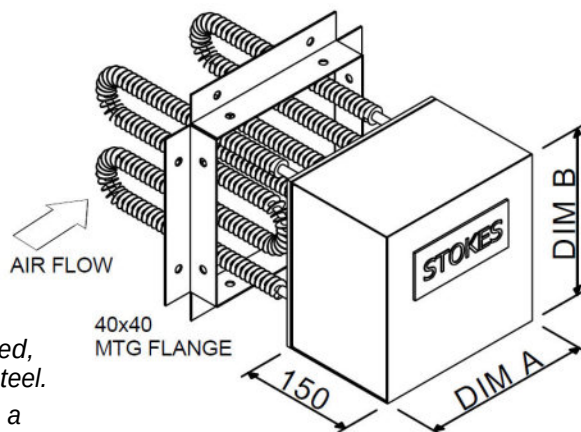
Note: Number of elements quoted are maximum in each case. Where a long box is required to accommodate duct, the elements are evenly spaced to cover face area of duct.

A = Width of box along duct.

B = Minimum possible height of duct for upright box fitting.

HD.= Heavy Duty Design.

W.P.= Weatherproof series



MAXIMUM NUMBER OF ELEMENTS ACCOMODATED

HD.	W.P.	Dim A. mm	Dim. B. mm	Max Qty U Form	Max Qty W Form	Max Qty Multi Form
3931-D	4451-D	150	150	- 3	-	-
3932-D	4452-D	150	225	- 6	3	-
3933-D	4453-D	150	300	- 9	3	1
3934-D	4454-D	150	375	- 9	3	3
3935-D	4455-D	150	450	- 12	6	3
3936-D	4456-D	150	600	- 18	6	6
3937-D	4457-D	225	150	* 3 4	1	-
3938-D	4458-D	225	225	* 3 6	3	-
3939-D	4459-D	225	300	* 6 9	6	2
3940-D	4460-D	225	375	* 9 12	6	3
3941-D	4461-D	225	450	*12 15	8	3
3942-D	4462-D	225	600	*15 21	9	6
3943-D	4463-D	300	150	* 3 6	2	1
3944-D	4464-D	300	225	* 6 9	6	2
3945-D	4465-D	300	300	* 9 12	6	3
3946-D	4466-D	300	375	*12 18	9	3
3947-D	4467-D	300	450	*18 24	12	6
3948-D	4468-D	300	600	*27 36	12	9

LABELS FITTED

2201.06

DUCT HEATER

kW VOLTS A.C. PHASE

STAGES ELEMENTS X

LIMIT CONTROL AUTO/MANUAL RESET

CAUTION:- MIN. AIR VELOCITY M/S

USE SUPPLY WIRE FOR 90°C

Stokes
Appliance Parts
Domestic Commercial Industrial

www.stokesap.com.au

WARNING

ALL WIRING TO ELEMENTS AND CONTROLS
MUST HAVE A TEMPERATURE RATING OF AT
LEAST 90C INSULATION TEMPERATURE



OPTIONAL CONTROLS

- Refer to pages 30-32 which lists the types of controls available that can be fitted within above boxes.
- Hi Limits
- Pressure Switches

Note: If pressure switches are to be fitted into the U Form column, then only the quantity marked with an asterisk (*) is to be used. All other columns will accommodate the controls listed on pages 30-32.

DUCT HEATER SELECTION TABLE

Comprising F.T. Series Low Temperature Stainless Steel Finned Elements.
Maximum Sheath Temperature 400°C in Still Air at 20°C Ambient.

NOTE: Commonly Termed as Black Heat Elements.

This range complies with AS1668 .1 and AS3102.

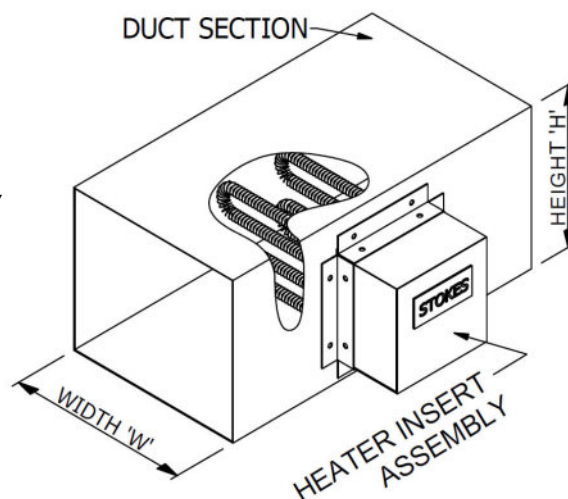
All Units Suitable for Connection to 3 Phase 415/240 Volt 4 Wire Supply
Elements 240 Volts.

