Zoppas Industries
Heating Element Technologies

CARTRIDGE HEATERS

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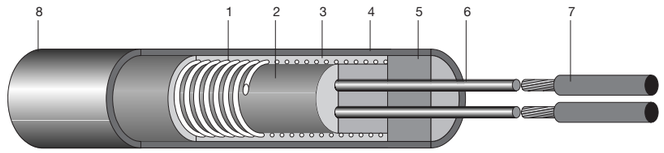
Heating Element Technologies

HI-DENSITY CARTRIDGE HEATERS

We design and manufacture cartridge heaters of high quality and reliability.
From design to laboratory validation, we work in synergy with our customers to customize heating elements and assemblies to their specific needs.

Depending on the type of application, working temperature and specific load, we offer different types of cartridge heating elements: with evenly distributed power, differentiated or with several independent heating elements.



1 Nickel-chrome 80/20 resistance wire
2 High purity magnesium oxide core
3 High purity compacted magnesium oxide
4 Stainless steel sheath
5 Ceramic end cap
6 Solid nickel conductors
7 Fiberglass-silicone insulated nickel leadwires
8 Tig welded bottom disc

CONSTRUCTIVE SPECIFICATIONS AND TOLERANCES:

Wattage	*+ 5%*	*- 10%*
Resistance	*+ 10%*	*- 5%*
Dielectric strength (voltage applied)	*1500*	*V*
Insulation (cold 1000 Vdc)	*> 10*	MΩ
Leakage current (cold)	*< 0,5*	*mA*
Maximum working temperature allowed on sheath	*750*	°C
Length tolerance	*± 2*	*%*

Ø mm	4	5	6,5	8	10	12,5	16	20	25*	32*
Ø in			1/4"		3/8"	1/2"	5/8"	3/4"	1"*	1"1/4*
Max V	240	240	240	240	240	240	400	400	400	400
Max A	2	2,5	4	5	8	14	18	22	25	25

Unheated end sections :

* *Upon request only*

Ø	Lmin	Lmax
25 -1"	150	1500
32 -1"¼	300	2000

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Both Ø heaters 6,5 and 8 mm are provided with 250mm long leads, fiberglass-silicone insulated nickel, internally connected.
For diameters =>10mm, see pag. 11.

METRIC SIZES

Ø mm	L mm	W 230V	W cm²	CODICE CODE
6,5 - 0,02 - 0,04	40	80	15	10.065.040.0080
		100	18	10.065.040.0100
		125	22	10.065.040.0125
		160	28	10.065.040.0160
		200	36	10.065.040.0200
	50	125	16	10.065.050.0125
		160	21	10.065.050.0160
		200	26	10.065.050.0200
		250	32	10.065.050.0250
		315	42	10.065.050.0315
	60	125	13	10.065.060.0125
		160	17	10.065.060.0160
		200	21	10.065.060.0200
		250	26	10.065.060.0250
		315	33	10.065.060.0315
	80	160	12	10.065.080.0160
		200	15	10.065.080.0200
		250	19	10.065.080.0250
		315	24	10.065.080.0315
	100	200	12	10.065.100.0200
		250	15	10.065.100.0250
		315	18	10.065.100.0315
		400	24	10.065.100.0400
	130	250	11	10.065.130.0250
		315	13	10.065.130.0315
		400	17	10.065.130.0400
		500	22	10.065.130.0500
	160	250	9	10.065.160.0250
		315	11	10.065.160.0315
		400	14	10.065.160.0400
		500	18	10.065.160.0500
8 - 0,03 - 0,05	40	125	18	10.080.040.0125
		160	23	10.080.040.0160
		200	30	10.080.040.0200
	50	125	14	10.080.050.0125
		160	18	10.080.050.0160
		200	22	10.080.050.0200
		250	28	10.080.050.0250
	60	160	14	10.080.060.0160
		200	17	10.080.060.0200
		250	22	10.080.060.0250
		315	27	10.080.060.0315
	80	200	12	10.080.080.0200
		250	15	10.080.080.0250
		315	19	10.080.080.0315
		400	24	10.080.080.0400
	100	200	9	10.080.100.0200
		250	12	10.080.100.0250
		315	14	10.080.100.0315
		400	18	10.080.100.0400
	130	250	9	10.080.130.0250
		315	11	10.080.130.0315
		400	14	10.080.130.0400
		500	18	10.080.130.0500
	160	250	7	10.080.160.0250
		315	9	10.080.160.0315
		400	11	10.080.160.0400
		500	14	10.080.160.0500
10 - 0,03 - 0,06	40	125	16	10.100.040.0125
		160	20	10.100.040.0160
		200	25	10.100.040.0200
		250	32	10.100.040.0250
		315	39	10.100.040.0315

Ø mm	L mm	W 230V	W cm²	CODICE CODE
10 - 0,03 - 0,06	50	160	15	10.100.050.0160
		200	18	10.100.050.0200
		250	23	10.100.050.0250
		315	28	10.100.050.0315
		400	36	10.100.050.0400
		500	46	10.100.050.0500
	60	160	12	10.100.060.0160
		200	15	10.100.060.0200
		250	18	10.100.060.0250
		315	23	10.100.060.0315
		400	30	10.100.060.0400
		500	37	10.100.060.0500
	80	200	10	10.100.080.0200
		250	13	10.100.080.0250
		315	16	10.100.080.0315
		400	20	10.100.080.0400
		500	26	10.100.080.0500
		630	32	10.100.080.0630
	100	250	10	10.100.100.0250
		315	12	10.100.100.0315
		400	16	10.100.100.0400
		500	20	10.100.100.0500
		630	25	10.100.100.0630
		800	31	10.100.100.0800
	130	250	7	10.100.130.0250
		315	9	10.100.130.0315
		400	12	10.100.130.0400
		500	14	10.100.130.0500
		630	18	10.100.130.0630
		800	23	10.100.130.0800
	160	315	7	10.100.160.0315
		400	9	10.100.160.0400
		500	11	10.100.160.0500
		630	14	10.100.160.0630
		800	18	10.100.160.0800
		1000	22	10.100.160.1000
	200	400	7	10.100.200.0400
		500	9	10.100.200.0500
		630	11	10.100.200.0630
		800	14	10.100.200.0800
		1000	18	10.100.200.1000
12,5 - 0,04 - 0,07	40	160	16	10.125.040.0160
		200	20	10.125.040.0200
		250	25	10.125.040.0250
		315	32	10.125.040.0315
	50	160	11	10.125.050.0160
		200	14	10.125.050.0200
		250	18	10.125.050.0250
		315	22	10.125.050.0315
		400	28	10.125.050.0400
	60	200	11	10.125.060.0200
		250	14	10.125.060.0250
		315	18	10.125.060.0315
		400	22	10.125.060.0400
		500	28	10.125.060.0500
	80	200	8	10.125.080.0200
		250	10	10.125.080.0250
		315	13	10.125.080.0315
		400	16	10.125.080.0400
		500	20	10.125.080.0500
		630	25	10.125.080.0630
	100	315	10	10.125.100.0315
		400	12	10.125.100.0400

Ø mm	L mm	W 230V	W cm²	CODICE CODE
12,5 - 0,04 - 0,07	100	500	15	10.125.100.0500
		630	19	10.125.100.0630
		800	24	10.125.100.0800
		1000	30	10.125.100.1000
	130	315	7	10.125.130.0315
		400	9	10.125.130.0400
		500	11	10.125.130.0500
		630	14	10.125.130.0630
		800	18	10.125.130.0800
		1000	22	10.125.130.1000
	160	400	7	10.125.160.0400
		500	9	10.125.160.0500
		630	11	10.125.160.0630
		800	14	10.125.160.0800
		1000	18	10.125.160.1000
		1250	22	10.125.160.1250
	200	500	7	10.125.200.0500
		630	9	10.125.200.0630
		800	11	10.125.200.0800
		1000	14	10.125.200.1000
		1250	17	10.125.200.1250
		1600	22	10.125.200.1600
	250	630	7	10.125.250.0630
		800	9	10.125.250.0800
		1000	11	10.125.250.1000
		1250	13	10.125.250.1250
		1600	18	10.125.250.1600
		2000	22	10.125.250.2000
	300	630	6	10.125.300.0630
		800	7	10.125.300.0800
		1000	9	10.125.300.1000
		1250	11	10.125.300.1250
		1600	15	10.125.300.1600
		2000	18	10.125.300.2000
16 - 0,05 - 0,08	50	200	12	10.160.050.0200
		250	15	10.160.050.0250
		315	19	10.160.050.0315
		400	24	10.160.050.0400
	60	200	9	10.160.060.0200
		250	11	10.160.060.0250
		315	14	10.160.060.0315
		400	18	10.160.060.0400
		500	22	10.160.060.0500
	80	250	8	10.160.080.0250
		315	10	10.160.080.0315
		400	13	10.160.080.0400
		500	16	10.160.080.0500
		630	20	10.160.080.0630
		800	26	10.160.080.0800
	100	315	8	10.160.100.0315
		400	10	10.160.100.0400
		500	12	10.160.100.0500
		630	15	10.160.100.0630
		800	20	10.160.100.0800
		1000	24	10.160.100.1000
	130	400	7	10.160.130.0400
		500	9	10.160.130.0500
		630	11	10.160.130.0630
		800	14	10.160.130.0800
		1000	18	10.160.130.1000
		1250	22	10.160.130.1250
	160	500	7	10.160.160.0500
		630	9	10.160.130.0630

