

Cartridge Heaters - C

Caloritech™ C Series cartridge heaters represent the highest commercial grade of heaters available anywhere. We sell only swaged heaters which provide maximum life expectancy and optimum value.

Unswaged heaters, not available from CCI Thermal, may be less expensive initially but will not provide reasonable service life in severe applications.

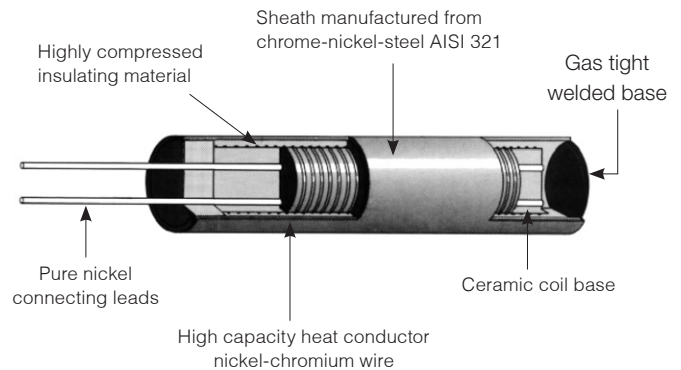
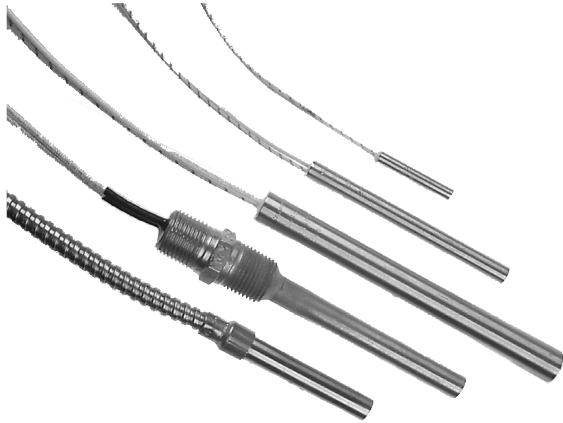


Figure 43 – Cartridge Heater Construction

Application

Cartridge heaters offer a convenient and efficient means of heating for metal dies, platens, moulds, heat sealing tools, hot plates, etc. Most heaters can be factory fitted with threaded bushings for liquid heating applications. Metal temperatures up to 1400°F (760°C) can be achieved with proper selection of materials, watt density and fit. See Figure 44.

Construction

High grade nickel chromium resistance wire is uniformly wound on a premium quality MgO core and welded to termination points. The core is then carefully centred in a stainless steel casing which is MgO filled and compacted. Stranded leads with silicon-impregnated mica glass insulation are fixed to termination points.

Installation

To install a cartridge heater it is necessary only to provide a hole in the part to be heated. The hole diameter and tolerance are determined from Figure 44. Wherever possible, it is advisable to extend the hole entirely through the part, so that the unit can be driven out readily if the necessity for removing it ever arises.

If a through hole is impractical it is best to increase the hole size a bit but not beyond the tolerances indicated by Figure 44.

To prolong life, minimize vibration and flexing of the lead wires and protect the end of the heater from contamination, especially by liquids.

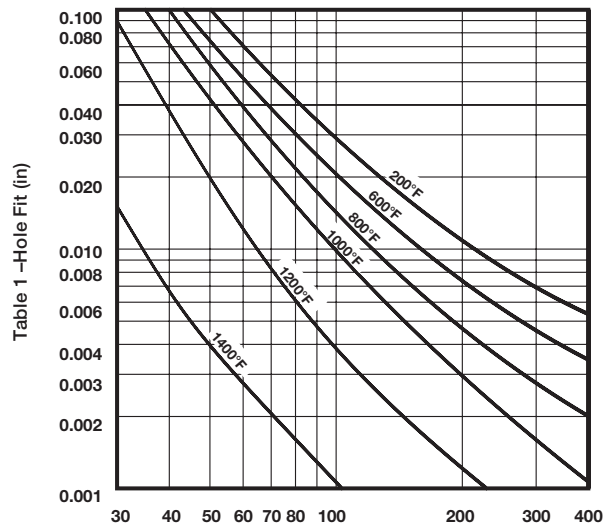


Table 1 – Watt Density - W/in²
Figure 44 – Allowable Watt Density vs Fit Tolerance and Work Temperature

Manufacturing Tolerances

Wattage tolerance (at rated voltage) +5%, -10%
Diameter tolerance $\pm 0.0008''$ (0.02 mm)
Length tolerances $\pm 1/16''$ (1.6 mm) or 1.5% of length

Construction

Caloritech™ high quality C Series cartridge heaters are swaged for maximum life expectancy.