Includes 5mm thick insulation on face of terminal box.

NOTE: Non Standard Units manufactured to clients requirements.
When ordering: specify catalogue no., quantity, wattage and type of
over temp. protection if required.

Delivery: 10-15 Working Days.

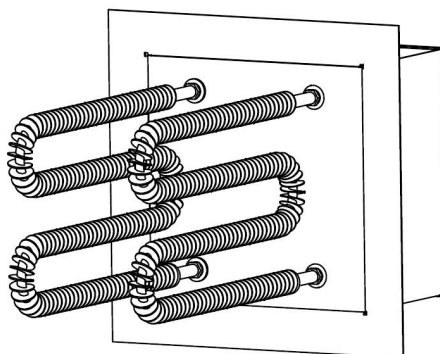
Max. operating air temperature 100°C see spec data page 34 & 35.



Catalogue No.	kW	Min. Duct Size WxH (mm)	No. of Elements	Elements	Terminal Box	Min. Air Flow m³/s
LF1	1	400 x 150	1	4063-U	3931-D	0.06
LF2	2	400 x 150	2	4063-U	3931-D	0.06
LF3	3	400 x 150	3	4063-U	3931-D	0.06
LF4	4.5	560 x 150	3	4065-U	3931-D	0.084
LF5	6	700 x 150	3	4067-U	3931-D	0.105
LF6	7.5	900 x 150	3	4069-U	3931-D	0.135
LF7	3	400 x 225	3	4063-U	3932-D	0.09
LF8	6	400 x 225	6	4063-U	3932-D	0.09
LF9	9	560 x 225	6	4065-U	3932-D	0.126
LF10	12	700 x 225	6	4067-U	3932-D	0.158
LF11	15	900 x 225	6	4069-U	3932-D	0.203
LF12	5.4	250 x 300	9	4061-U	3939-D	0.075
LF13	9	400 x 300	9	4063-U	3939-D	0.12
LF14	13.5	560 x 300	9	4065-U	3939-D	0.168
LF15	18	700 x 300	9	4067-U	3939-D	0.21
LF16	22.5	900 x 300	9	4069-U	3939-D	0.27
LF17	27	1000 x 300	9	4071-U	3939-D	0.3
LF18	12	400 x 375	12	4063-U	3940-D	0.15
LF19	18	560 x 375	12	4065-U	3940-D	0.21
LF20	24	700 x 375	12	4067-U	3940-D	0.263
LF21	30	900 x 375	12	4069-U	3940-D	0.34
LF22	36	1000 x 375	12	4071-U	3940-D	0.375
LF23	48	1300 x 375	12	4073-U	3940-D	0.488

DUCT HEATER SELECTION TABLE

Catalogue No.	kW	Min. Duct Size WxH (mm)	No. of Elements	Elements	Terminal Box	Min. Air Flow m³/s
LF24	15	400 x 450	15	4063-U	3941-D	0.18
LF25	22.5	560 x 450	15	4065-U	3941-D	0.252
LF26	30	700 x 450	15	4067-U	3941-D	0.315
LF27	37.5	900 x 450	15	4069-U	3941-D	0.405
LF28	45	1000 x 450	15	4071-U	3941-D	0.45
LF29	60	1300 x 450	15	4073-U	3941-D	0.585
LF30	18	400 x 600	18	4063-U	3942-D	0.24
LF31	27	560 x 600	18	4065-U	3942-D	0.336
LF32	36	700 x 600	18	4067-U	3942-D	0.42
LF33	45	900 x 600	18	4069-U	3942-D	0.54
LF34	54	1000 x 600	18	4071-U	3942-D	0.6
LF35	72	1300 x 600	18	4073-U	3942-D	0.78
COMPACT DUCT ASSEMBLIES						
LF36	1	220 x 150	1	4063-W	3937-D	0.03
LF37	2	220 x 225	2	4063-W	3932-D	0.045
LF38	3	220 x 225	3	4063-W	3938-D	0.045
LF39	6	400 x 225	3	4067-W	3938-D	0.09
LF40	9	540 x 225	3	4071-W	3938-D	0.122
LF41	12	400 x 300	6	4067-W	3945-D	0.12
LF42	15	480 x 300	6	4069-W	3945-D	0.144
LF43	18	550 x 300	6	4071-W	3945-D	0.165
LF44	24	700 x 300	6	4073-W	3945-D	0.21
LF45	27	550 x 450	9	4071-W	3947-D	0.248



OPTIONAL EXTRAS:

Controls and Access.

Refer to pages 30-32 for all relevant control details.