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METRIC SIZES

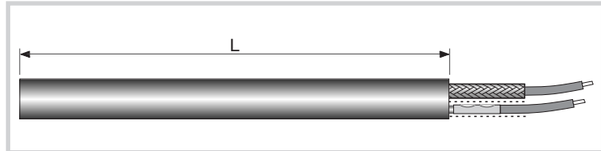
Ø mm	L mm	W 230V	W cm²	CODICE CODE
16 - 0,05 - 0,08	160	800	11	10.160.160.0800
		1000	14	10.160.160.1000
		1250	18	10.160.160.1250
		1600	22	10.160.160.1600
	200	630	7	10.160.200.0630
		800	9	10.160.200.0800
		1000	11	10.160.200.1000
		1250	14	10.160.200.1250
		1600	18	10.160.200.1600
		2000	22	10.160.200.2000
	250	630	5	10.160.250.0630
		800	7	10.160.250.0800
		1000	9	10.160.250.1000
		1250	11	10.160.250.1250
		1600	14	10.160.250.1600
		2000	18	10.160.250.2000
	300	800	6	10.160.300.0800
		1000	7	10.160.300.1000
		1250	9	10.160.300.1250
		1600	11	10.160.300.1600
		2000	14	10.160.300.2000
		2500	18	10.160.300.2500
	350	800	5	10.160.350.0800
		1000	6	10.160.350.1000
		1250	8	10.160.350.1250
		1600	10	10.160.350.1600

Ø mm	L mm	W 230V	W cm²	CODICE CODE
16 - 0,05 - 0,08	350	2000	12	10.160.350.2000
		2500	16	10.160.350.2500
	400	800	4	10.160.400.0800
		1000	5	10.160.400.1000
		1250	6	10.160.400.1250
		1600	8	10.160.400.1600
		2000	10	10.160.400.2000
		2500	13	10.160.400.2500
20 - 0,06 - 0,10	80	400	11	10.200.080.0400
		500	14	10.200.080.0500
		630	17	10.200.080.0630
	100	400	8	10.200.100.0400
		500	10	10.200.100.0500
		630	13	10.200.100.0630
	130	500	7	10.200.130.0500
		630	9	10.200.130.0630
		800	12	10.200.130.0800
		1000	15	10.200.130.1000
	160	630	7	10.200.160.0630
		800	9	10.200.160.0800
		1000	11	10.200.160.1000
		1250	14	10.200.160.1250
	200	800	7	10.200.200.0800
		1000	9	10.200.200.1000
		1250	11	10.200.200.1250
		1600	14	10.200.200.1600

Ø mm	L mm	W 230V	W cm²	CODICE CODE
20 - 0,06 - 0,10	250	1000	7	10.200.250.1000
		1250	9	10.200.250.1250
		1600	11	10.200.250.1600
		2000	14	10.200.250.2000
	300	1000	6	10.200.300.1000
		1250	7	10.200.300.1250
		1600	9	10.200.300.1600
		2000	11	10.200.300.2000
	350	1250	6	10.200.350.1250
		1600	8	10.200.350.1600
		2000	10	10.200.350.2000
		2500	12	10.200.350.2500
	400	1250	5	10.200.400.1250
		1600	7	10.200.400.1600
		2000	9	10.200.400.2000
		2500	11	10.200.400.2500
	450	1600	6	10.200.450.1600
		2000	7	10.200.450.2000
		2500	9	10.200.450.2500
		3200	12	10.200.450.3200
	500	1600	5	10.200.500.1600
		2000	6	10.200.500.2000
		2500	8	10.200.500.2500
		3200	11	10.200.500.3200

HI-DENSITY CARTRIDGE HEATERS

The 1/4“ Ø heaters are provided with 250mm long leads, fiberglass-silicone insulated nickel, internally connected.
For diameters =>3/8“, see pag. 11.



BRITISH SIZES

Ø	L	W 230V	W cm²	CODICE CODE
1/4” 6,35 mm - 0,02 - 0,04	1” 25,4 mm	100	38	10.063.025.0100
		160	53	10.063.025.0160
	1”1/4 31,8 mm	100	25	10.063.031.0100
		125	31	10.063.031.0125
		160	40	10.063.031.0160
		200	50	10.063.031.0200
	1”1/2 38,1 mm	80	15	10.063.038.0080
		100	18	10.063.038.0100
		125	23	10.063.038.0125
		160	29	10.063.038.0160
		200	36	10.063.038.0200
	2” 50,8 mm	125	17	10.063.050.0125
		160	21	10.063.050.0160
		200	27	10.063.050.0200
		250	33	10.063.050.0250
		315	42	10.063.050.0315
	2”1/2 63,5 mm	125	13	10.063.063.0125
		160	16	10.063.063.0160
		200	20	10.063.063.0200
		250	25	10.063.063.0250
		315	32	10.063.063.0315
	3” 76,2 mm	160	13	10.063.076.0160
		200	16	10.063.076.0200
		250	20	10.063.076.0250
		315	25	10.063.076.0315
	3”1/2 88,9 mm	160	11	10.063.088.0160
		200	13	10.063.088.0200

Ø	L	W 230V	W cm²	CODICE CODE
1/4” 6,35 mm - 0,02 - 0,04	3”1/2 88,9 mm	250	17	10.063.088.0250
		315	21	10.063.088.0315
	4” 101,6 mm	200	11	10.063.101.0200
		250	14	10.063.101.0250
		315	18	10.063.101.0315
		400	23	10.063.101.0400
	5” 127 mm	250	11	10.063.127.0250
		315	14	10.063.127.0315
		400	18	10.063.127.0400
		500	23	10.063.127.0500
	6” 152,4 mm	250	9	10.063.152.0250
		315	12	10.063.152.0315
		400	15	10.063.152.0400
		500	18	10.063.152.0500
3/8” 9,52 mm - 0,03 - 0,06	1” 25,4 mm	125	28	10.095.025.0125
		200	44	10.095.025.0200
	1”1/4 31,8 mm	125	21	10.095.031.0125
		200	33	10.095.031.0200
	1”1/2 38,1 mm	125	17	10.095.038.0125
		160	21	10.095.038.0160
		200	27	10.095.038.0200
		250	33	10.095.038.0250
		315	42	10.095.038.0315
	1”3/4 44,5 mm	125	13	10.095.044.0125
		160	17	10.095.044.0160
		200	21	10.095.044.0200

Ø	L	W 230V	W cm²	CODICE CODE
3/8” 9,52mm - 0,03 - 0,06	1”3/4 44,5 mm	250	26	10.095.044.0250
		315	33	10.095.044.0315
	2” 50,8 mm	160	15	10.095.050.0160
		200	19	10.095.050.0200
		250	24	10.095.050.0250
		315	30	10.095.050.0315
		400	38	10.095.050.0400
	2”1/2 63,5 mm	160	11	10.095.063.0160
		200	14	10.095.063.0200
		250	17	10.095.063.0250
		315	22	10.095.063.0315
		400	28	10.095.063.0400
		500	34	10.095.063.0500
	3” 76,2 mm	200	11	10.095.076.0200
		250	14	10.095.076.0250
		315	18	10.095.076.0315
		400	22	10.095.076.0400
		500	28	10.095.076.0500
		630	45	10.095.076.0630
	3”1/2 88,9 mm	200	9	10.095.088.0200
		250	11	10.095.088.0250
		315	14	10.095.088.0315
		400	18	10.095.088.0400
		500	23	10.095.088.0500
		630	29	10.095.088.0630