CONTROLS

SINGLE STAGE

TEMPERATURE LIMITER CAT. No. 7286

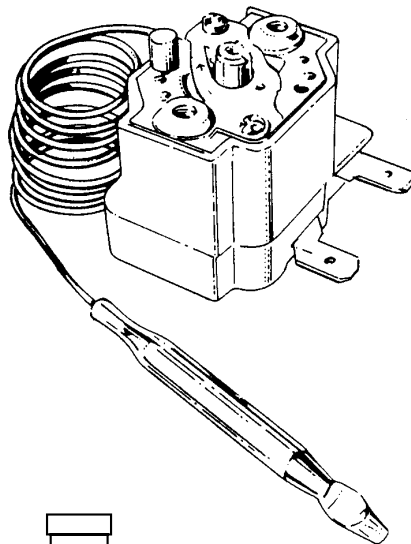
MANUAL RESET: - Adjustable

Temp: 60°C to 150°C.

Rating: 20 Amp at 240 V.

Capillary Length: 525mm ±25mm.

Sensing Bulb: 6mm ± 0.5mm Dia. 66mm ±5mm long.



ADJUSTABLE PRESSURE SWITCH

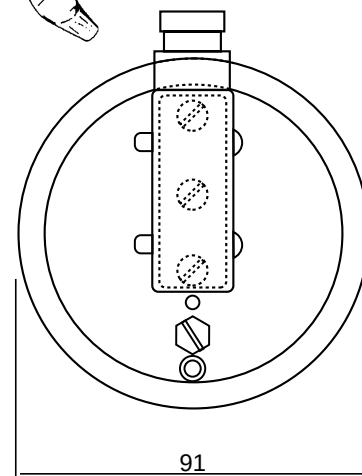
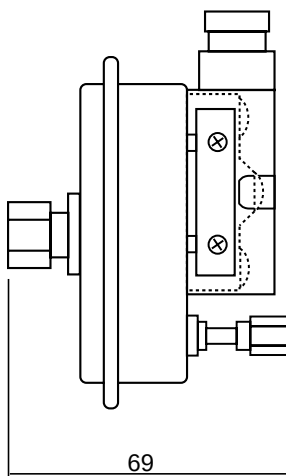
For incorporation in duct insert assemblies.

CAT. No. 7383

Typical applications include:

- Clogged air filter detection for-
 - warm air furnaces
 - air conditioning systems
 - electronic air cleaners
 - cooling fans for electronic equipment
- Detection of frost buildup on outdoor coils of a heat pump. _

Operating Pressure Range: The following pressures are nominal values when the switch is mounted vertically as shown.



Electrical Rating

278 VA pilot duty @ 24volts AC
300 VA pilot duty @ 120 to 277volts AC
15 amps resistive load to 277volts AC

Electrical Switch

Single pole, Double throw, Snap action contacts

Electrical connectors

3#6 - 32 screw terminal with cup washer

Control set point

Adjustable

Field Adjustable set point range

Contacts change on pressure rise
@ 42.15 Pa to 1245 Pa

Maximum pressure

1/2 PSI (3.4 Kpa)

Operating Temperature Range

- 40° to 87.7°c

Recommended Operating Position

MUST be vertical.

CONTROLS

OVER TEMPERATURE LIMIT PROTECTION

To prevent heater failure which may result from accidental stoppage of air circulation, a thermal cut out device is installed in the heater bank in line with the air flow. The thermal cut out can be supplied with either manual or auto reset.

(A.) Cat. No. 6010 or 6183 MANUAL RESET: Capillary Type

Description:

Fixed set point overtemperature cutout SPST contacts opening on temperature rise, temp 120°C.

Capillary length = 610mm 2mm Dia.

Electrical Rating

100,000 Cycles	25 amperes non inductive 120-277 VAC
Manual Reset	125 VA Pilot Duty 120-277 VAC

Complies with
AS1668.1



(B.) Cat. No. 6013 AUTO RESET: Contact Type

Description:

Fixed set point overtemperature cutout with SPST contacts opening on temperature rise. Open 87°C. Close 79°C.

The 6013 is a relatively small, versatile, low cost $\frac{3}{4}$ inch bimetal disc temperature control recognized by most of the world's testing agencies. It is used as a temperature limiting or regulating control for large electrical loads up to 25 amperes at 120/240 VAC.



(C.) Cat. No. 6055 FAN/HEAT SEQUENCER & TIME DELAY

The Cat. No. 6055 Series controls are field proven devices for controlling fans, heating elements in electric furnaces, heat pumps, gas furnaces, central air conditioners, as well as many other applications such as relays in control systems where a time delay is required. These products utilize the impact action of bimetal disc technology powered by low wattage PTC (positive temperature coefficient) solid state heaters to operate the electrical switch contacts. (24volt Bimetal)

The 6055 time delay relays are used as sequencers on electric heating products. This control has only one timing.

On Time = 15-35 Sec.

Off Time = 25-55 Sec.

* 24V Transformer available on request



REPRESENTATIVE ELECTRICAL RATINGS			
Inductive Amperes		Resist Amps.	Volts
Full Load	Locked Rotor	Per Pole	AC
14.0	72.0	25.0	120
7.0	42.0	25.0	240
3.0	18.0	12.5	480

CONTROLS

SOLID STATE RELAY with DIMMER CONTROL

FEATURES:

- Load current range up to 40amps
- Able to be driven by variable pot control
- Internally mounted snubber circuit protection for huge current application
- Zero cross turn-on, zero current turn-off
- High reliability



SPECIFICATION:

Model SRR2540

Cat No. 7399

Data

Type	(VR-AC)
Input signal Voltage	VR B200 K
Input signal voltage range	110V - 220V - 240V
Load current	40A
Max 1 cycle surge current	315A
Weight (approx)	70g

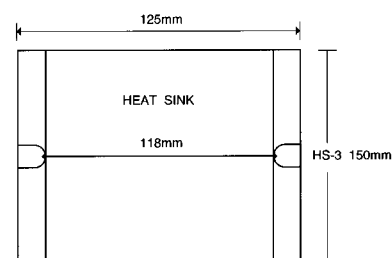
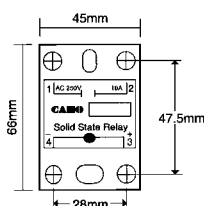


ORDERING INFORMATION

Cat No. 7399 40 AMP solid state c/w pot

Cat No. 7398 = Heat sink to suit

DIMENSIONS



ADJUSTABLE SET POINT OVER TEMPERATURE CUT-OUT

This adjustable thermostat can be incorporated into a heater bank itself or alternatively fitted remotely in the ductwork.

0-102°C Manual Reset Adjustable

Cat No. A25CN-4C



TECHNICAL INFORMATION

TECHNICAL INFORMATION GUIDE

The information supplied is to provide customers with a knowledge of our standard product range.

Whilst providing the necessary technical information as a guide to assist customers make the correct selection of products for their particular application, no liability as to the interpretation or correctness of that information can be accepted.

FORCED AIR HEATING CALCULATIONS

Refer to the six graphs on pages 34 & 35 that will be of assistance in finalising calculations for air handling.

- i. Power requirements for air heating. Graph 1.
- ii. Air heating Finned Tubular heaters. Graph 2.
- iii. Air recirculation heating Finned Tubular heaters. Graphs 3, 4.
- iv. Static pressure drop on Tubular heaters. Graphs 5, 6.

Air velocity equals volume of air divided by the face area of duct at heater position.

The following formulas will assist in above calculation requirements.

$$1. \quad KW = m^3/s \times TR^{\circ}C \times 1.278$$

or

$$2. \quad KW = \frac{L/s \times TR^{\circ}C}{783}$$

where KW = Kilowatts

m³/s = Volume of air in cubic metres per second

L/s = Volume in litres per second

TR[°]C = Temperature rise ° celsius

EXAMPLE

Air is circulated through a heated duct by a 1500 CFM FAN. The air enters the duct at 25°C and is to be heated to 150°C.

Select the appropriate formula from above;

$$1500 \text{ CFM} = 1500 \times 0.472 = 708 \text{ L/s}$$

$$KW = \frac{708 \text{ (L/s)} \times (150 - 25)^{\circ}C}{783} = 113.03 \text{ KW}$$