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BRITISH SIZES

Ø	L	W 230V	W cm²	CODICE CODE
3/8” 9,52 mm - 0,03 - 0,06	4” 101,6 mm	250	10	10.095.101.0250
		315	12	10.095.101.0315
		400	16	10.095.101.0400
		500	20	10.095.101.0500
		630	25	10.095.101.0630
		800	32	10.095.101.0800
	5” 127 mm	250	7	10.095.127.0250
		315	9	10.095.127.0315
		400	12	10.095.127.0400
		500	15	10.095.127.0500
		630	18	10.095.127.0630
		800	24	10.095.127.0800
	6” 152,4 mm	315	8	10.095.152.0315
		400	10	10.095.152.0400
		500	12	10.095.152.0500
		630	15	10.095.152.0630
		800	20	10.095.152.0800
		1000	24	10.095.152.1000
	7” 177,8 mm	400	8	10.095.177.0400
		500	10	10.095.177.0500
		630	13	10.095.177.0630
		800	16	10.095.177.0800
		1000	21	10.095.177.1000
	8” 203,2 mm	400	7	10.095.203.0400
		500	9	10.095.203.0500
		630	11	10.095.203.0630
		800	18	10.095.203.0800
		1000	23	10.095.203.0800
1/2” 12,7 mm - 0,04 - 0,07	1”1/2 38,1 mm	160	18	10.127.038.0160
		200	22	10.127.038.0200
		250	28	10.127.038.0250
		315	35	10.127.038.0315
	2” 50,8 mm	160	11	10.127.050.0160
		200	14	10.127.050.0200
		250	18	10.127.050.0250
		315	22	10.127.050.0315
		400	28	10.127.050.0400
	2”1/2 63,5 mm	200	10	10.127.063.0200
		250	13	10.127.063.0250
		315	16	10.127.063.0315
		400	20	10.127.063.0400
		500	26	10.127.063.0500
	3” 76,2 mm	250	10	10.127.076.0250
		315	13	10.127.076.0315
		400	16	10.127.076.0400
		500	20	10.127.076.0500
		630	26	10.127.076.0630
		800	33	10.127.076.0800
	3”1/2 88,9 mm	250	9	10.127.088.0250
		315	11	10.127.088.0315
		400	14	10.127.088.0400
		500	18	10.127.088.0500
		630	22	10.127.088.0630
		800	28	10.127.088.0800
	4” 101,6 mm	315	9	10.127.101.0315
		400	12	10.127.101.0400
		500	15	10.127.101.0500
		630	18	10.127.101.0630
		800	24	10.127.101.0800
		1000	36	10.127.101.1000
	5” 127 mm	315	7	10.127.127.0315
		400	9	10.127.127.0400
		500	11	10.127.127.0500
		630	14	10.127.127.0630
		800	18	10.127.127.0800
		1000	23	10.127.127.1000
	6” 152,4 mm	400	7	10.127.152.0400
		500	9	10.127.152.0500
		630	12	10.127.152.0630
		800	15	10.127.152.0800

Ø	L	W 230V	W cm²	CODICE CODE
1/2” 12,7 mm - 0,04 - 0,07	6” 152,4 mm	1000	18	10.127.152.1000
		1250	23	10.127.152.1250
	7” 177,8 mm	400	6	10.127.177.0400
		500	8	10.127.177.0500
		630	10	10.127.177.0630
		800	12	10.127.177.0800
		1000	16	10.127.177.1000
	8” 203,2 mm	500	7	10.127.203.0500
		630	8	10.127.203.0630
		800	11	10.127.203.0800
		1000	14	10.127.203.1000
		1250	17	10.127.203.1250
		1600	22	10.127.203.1600
	9” 228,6 mm	500	6	10.127.228.0500
		630	8	10.127.228.0630
		800	10	10.127.228.0800
		1000	12	10.127.228.1000
		1250	15	10.127.228.1250
		1600	19	10.127.228.1600
	10” 254 mm	630	7	10.127.254.0630
		800	9	10.127.254.0800
		1000	11	10.127.254.1000
		1250	13	10.127.254.1250
		1600	17	10.127.254.1600
		2000	21	10.127.254.2000
	12” 304,8 mm	630	6	10.127.304.0630
		800	7	10.127.304.0800
		1000	9	10.127.304.1000
		1250	11	10.127.304.1250
		1600	14	10.127.304.1600
		2000	18	10.127.304.2000
5/8” 15,87 mm - 0,05 - 0,08	2” 50,8 mm	200	11	10.158.050.0200
		250	14	10.158.050.0250
		315	18	10.158.050.0315
		400	23	10.158.050.0400
	2”1/2 63,5 mm	200	8	10.158.063.0200
		250	10	10.158.063.0250
		315	13	10.158.063.0315
		400	16	10.158.063.0400
		500	20	10.158.063.0500
	3” 76,2 mm	250	8	10.158.076.0250
		315	11	10.158.076.0315
		400	13	10.158.076.0400
		500	17	10.158.076.0500
		630	21	10.158.076.0630
		800	26	10.158.076.0800
	4” 101,6 mm	315	8	10.158.101.0315
		400	10	10.158.101.0400
		500	12	10.158.101.0500
		630	15	10.158.101.0630
		800	20	10.158.101.0800
		1000	24	10.158.101.1000
	5” 127 mm	400	7	10.158.127.0400
		500	8	10.158.127.0500
		630	10	10.158.127.0630
		800	14	10.158.127.0800
		1000	17	10.158.127.1000
		1250	21	10.158.127.1250
	6” 152,4 mm	500	7	10.158.152.0500
		630	9	10.158.152.0630
		800	12	10.158.152.0800
		1000	15	10.158.152.1000
		1250	19	10.158.152.1250
		1600	24	10.158.152.1600
	7” 177,8 mm	500	6	10.158.177.0500
		630	8	10.158.177.0630
		800	10	10.158.177.0800
		1000	13	10.158.177.1000
		1250	16	10.158.177.1250
		1600	20	10.158.177.1600

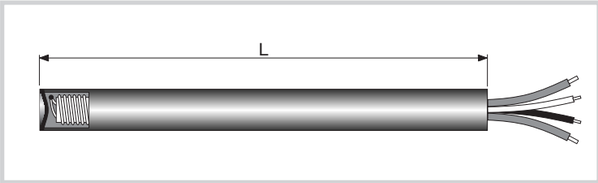
Ø	L	W 230V	W cm²	CODICE CODE
5/8” 15,87 mm - 0,05 - 0,08	8” 203,2 mm	630	7	10.158.203.0630
		800	9	10.158.203.0800
		1000	11	10.158.203.1000
		1250	14	10.158.203.1250
		1600	18	10.158.203.1600
		2000	22	10.158.203.2000
	10” 254 mm	630	5	10.158.254.0630
		800	7	10.158.254.0800
		1000	9	10.158.254.1000
		1250	11	10.158.254.1250
		1600	14	10.158.254.1600
		2000	17	10.158.254.2000
	12” 304,8 mm	800	6	10.158.304.0800
		1000	7	10.158.304.1000
		1250	9	10.158.304.1250
		1600	11	10.158.304.1600
		2000	14	10.158.304.2000
		2500	17	10.158.304.2500
	14” 355,6 mm	800	5	10.158.355.0800
		1000	6	10.158.355.1000
		1250	7	10.158.355.1250
		1600	9	10.158.355.1600
		2000	12	10.158.355.2000
		2500	15	10.158.355.2500
	16” 406,4 mm	1000	5	10.158.406.1000
		1250	6	10.158.406.1250
		1600	8	10.158.406.1600
		2000	10	10.158.406.2000
		2500	12	10.158.406.2500
3/4” 19,05 mm - 0,06 - 0,10	3” 76,2 mm	400	11	10.190.076.0400
		500	14	10.190.076.0500
		630	18	10.190.076.0630
	4” 101,6 mm	400	8	10.190.101.0400
		500	10	10.190.101.0500
		630	13	10.190.101.0630
	5” 127 mm	500	7	10.190.127.0500
		630	9	10.190.127.0630
		800	11	10.190.127.0800
		1000	14	10.190.127.1000
	6” 152,4 mm	630	8	10.190.152.0630
		800	10	10.190.152.0800
		1000	13	10.190.152.1000
		1250	16	10.190.152.1250
	8” 203,2 mm	800	7	10.190.203.0800
		1000	9	10.190.203.1000
		1250	11	10.190.203.1250
		1600	15	10.190.203.1600
	10” 254 mm	1000	7	10.190.254.1000
		1250	9	10.190.254.1250
		1600	11	10.190.254.1600
		2000	14	10.190.254.2000
	12” 304,8 mm	1000	6	10.190.304.1000
		1250	7	10.190.304.1250
		1600	9	10.190.304.1600
		2000	12	10.190.304.2000
	14” 355,6 mm	1250	6	10.190.355.1250
		1600	8	10.190.355.1600
		2000	10	10.190.355.2000
		2500	13	10.190.355.2500
	16” 406,4 mm	1250	5	10.190.406.1250
		1600	7	10.190.406.1600
		2000	9	10.190.406.2000
		2500	11	10.190.406.2500
	18” 457,2 mm	1600	6	10.190.457.1600
		2000	8	10.190.457.2000
		2500	10	10.190.457.2500
		3200	12	10.190.457.3200
	20” 508 mm	1600	6	10.190.508.1600
		2000	7	10.190.508.2000
		2500	9	10.190.508.2500
		3200	11	10.190.508.3200