$$\text{SAFETY FACTOR } 20\% = 22.61$$

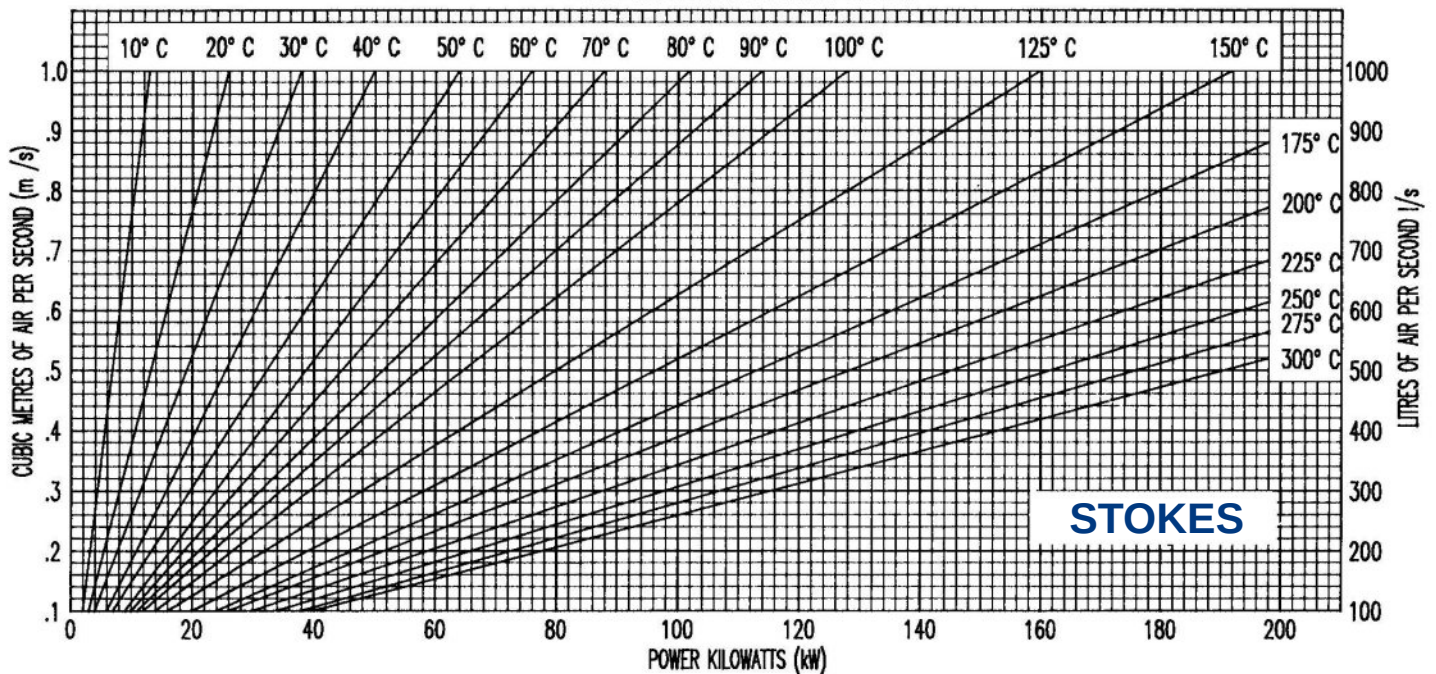
$$\text{TOTAL POWER REQUIREMENT} = 135.60 \text{ KW}$$

Therefore heaters of the correct type totalling 136 KW should be selected.

TECHNICAL INFORMATION

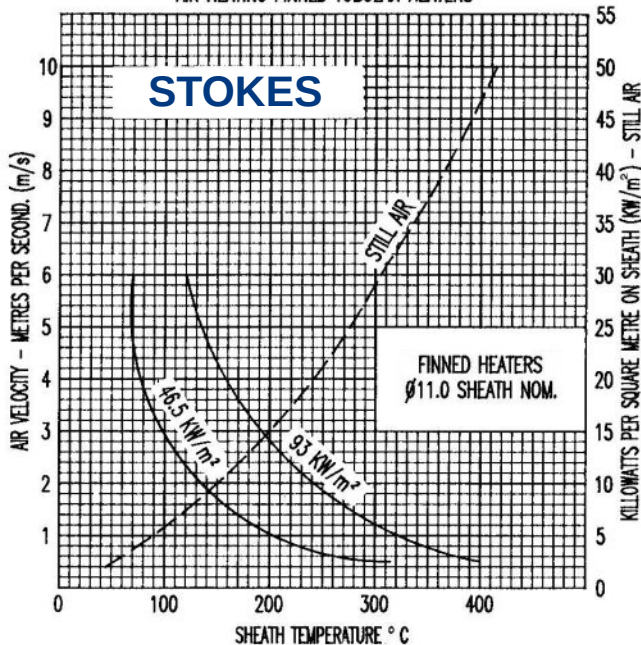
Graph 1.

POWER REQUIREMENTS FOR AIR HEATING



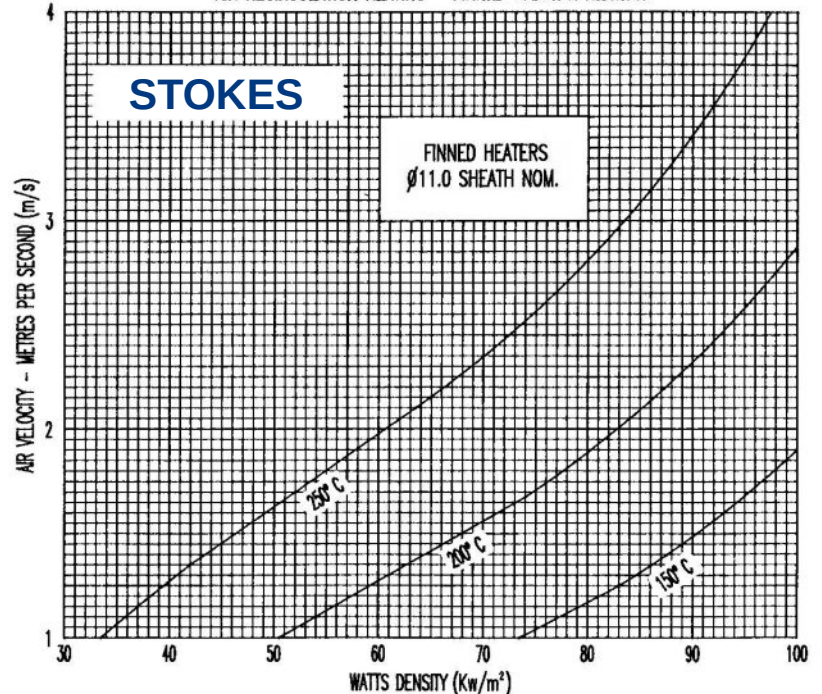
Graph 2.

AIR HEATING FINNED TUBULAR HEATERS



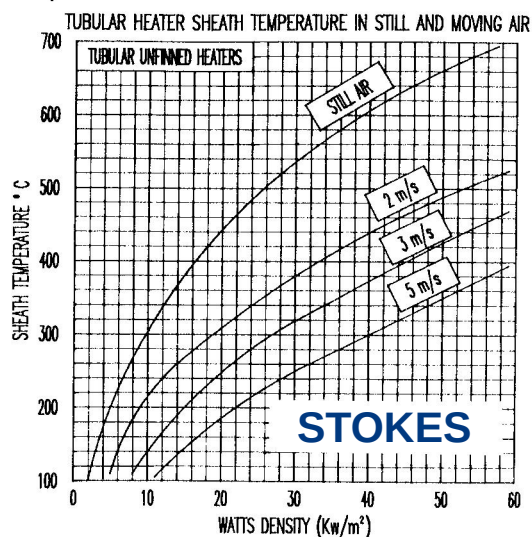
Graph 3.

AIR RECIRCULATION HEATING - FINNED TUBULAR HEATERS

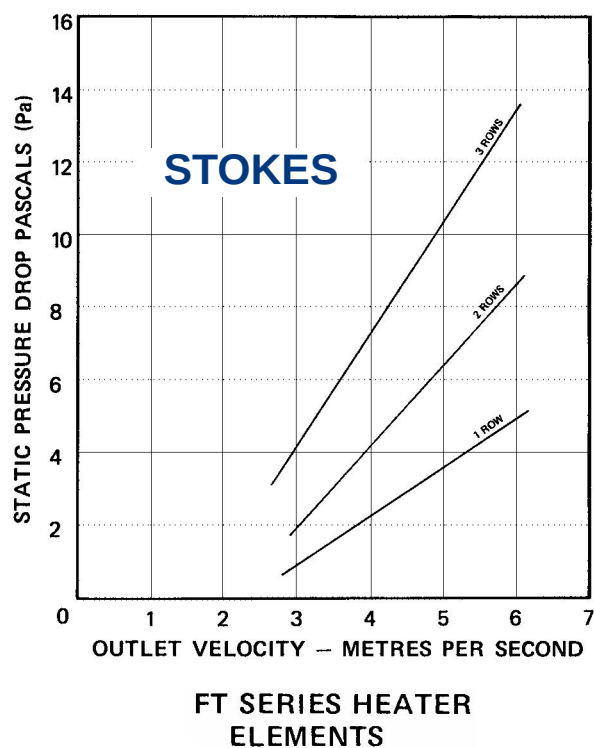


TECHNICAL INFORMATION

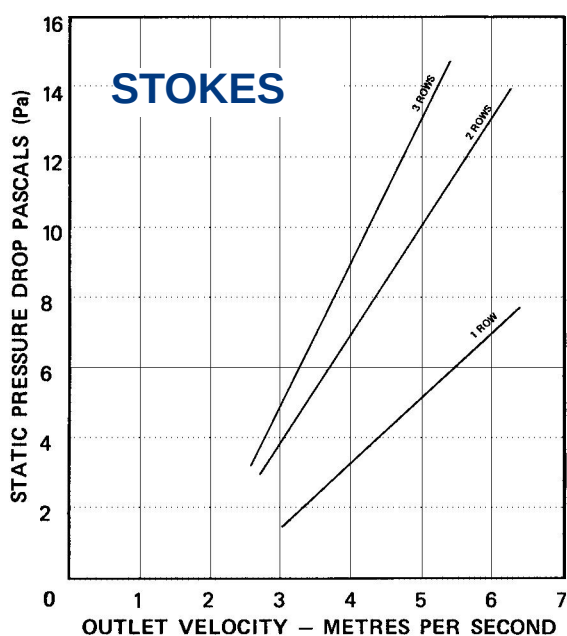
Graph 4.