HI-DENSITY CARTRIDGE HEATERS WITH BUILT-IN THERMOCOUPLE

Standard supply 1000mm long fiberglass-silicone insulated nickel leads, and PTFE thermocouple insulated leads, both internally connected.

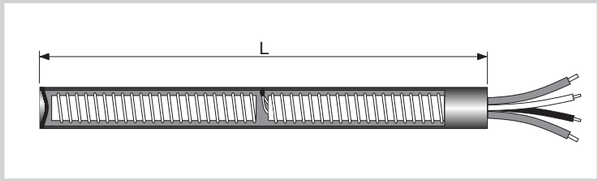
TC1 Type

Standard
Thermocouple hot junction is in contact to sheath and bottom disc; it will provide good temperature readings with quick response.



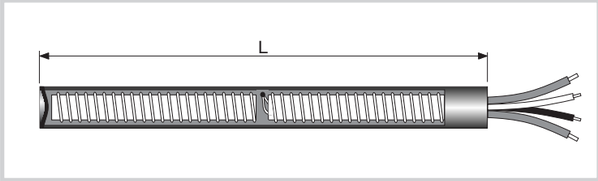
TC2 Type

Upon request
Thermocouple hot junction is insulated and located in proximity of bottom disc; slower response than TC1 type.



TC3 Type

Upon request (L min. 80 mm)
Thermocouple hot junction is located at the middle of the lenght and in contact to the sheath; it will provide good temperature readings with quick response.



TC4 Type

Upon request (L min. 50 mm)
Thermocouple hot junction is insulated and located at the middle of the length in proximity of the sheath; slower response than TC3 type.

ALL HI-DENSITY CARTRIDGE HEATERS CAN BE MANUFACTURED WITH BUILT-IN ‘J’ OR ‘K’ THERMOCOUPLE.

THERMOCOUPLE DIN			TEMPERATURE APPLICATION
TYPE	POLE POSITIVE	POLE NEGATIVE	
J	IRON (+) RED	COSTANTAN (-) BLUE	UP TO 500°C
K	CHROMEL (+) RED	ALUMEL (-) GREEN	UP TO 750°C

Zoppas Industries
Heating Element Technologies

HI-DENSITY CARTRIDGE HEATERS WITH BUILT-IN 'J' THERMOCOUPLE

TC1 Type

Standard supply 1000 mm long fiberglass-silicone insulated nickel leads, and PTFE thermocouple insulated leads, both internally connected.

METRIC SIZES

Ø mm.	L mm.	W 230V	W cm²	CODICE CODE
6,5 -0,02 -0,04	40	125	22	11.065.040.0125
		160	28	11.065.040.0160
		200	36	11.065.040.0200
	50	125	16	11.065.050.0125
		160	21	11.065.050.0160
		200	26	11.065.050.0200
	60	160	17	11.065.060.0160
		200	21	11.065.060.0200
		250	26	11.065.060.0250
	80	200	15	11.065.080.0200
		250	19	11.065.080.0250
		315	24	11.065.080.0315
	100	250	15	11.065.100.0250
		315	18	11.065.100.0315
		400	24	11.065.100.0400
	130	315	13	11.065.130.0315
		400	17	11.065.130.0400
		500	22	11.065.130.0500
	160	315	11	11.065.160.0315
		400	14	11.065.160.0400
		500	18	11.065.160.0500
8 -0,03 -0,05	40	160	23	11.080.040.0160
		200	30	11.080.040.0200
	50	160	18	11.080.050.0160
		250	28	11.080.050.0250
	60	200	17	11.080.060.0200
		315	27	11.080.060.0315

Ø mm.	L mm.	W 230V	W cm²	CODICE CODE
8 -0,03 -0,05	80	250	15	11.080.080.0250
		315	19	11.080.080.0315
		400	24	11.080.080.0400
	100	250	12	11.080.100.0250
		400	18	11.080.100.0400
	130	315	11	11.080.130.0315
		500	18	11.080.130.0500
	160	315	9	11.080.160.0315
		500	14	11.080.160.0500
10 -0,03 -0,06	40	160	20	11.100.040.0160
		200	25	11.100.040.0200
		250	32	11.100.040.0250
	50	200	18	11.100.050.0200
		250	23	11.100.050.0250
		315	28	11.100.050.0315
	60	200	15	11.100.060.0200
		250	18	11.100.060.0250
		315	23	11.100.060.0315
	80	250	13	11.100.080.0250
		315	16	11.100.080.0315
		400	20	11.100.080.0400
	100	315	12	11.100.100.0315
		400	16	11.100.100.0400
		500	20	11.100.100.0500
	130	315	9	11.100.130.0315
		400	12	11.100.130.0400
		500	14	11.100.130.0500

Ø mm.	L mm.	W 230V	W cm²	CODICE CODE
10 -0,03 -0,06	160	400	9	11.100.160.0400
		500	11	11.100.160.0500
		630	14	11.100.160.0630
	200	500	9	11.100.200.0500
		800	14	11.100.200.0800
12,5 -0,04 -0,07	40	200	20	11.125.040.0200
		250	25	11.125.040.0250
	50	200	14	11.125.050.0200
		315	22	11.125.050.0315
		400	28	11.125.050.0400
	60	250	14	11.125.060.0250
		400	22	11.125.060.0400
	80	250	10	11.125.080.0250
		400	16	11.125.080.0400
	100	400	12	11.125.100.0400
		630	19	11.125.100.0630
	130	400	9	11.125.130.0400
		630	14	11.125.130.0630
	160	500	9	11.125.160.0500
		800	14	11.125.160.0800
	200	630	9	11.125.200.0630
		1000	14	11.125.200.1000
	250	800	9	11.125.250.0800
		1250	13	11.125.250.1250
	300	1000	9	11.125.300.1000
		1600	15	11.125.300.1600

BRITISH SIZES

Ø	L	W 230V	W cm²	CODICE CODE
1/4" 6,35 mm -0,02 -0,04	1" 25,4 mm	160	53	11.063.025.0160
	1"1/4 31,8 mm	125	31	11.063.031.0125
		160	40	11.063.031.0160
		200	50	11.063.031.0200
	1"1/2 38,1 mm	125	23	11.063.038.0125
		160	29	11.063.038.0160
		200	36	11.063.038.0200
	1"3/4 44,5 mm	125	19	11.063.044.0125
		160	25	11.063.044.0160
		200	31	11.063.044.0200
	2" 50,8 mm	160	21	11.063.050.0160
		200	27	11.063.050.0200
		250	33	11.063.050.0250
	2"1/2 63,5 mm	200	20	11.063.063.0200
		250	25	11.063.063.0250
		315	32	11.063.063.0315
	3" 76,2 mm	200	16	11.063.076.0200
		250	20	11.063.076.0250
		315	25	11.063.076.0315
	3"1/2 88,9 mm	200	13	11.063.088.0200
		250	17	11.063.088.0250
		315	21	11.063.088.0315
	4" 101,6 mm	250	14	11.063.101.0250
		315	18	11.063.101.0315
		400	23	11.063.101.0400
	5" 127 mm	315	14	11.063.127.0315
		400	18	11.063.127.0400
		500	23	11.063.127.0500
	6" 152,4 mm	315	12	11.063.152.0315
		400	15	11.063.152.0400
		500	18	11.063.152.0500