Graph 5.



Graph 6.



UNFINNED TUBULAR ELEMENTS

TECHNICAL INFORMATION

TEMPERATURE CONVERSIONS

Cent. Fahr.	Cent. Fahr.	Cent. Fahr.	Cent. Fahr.	Cent. Fahr.	Cent. Fahr.	Cent. Fahr.	Cent. Fahr.
0° 32°	125° 257°	250° 482°	375° 707°	500° 932°	625° 1157°	750° 1382°	875° 1607°
5° 41°	130° 266°	255° 491°	380° 716°	505° 941°	630° 1166°	755° 1391°	880° 1616°
10° 50°	135° 275°	260° 500°	385° 725°	510° 950°	635° 1175°	760° 1400°	885° 1625°
15° 59°	140° 284°	265° 509°	390° 734°	515° 959°	640° 1184°	765° 1409°	890° 1634°
20° 68°	145° 293°	270° 518°	395° 743°	520° 968°	645° 1193°	770° 1418°	895° 1643°
25° 77°	150° 302°	275° 527°	400° 752°	525° 977°	650° 1202°	775° 1427°	900° 1652°
30° 86°	155° 311°	280° 536°	405° 761°	530° 986°	655° 1211°	780° 1436°	905° 1661°
35° 95°	160° 320°	285° 545°	410° 770°	535° 995°	660° 1220°	785° 1445°	910° 1670°
40° 104°	165° 329°	290° 554°	415° 779°	540° 1004°	665° 1229°	790° 1454°	915° 1679°
45° 113°	170° 338°	295° 563°	420° 788°	545° 1013°	670° 1238°	795° 1463°	920° 1688°
50° 122°	175° 347°	300° 572°	425° 797°	550° 1022°	675° 1247°	800° 1472°	925° 1697°
55° 131°	180° 356°	305° 581°	430° 806°	555° 1031°	680° 1256°	805° 1481°	930° 1706°
60° 140°	185° 365°	310° 590°	435° 815°	560° 1040°	685° 1265°	810° 1490°	935° 1715°
65° 149°	190° 374°	315° 599°	440° 824°	565° 1049°	690° 1274°	815° 1499°	940° 1724°
70° 158°	195° 383°	320° 608°	445° 833°	570° 1058°	695° 1283°	820° 1508°	945° 1733°
75° 167°	200° 392°	325° 617°	450° 842°	575° 1067°	700° 1292°	825° 1517°	
80° 176°	205° 401°	330° 626°	455° 851°	580° 1076°	705° 1301°	830° 1526°	
85° 185°	210° 410°	335° 635°	460° 860°	585° 1085°	710° 1310°	835° 1535°	
90° 194°	215° 419°	340° 644°	465° 869°	590° 1094°	715° 1319°	840° 1544°	
95° 203°	220° 428°	345° 653°	470° 878°	595° 1103°	720° 1328°	845° 1553°	
100° 212°	225° 437°	350° 662°	475° 887°	600° 1112°	725° 1337°	850° 1562°	
105° 221°	230° 446°	355° 671°	480° 896°	605° 1121°	730° 1346°	855° 1571°	
110° 230°	235° 455°	360° 680°	485° 905°	610° 1130°	735° 1355°	860° 1580°	
115° 239°	240° 464°	365° 689°	490° 914°	615° 1139°	740° 1364°	865° 1589°	
120° 248°	245° 473°	370° 698°	495° 923°	620° 1148°	745° 1373°	870° 1598°	

TABLE OF VALUES FOR INTERPOLATION IN ABOVE

FORMULAE

Fahrenheit to Celsius (°C) = $5/9(°F - 32)$
 Celsius to Fahrenheit(°F) = $(9/5°C) + 32$
 Celsius to Kelvin K = $°C + 273.15$

1°C = 1.80°F	4°C = 7.2°F	7°C = 12.6°F
2°C = 3.60°F	5°C = 9.0°F	8°C = 14.4°F
3°C = 5.40°F	6°C = 10.8°F	9°C = 16.2°F
1°F = 0.55°C	4°F = 2.22°C	7°F = 3.88°C
2°F = 1.11°C	5°F = 2.77°C	8°F = 4.44°C
3°F = 1.66°C	6°F = 3.33°C	9°F = 5.00°C