Ø	L	W 230V	W cm²	CODICE CODE
3/8" 9,52 mm -0,03 -0,06	1" 25,4 mm	200	44	11.095.025.0200
	1"1/4 31,8 mm	160	26	11.095.031.0160
		200	33	11.095.031.0200
	1"1/2 38,1 mm	160	21	11.095.038.0160
		200	27	11.095.038.0200
		250	33	11.095.038.0250
	1"3/4 44,5 mm	160	17	11.095.044.0160
		200	21	11.095.044.0200
		250	26	11.095.044.0250
		315	33	11.095.044.0315
	2" 50,8 mm	200	19	11.095.050.0200
		250	24	11.095.050.0250
		315	30	11.095.050.0315
	2"1/2 63,5 mm	200	14	11.095.063.0200
		250	17	11.095.063.0250
		315	22	11.095.063.0315
		400	28	11.095.063.0400
	3" 76,2 mm	250	14	11.095.076.0250
		315	18	11.095.076.0315
		400	22	11.095.076.0400
		500	28	11.095.076.0500
	3"1/2 88,9 mm	250	11	11.095.088.0250
		315	14	11.095.088.0315
		400	18	11.095.088.0400
		500	23	11.095.088.0500
	4" 101,6 mm	315	12	11.095.101.0315
		400	16	11.095.101.0400
		500	20	11.095.101.0500
	5" 127 mm	400	12	11.095.127.0400
		500	15	11.095.127.0500
	6" 152,4 mm	400	10	11.095.152.0400
		500	12	11.095.152.0500
		630	15	11.095.152.0630

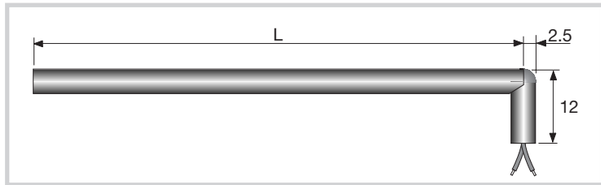
Ø	L	W 230V	W cm²	CODICE CODE
3/8" 9,52 mm -0,03 -0,06	7" 177,8 mm	500	10	11.095.177.0500
		800	16	11.095.177.0800
	8" 203,2 mm	500	9	11.095.203.0500
		800	14	11.095.203.0800
1/2" 12,7 mm -0,04 -0,07	1"1/2 38,1 mm	200	22	11.127.038.0200
		250	28	11.127.038.0250
	2" 50,8 mm	200	14	11.127.050.0200
		315	22	11.127.050.0315
	2"1/2 63,5 mm	250	13	11.127.063.0250
		400	20	11.127.063.0400
	3" 76,2 mm	250	10	11.127.076.0250
		400	16	11.127.076.0400
	3"1/2 88,9 mm	315	11	11.127.088.0315
		400	14	11.127.088.0400
		500	18	11.127.088.0500
	4" 101,6 mm	400	12	11.127.101.0400
		500	15	11.127.101.0500
		630	18	11.127.101.0630
	5" 127 mm	400	9	11.127.127.0400
		630	14	11.127.127.0630
		800	18	11.127.127.0800
	6" 152,4 mm	500	9	11.127.152.0500
		800	15	11.127.152.0800
	7" 177,8 mm	500	8	11.127.177.0500
		800	12	11.127.177.0800
	8" 203,2 mm	630	8	11.127.203.0630
		1000	14	11.127.203.1000
	9" 228,6 mm	630	8	11.127.228.0630
		1000	12	11.127.228.1000
	10" 254 mm	800	9	11.127.254.0800
		1250	13	11.127.254.1250
		1600	17	11.127.254.1600
	12" 304,8 mm	1000	9	11.127.304.1000
		1600	14	11.127.304.1600

MICRO HI-DENSITY CARTRIDGE HEATERS Ø4

Microcartidge heaters **Micro4** are a condensate of micromechanic, technologie to generate very high performances (wattage density at 230V). Main application are micronozzles for plastic injection and in mini-packaging machines, and of course, all applications where high power in extremely small volume is required.

FLEXIBLE EXIT

The 4 Ø heaters are provided with 250mm long leads, PTFE insulated nickel, internally connected.



LEADWIRES EXIT 90°

The 4 Ø heaters are provided with 250mm long leads, PTFE or fiberglass-silicone insulated nickel, internally connected.

METRIC SIZES

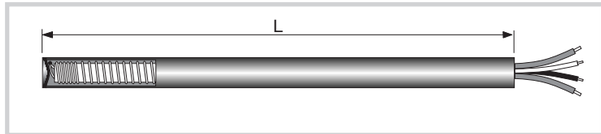
Ø mm	L mm	W 230V	W cm²	CODICE CODE
4 -0,02 -0,04	30	50	20	10.040.030.0050
		75	30	10.040.030.0075
	35	60	19	10.040.035.0060
		90	29	10.040.035.0090
	40	70	19	10.040.040.0070
		105	28	10.040.040.0105

Ø mm	L mm	W 230V	W cm²	CODICE CODE
4 -0,02 -0,04	45	80	18	10.040.045.0080
		120	27	10.040.045.0120
	50	90	18	10.040.050.0090
		135	27	10.040.050.0135
	55	100	18	10.040.055.0100
		150	27	10.040.055.0150

Ø mm	L mm	W 230V	W cm²	CODICE CODE
4 -0,02 -0,04	60	110	18	10.040.060.0110
		165	26	10.040.060.0165
	70	130	17	10.040.070.0130
		195	26	10.040.070.0195
	80	150	17	10.040.080.0150
		225	26	10.040.080.0225

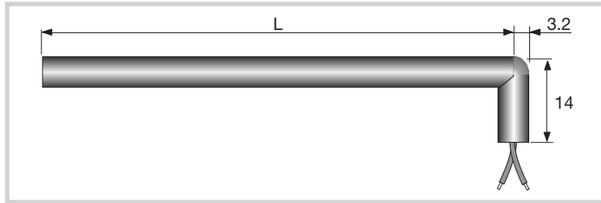
HI-DENSITY CARTRIDGE HEATERS Ø5 WITH OR WITHOUT THERMOCOUPLE BUILT INSIDE

Microcartidge heaters **Micro5** are the state of the art of cartridges with built in thermocouple at 230V. Reliability and lifetime are guaranteed if they are correctly installed. The **Micro5** can be manufactured with distributed wattage density and they are the unique solution in plastic injection micronozzles where a separate thermocouple is not applicable.



TC1 Type - FLEXIBLE EXIT

The 5 Ø heaters are provided with 1000mm long fiberglasssilicone insulated nickel leads, and PTFE thermocouple insulated leads, both internally connected.



LEADWIRES EXIT 90°

The 5 Ø heaters are provided with 250mm long leads, fiberglass-silicone or PTFE insulated nickel, internally connected.

METRIC SIZES

Ø mm	L mm	W 230V	W cm²	CODICE CODE
5 -0,02 -0,04	30	100	42	11.050.030.0100
		125	53	11.050.030.0125
	40	100	26	11.050.040.0100
		160	41	11.050.040.0160
	50	100	18	11.050.050.0100

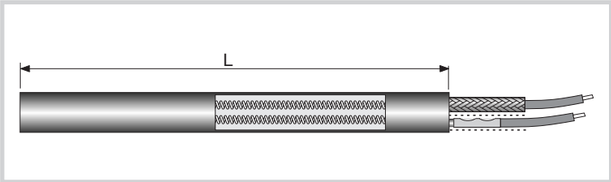
Ø mm	L mm	W 230V	W cm²	CODICE CODE
5 -0,02 -0,04	50	160	29	11.050.050.0160
	60	125	18	11.050.060.0125
		200	28	11.050.060.0200
	80	125	12	11.050.080.0125
		200	20	11.050.080.0200

Ø mm	L mm	W 230V	W cm²	CODICE CODE
5 -0,02 -0,04	100	160	12	11.050.100.0160
		250	19	11.050.100.0250
	130	200	11	11.050.130.0200
		315	18	11.050.130.0315

Zoppas Industries
Heating Element Technologies

MEDIUM-DENSITY CARTRIDGE HEATERS

Medium density cartridge heaters are manufactured with one or more nickel-chrome 80/20 resistive wire spirals, in compacted MgO mass. Suitable for heating applications not requiring high watt density (working temperatures up to 500°C).



The heaters are provided with 250mm long leads, fiberglass-silicone or PTFE insulated nickel, externally connected.

TECHNICAL DATA FOR DESIGN

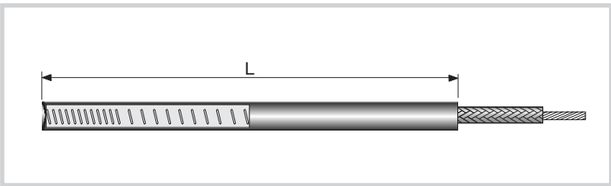
Ø	6,5 -0,02 1/4" -0.08	8 -0,03 -0,10	10 -0,03 3/8" -0,12	12,5 -0,04 1/2" -0,14	16 -0,05 5/8" -0,16	20 -0,06 3/4" -0,20
L. min. mm	160	160	200	300	400	500
L. max. mm	1000	1000	1400	1800	2000	2000
Ampere max.	4	5	7	10	14	18
Watt max / cm²	15	15	15	14	14	13
Volt max	240	240	240	240	400	400
Watt max (V240)	900	1000	1400	2000	3400	4500
Watt max (V400)	-	-	-	-	5000	7000

CONSTRUCTIVE SPECIFICATIONS AND TOLERANCES:

Wattage	*+ 10%*	*- 10%*
Resistance	*+ 10%*	*- 10%*
Dielectric strength (voltage applied)	*1500*	*V*
Insulation (cold 1000 Vdc)	*> 10*	*MΩ*
Leakage current (cold)	*< 0,5*	*mA*
Maximum working temperature allowed on sheath	*500*	*°C*
Length tolerance	*± 2*	*%*

GROUNDED CARTRIDGE HEATERS

Grounded cartridge heaters are manufactured with one spiral of nickel-chrome 80/20 resistive wire, connected to the lead and the bottom disck, in compactedMgOmass.



The heaters are provided with 500mm long leads, fiberglass-silicone insulated nickel.

METRIC SIZES

Ø mm	L mm	W 24V	W cm²	CODICE CODE
4,5 -0,02 -0,04	40	60	15	40.045.040.0060
		100	25	40.045.040.0100
	50	60	11	40.045.050.0060
		100	18	40.045.050.0100
	60	80	11	40.045.060.0080

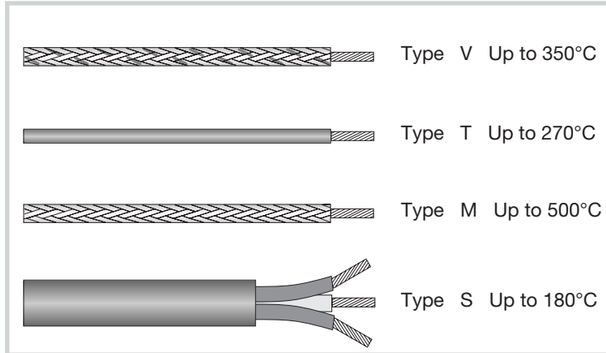
Ø mm	L mm	W 24V	W cm²	CODICE CODE
4,5 -0,02 -0,04	60	125	17	40.045.060.0125
	70	80	10	40.045.070.0080
		125	15	40.045.070.0125
	80	100	11	40.045.080.0100
		160	17	40.045.080.0160

Ø mm	L mm	W 24V	W cm²	CODICE CODE
4,5 -0,02 -0,04	100	100	8	40.045.100.0100
		160	13	40.045.100.0160
	130	125	7	40.045.130.0125
		200	12	40.045.130.0200

LARGER DIAMETERS AND/OR THREADED TERMINAL UPON REQUEST.

MINIMUM VOLTAGE 6V, MAXIMUM 48V.

FITTINGS



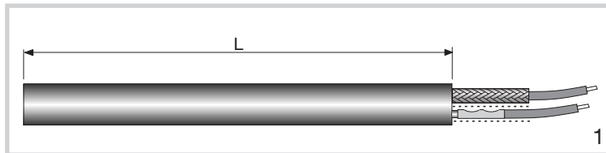
STANDARD LEADS

Fiberglass-silicone insulated Ni conductor.

PTFE insulated Ni conductor.

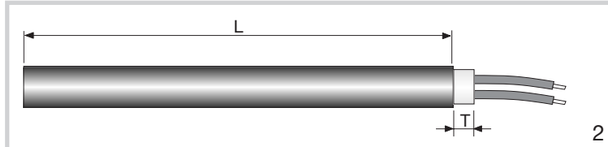
Fiberglass-mica insulated Ni conductor.

Silicone bi-tripolar cable insulated Cu conductor.



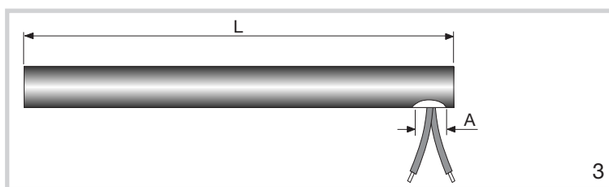
LEADSWIRES EXTERNALLY CONNECTED

Ø	3/8"- 10 - 12.5 - 1/2"- 5/8"- 16 - 3/4"- 20



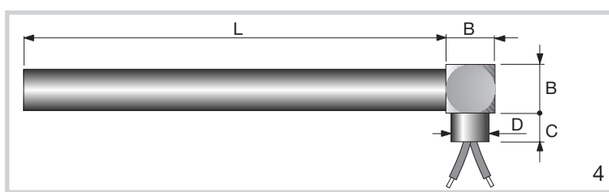
FLEXIBLE EXIT

Ø	3/8" - 10	12.5 - 1/2"	5/8" - 16	3/4" - 20
T ~	5	6	7	8



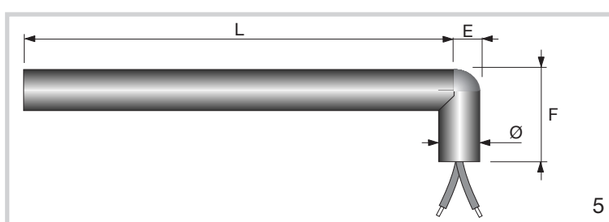
LEADWIRES EXIT 90° Type A

Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
A	5	5.5	6.5	9.5	12	14



LEADWIRES EXIT 90° Type B

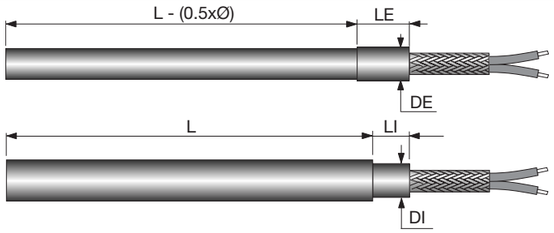
Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
B	8	10	12	14	18	22
C	6	7	7	8	10	10
D	8	10	10	12.5	16	16



LEADWIRES EXIT 90° Type C

Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
E	4.2	5.2	6.5	8	10.5	13
F	16	18	22	26	30	36

FITTINGS - LEADWIRES PROTECTION



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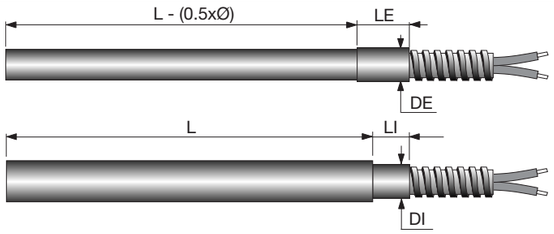

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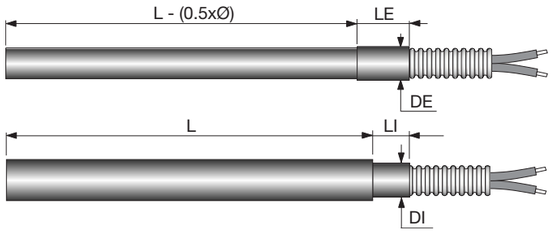

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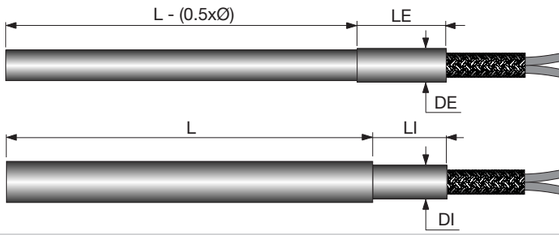