TECHNICAL INFORMATION

CONVERSION FACTORS

LENGTH			
Millimetres (mm)	Metres (m)	Inches (in)	Feet (ft)
1	10 ⁻³	0.03937	0.00328
10 ³	1	39.37	3.28
25.4	0.0254	1	0.0833
304.8	0.3048	12	1

VELOCITY			
Feet Per Second (ft/s)	Feet Per Minute (ft/min)	Metres Per Second (m/s)	Metres Per Minute (m/min)
1	60	0.305	18.29
0.0167	1	0.005	0.305
3.28	196.85	1	60
0.055	3.28	0.0167	1

AREA			
Square Millimetres (mm ²)	Square Metres (m ²)	Square Inches (in ²)	Square Feet (ft ²)
1	10 ⁻⁶	1.55x10 ⁻³	0.01076x10 ⁻³
10 ⁻⁶	1	1550	10.764
645.16	0.645x10 ⁻³	1	6.949x10 ⁻³
92.903x10 ⁻³	0.0929	144	1

PRESSURE			
Inch Water (inH2O)	Millimetre Mercury (mmHg)	Pound Force Square In. (lbf/in)	Kilopascal (kpa)
1	25.4	39.09x10 ⁻³	0.2486
13.61	1	0.4912	3.386
27.70	2.036	1	6.895
4.02	0.2953	0.145	1

MASS			
Kilogram (kg)	Metric Ton (Tonne 1000kg)	Pound (lb)	UK Ton (ton)
1	10 ⁻³	2.205	0.984 x 10 ⁻³
10 ³	1	2205	0.984
0.454	0.454 x 10 ⁻³	1	0.461 x 10 ⁻³
1016	1.016	2240	1

DENSITY		
Kilogram Force (kgf)	Newton (N)	Pound Force (lbf)
1	9.807	2.205
0.102	1	0.225
0.454	4.448	1

VOLUME					
Cubic Millimetres (mm ³)	Cubic Metres (m ³)	Litre (litre)	Cubic Inches (in ³)	Cubic Feet (ft ³)	Imperial Gallon (gal.)
1	10 ⁻⁹	10 ⁻⁶	61.023	0.353x10 ⁻⁹	0.220x10 ⁻⁶
10 ⁹	1	10 ⁻³	61.023x10 ³	35.315	219.9
10 ⁶	10 ⁻³	1	61.023	0.035	0.0220
16.4x10 ³	16.4x10 ⁻⁶	16.4x10 ⁻³	1	0.578x10 ⁻³	3.6x10 ⁻³
28.32x10 ³	0.0283	28.316	1728	1	6.229
4546x10 ³	0.0045	4.546	277.46	0.1605	1

DENSITY		
Kilogram Per Cubic Metre (kg/m ³)	Pound Per Cubic Inch (lb/in ³)	Pound Per Cubic Foot (lb/in ³)
1	0.036x10 ⁻³	0.0624
2768x10 ³	1	1728
16.02	0.578 x 10 ⁻³	1

TECHNICAL INFORMATION CONVERSION FACTORS

POWER	
Kilowatt (kWh)	British Thermal (Btu)
1	3412
0.293×10^{-3}	1

WATT DENSITY	
Watt Per Square Inch (watt/in ²)	Kilowatt Per Square Metre (kW/m ²)
1	1.55
0.645	1

SPECIFIC HEAT CAPACITY		
Btu/lb. °F	J/kg.K	kJ/kg.K
1	4.187×10^{-3}	4.187
238.8	1	10^{-3}
0.2388	10^3	1
Note 1 Cal = 4.187J		

ENERGY	
British Thermal Unit (Btu)	KiloJoule (kJ)
1	1.06
0.948	1

VOLUME RATE OF FLOW					
Cubic Foot Per Second (ft ³ /s)	Cubic Foot Per Minute (ft ³ /min)	Litres Per Second (litre/s)	Gallons Per Minute (gal/min)	Cubic Metres Per Second (m ³ /s)	Cubic Metres Per Minute (m ³ /min)
1	60	28.316	373.2	0.028	1.68
0.016	1	0.472	6.229	0.47×10^{-3}	0.0283
0.035	2.119	1	13.2	1×10^{-3}	60×10^{-3}
0.003	0.1605	0.076	1	0.076×10^{-3}	4.56×10^{-3}
35.315	2119	1×10^3	13.19×10^3	1	60
0.588	35.315	16.6	219.9	0.016	1

GUARANTEE

Stokes Appliance Parts "**Stokes**" guarantee electric heating elements supplied 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** option, refund of purchase price.

Stokes shall not be responsible for the cost of removal and return of any defective element or reinstalling the repaired or replacement element.

GUARANTEE PERIOD

Twelve (12) months from the date of sale by **Stokes** 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** 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**.

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