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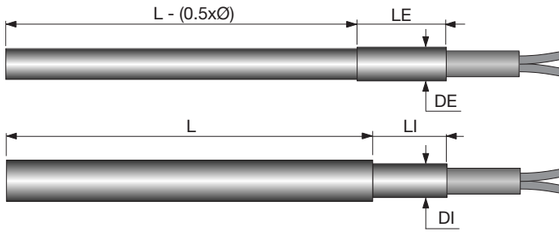


10

11

FIBERGLASS - SILICONE HOSE

	Connection tube						
Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	3/4"	20
DE	--	--	11	--	--	--	--
LE	--	--	15	--	--	--	--
DI	--	--	--	10.5	14	17	18
LI	--	--	--	12	16	20	20

METAL GALVANIZED CONDUIT

	Connection tube						
Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	3/4"	20
DE	7.5	9.2	11	14 *	--	--	--
LE	10	12	15	16 *	--	--	--
DI	--	--	--	10.5	14	17	18
LI	--	--	--	12	16	20	20

* *For Leads Hi Temp. or Amp. >10*

WATERTIGHT STAINLESS STEEL CONDUIT

	Connection tube						
Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	3/4"	20
DE	--	--	11	14	--	--	--
LE	--	--	15	16	--	--	--
DI	--	--	--	--	14	17	18
LI	--	--	--	--	16	20	20

BRAIDED STEEL HOSE

	Connection tube						
Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	3/4"	20
DE	7.5	9.2	11	14	--	--	--
LE	30	30	35	35	--	--	--
DI	--	--	--	--	14	17	18
LI	--	--	--	--	35	40	40

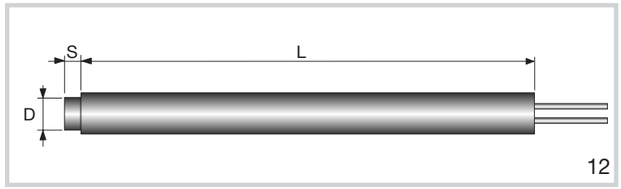
SILICONE CABLE

	Connection tube						
Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	3/4"	20
DE	7.5	9.2	11	14	--	--	--
LE	30	30	35	35	--	--	--
DI	--	--	--	10.5	14	17	18
LI	--	--	--	30	35	40	40

CERAMIC BEADS

Ø	3/8"- 10 - 12.5 - 1/2"- 5/8"- 16 - 3/4"- 20

FITTINGS



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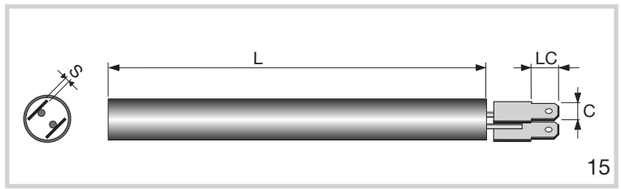

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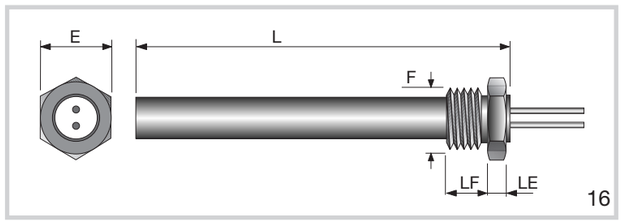

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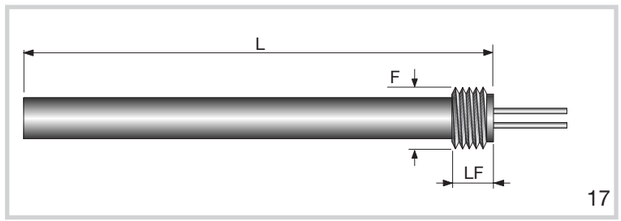

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EXTRACTION NIB — Upon request

Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
D	--	--	7.5	9	12	16
S	--	--	4	5	6	8

THREADED PIN — Upon request

Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
F	M3	M3	M4	M5	M6	M8
LF	15	15	15	20	20	20

STAINLESS STEEL SCREW — Upon request

Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
F	--	--	--	M3	M4	M4
LF	--	--	--	8	10	10

STAINLESS STEEL FASTON — Upon request

Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
C	--	--	--	6.3	6.3	6.3
LC	--	--	--	8	8	8
S	--	--	--	0.8	0.8	0.8

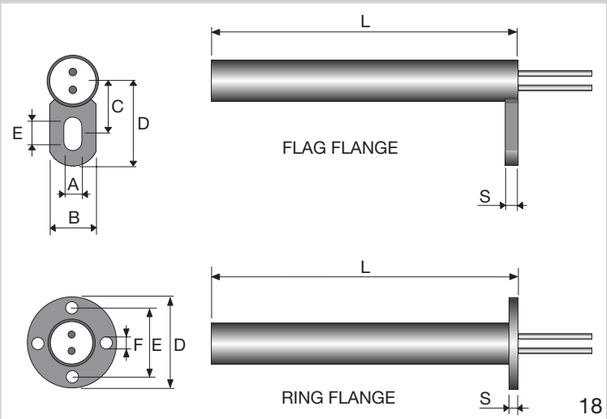
STAINLESS STEEL BUSHING WITH HEXAGON HEAD

Ø	6.5	8	10	12.5	16	20
F	M10x1	M12x1.5	M14x1.5	M16x1.5	M20x1.5	M27x1.5
Ø	1/4"	--	3/8"	1/2"	5/8"	3/4"
F	1/8" Gas	--	1/4" Gas	3/8" Gas	1/2" Gas	3/4" Gas
LF	7	9	9	10.5	13	13.5
E	12	14	17	19	24	30
LE	3.5	4	4	4.5	5	6.5

STAINLESS STEEL THREADED COLLAR

Ø	6.5	8	10	12.5	16	20
F	M10x1	M12x1.5	M14x1.5	M16x1.5	M20x1.5	M27x1.5
Ø	1/4"	--	3/8"	1/2"	5/8"	3/4"
F	1/8" Gas	--	1/4" Gas	3/8" Gas	1/2" Gas	3/4" Gas
LF	7	9	9	10.5	13	13.5

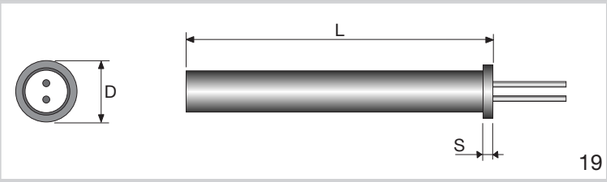
FITTINGS



STAINLESS STEEL FIXING FLANGE

Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
A	3.2	3.5	3.5	4.5	5.5	6.5
B	6	7	9	10	13	15
C	8.5	9.5	10.5	13.5	16.5	19.5
D	13	14.5	16.5	20.5	25.5	29.5
E	3	3	3	4	5	6
S	1.2	1.2	1.5	1.5	2	2

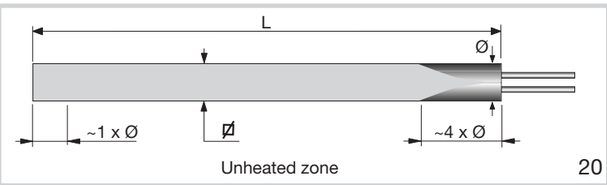
Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
D	20	20	25	25	33	33
E	14	14	19	19	27	27
F	3.2	3.2	3.2	3.2	3.2	3.2
S	1.2	1.2	1.5	1.5	2	2



STAINLESS STEEL STOP RING

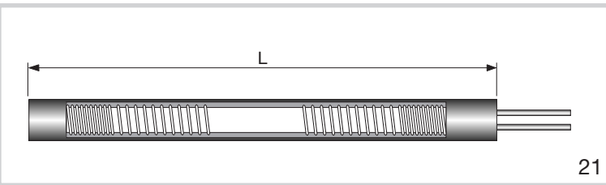
Ø	6.5 1/4"	8	10 3/8"	12.5 1/2"	16 5/8"	20 3/4"
D	10	12	15	17.5	22	26
S	1.2	1.2	1.5	1.5	2	2

SPECIAL EXECUTIONS UPON REQUEST

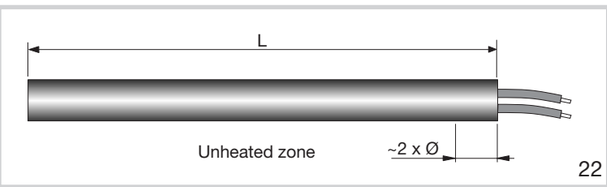


SQUARE CROSS-SECTION EITHER STAINLESS STEEL OR NICKEL

Ø	4.5 ±0.1	6 ±0.1	8 ±0.1	10 ±0.15	6x12 ±0.15
Ø	4.5 ±0.1	6 ±0.1	8 ±0.1	10 ±0.15	10 ±0.15



POWER DISTRIBUTION AND UNHEATED ZONES ACCORDING TO REQUEST



INTERNAL LEADWIRES CONNECTION (INTEGRALS)
Max length 1000mm

Ø	3/8"- 10 - 12.5 - 1/2"- 5/8"- 16 - 3/4"- 20

ENGINEERING AND TECHNICAL DATA

Watt $= VI = I^2R = \frac{V^2}{R}$	Volt $= IR = \frac{W}{I} = \sqrt{WR}$	Ohm $= \frac{V}{I} = \frac{W}{I^2} = \frac{V^2}{W}$	Ampere $= \frac{V}{R} = \sqrt{\frac{W}{R}} = \frac{W}{V}$

DETERMINING REQUIRED WATTAGE

$$KW = \frac{Kg. \times Cs. \times \Delta T}{864 \times tm}$$

Kg = Peso del materiale in Kg.
Cs = Calore specifico del materiale
ΔT = Differenza di temperatura tra quella da raggiungere e quella iniziale
tm = Tempo in ore per raggiungere la temperatura
864 = Rapporto di trasformazione tra KCal e KW

Kg = Materials weight in kilos.
Cs = Specific heat
ΔT = Amount difference in temperature between the required and the starting temperature in degrees °C
tm = Time in hours to reach the operating temperature
864 = Trasformation rapport from KCal to KW

Compensare le perdite di calore aumentando la potenza del:

- 30 / 40 % per piccole masse senza isolamento
- 10 / 20 % per piccole masse con isolamento
- 15 / 25 % per grosse masse senza isolamento
- 5 / 10 % per grosse masse con isolamento
- 20 / 30 % per bagni non isolati
- 10 / 20 % per bagni isolati

Replace heat losses increasing the wattage of:

- *30 / 40 % for little uninsulated mass*
- *10 / 20 % for little insulated mass*
- *15 / 25 % for big uninsulated mass*
- *5 / 10 % for big insulated mass*
- *20 / 30 % for uninsulated baths*
- *10 / 20 % for insulated baths*

VARIAZIONE DELLA POTENZA AL VARIARE DELLA TENSIONE
WATTAGE CHANGE WITH VOLTAGE CHANGE

Watt che si ottengono cambiando la tensione V1 alla tensione V2

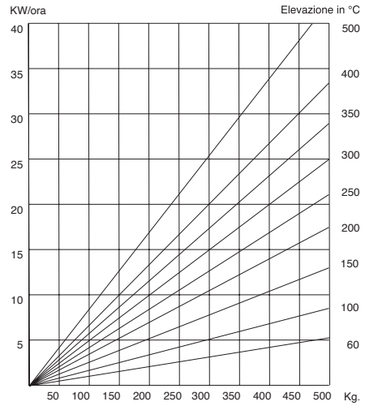
Watts obtained when nominal voltage V1 changes to voltage V2

$$W_2 = W_1 \times \left(\frac{V_2}{V_1}\right)^2$$

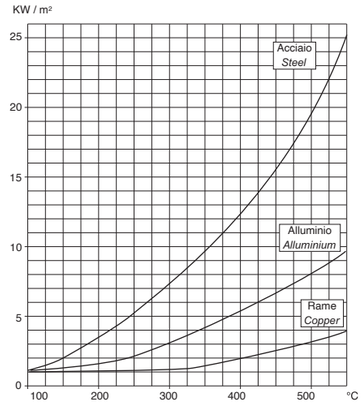
Tensione V2 che si deve applicare per ottenere la potenza desiderata W2

Voltage V2 to be used to obtain new wattage W2

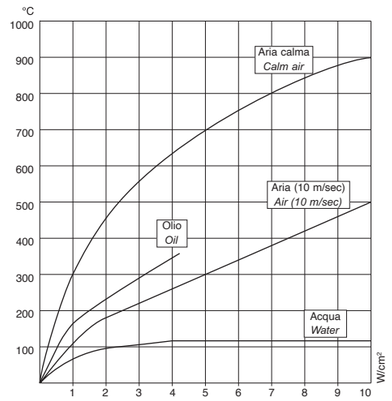
$$V_2 = V_1 \times \sqrt{\frac{W_2}{W_1}}$$



Power required to rise temperature of mild steel (includes 25% to compensate for heat losses)



Heat losses from uninsulated metal surfaces (in calm air)



Sheath temperature tubular heaters at various W/cm² densities

PROPERTIES OF VARIOUS MATERIALS

MATERIALI	*MATERIALS*	PESO SPECIFICO (Kg/dm³)	CALORE SPECIFICO (KCal/Kg °C)	CONDUCIBILITÀ TERMICA "K" (Kcal/m °C)	TEMP. DI FUSIONE (°C)	MATERIALI	*MATERIALS*	PESO SPECIFICO (Kg/dm³)	CALORE SPECIFICO (KCal/Kg °C)	CONDUCIBILITÀ TERMICA "K" (Kcal/m °C)	TEMP. DI FUSIONE (°C)
Acciaio	*Steel*	7,86	0,122	57,00	1515	Oro	*Gold*	19,32	0,032	251,00	1062
Acciaio inox 304	*Stainless steel 304*	7,91	0,120	13,02	1398	Ottone	*Brass-yellow*	8,47	0,096	103,00	932
Acciaio inox 430	*Stainless steel 430*	7,61	0,110	19,22	1454	Paraffina	*Paraffin*	0,88	0,690	0,20	56
Acqua	*Water*	1,00	1,000	1,36	0	Piombo liquido	*Lead liquid*	10,71	0,037	13,39	
Alluminio	*Alluminium*	2,71	0,240	190,00	643	Piombo solido	*Lead solid*	11,34	0,032	29,76	326
Argento	*Silver*	10,49	0,057	359,00	960	Platino	*Platinum*	21,45	0,035	59,52	1773
Asfalto	*Asphalt*	2,10	0,400	0,65		Rame	*Copper*	8,91	0,095	332,00	1082
Cemento armato	*Cement board*	1,94	0,250	0,64		Resine fenoliche	*Phenolic*	1,27	0,400	0,07-0,14	
Ghisa	*Iron, cast*	7,20	0,120	42,90	1176	Lega (Sn-Pb 50%)	*Solder (Sn-Pb 50%)*	8,92	0,051	38,44	182
Inconel 600	*Inconel 600*	8,41	0,126	12,77	1371	Stagno liquido	*Tin liquid*	7,00	0,065	27,03	
Incoloy 800	*Incoloy 800*	8,00	0,130	9,92	1371	Stagno solido	*Tin solid*	7,27	0,052	56,42	232
Magnesio	*Magnesium*	1,74	0,270	137,00	650	Steatite	*Steatite*	2,60	0,200	2,17-2,85	
MgO (Compattato)	*MgO (Compacted)*	3,10	0,209	2,48		Tantalio	*Tantalium*	16,60	0,035	46,50	2996
Mica	*Mica*	2,82	0,210	0,37		Teflon	*Teflon*	2,15	0,250	0,21	
Molibdeno	*Molybdenum*	10,21	0,071	121,00	2621	Titanio	*Titanium*	4,53	0,130	13,88	1668
Monel 400	*Monel 400*	8,82	0,110	18,72	1315	Tungsteno	*Tungsten*	19,30	0,040	140,00	3410
Muro di mattoni	*Brickwork*	2,10	0,220	0,37-0,62		Zinco	*Zinc*	7,14	0,096	91,76	419
Nichel 200	*Nickel 200*	8,88	0,120	64,48	1435	Zirconio	*Zirconium*	6,47	0,067	17,98	1843
Ni Cr 80/20	*Nichrome 80/20*	8,35	0,110	12,89	1398	Zolfo	*Sulfur*	2,07	0,175	0,23	119

ZIHET reserves the right to make changes without prior notice: all the specifications may be subject to change

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