Sheath is high temperature 321 stainless steel.

Table 12 – Standard Watt Density Cartridge Heaters, C Series

(Table 12 continues on page A19)

	Sheath Length		Watt Density			Caloritech™ Catalog No.		Chromalox Catalog No.		Watlow Catalog No.	
	in	mm	Watts	W/in ²	W/cm ²	120V	240V	120V	240V	120V	240V
1/4" (6.4 mm) Hole Diameter (0.247"/6.3 mm Sheath Diameter)	1	25.4	80	208	32.2	C1025801	–	CIR10110	–	E1A51	–
			100	260	40.3	C1025101	C1025103	CIR10111	CIR10111	E1A52	E1A66
			150	390	60.5	C1025151	–	CIR10112	–	E1A53	–
	1 1/4	31.8	225	390	60.5	–	C1031223	–	CIR10121	–	E1A61
	1 1/2	38.1	125	140	21.7	C1038121	–	CIR1015	–	–	–
	1 1/2	38.1	175	228	35.3	C1038171	C1038173	CIR1019	CIR1019	–	E1J49
	1 1/2	38.1	250	325	50.4	–	C1038253	–	CIR10153	–	E1135
	2	50.8	100	87	13.5	C1050101	–	CIR1021	–	E2A55	–
			150	130	20.2	C1050151	C1050153	CIR1020	CIR1020	E2A56	E2A77
			200	173	26.8	C1050201	C1050205	CIR1023	CIR1023	E2A57	E2A50
			250	215	33.3	C1050251	C1050253	CIR1024	CIR1024	E2A72	E2A76
	3	76.2	200	104	16.1	C1076201	C11076203	CIR1030	CIR1030	E3A49	E2A60
	3	76.2	300	156	24.2	C1076301	C11076303	CIR1032	CIR1032	E3A50	E2A51
	4	101.6	300	111	17.2	C1101301	C1101303	CIR1040	CIR1040	E3A30	E2A6
5	127.0	350	101	15.7	–	C1127353	–	CIR1050	–	E4A45	
6	152.4	400	94	14.6	–	C1152403	–	CIR1060	–	E2A46	
3/8" (9.5 mm) Hole Diameter (0.372"/9.4 mm Sheath Diameter)	1	25.4	55	95	14.7	C2025551	–	CIR20110	–	G1A71	–
			100	172	26.7	C2025101	–	CIR20112	–	G1A29	–
			150	259	40.1	C2025151	–	CIR20113	–	G1A38	–
			200	344	53.3	–	C2025203	–	CIR20114	–	G1A83
	1 1/4	31.8	125	144	22.3	C2031121	–	CIR20131	–	G1E74	–
	1 1/4	31.8	150	172	26.7	C2031151	C2031153	CIR2012	CIR2012	G1E92	G1E93
	1 1/2	38.1	30	32	5.0	C2038301	–	–	–	–	–
	1 1/2	38.1	50	53	8.2	C2038501	–	CIR2018	CIR2018	G1J25	–
	1 1/2	38.1	85	68	10.5	C2038851	–	CIR2016	–	G1J66	–
	1 1/2	38.1	100	86	13.3	C2038101	C2038103	CIR20151	CIR20151	G1J59	G1J110
	1 1/2	38.1	150	129	20.0	C2038151	C2038153	CIR2019	CIR2019	G1J31	G1J39
	1 1/2	38.1	200	173	26.8	C2038201	C2038203	CIR20151	CIR20151	G1J85	G1J73
	1 1/2	38.1	250	216	33.5	C2038251	C2038253	CIR20191	CIR2019	G1J86	G1J54
	2	50.8	50	29	4.5	C2050501	–	CIR20201	–	G2A53	–
			75	42	6.5	C2050751	C2050753	CIR20209	–	–	G2A192
			100	57	8.8	C2050101	C2050103	CIR20202	CIR20202	G2A84	G2A76
			150	86	13.3	C2050151	C2050153	CIR2021	CIR2021	G2A56	G2A81
			200	115	17.8	C2050201	C2050203	CIR20203	CIR20203	G2A127	G2A37
			250	144	22.3	C2050251	C2050253	CIR2020	CIR2020	G2A47	G2A73
			300	172	26.7	C2050301	C2050303	CIR20204	CIR20204	G2A139	G2A98
			400	230	35.7	C2050401	C2050403	CIR20206	CIR20206	G2A153	G2A146W
	2 1/2	63.5	500	216	33.5	C2063501	C2063503	CIR20252	CIR20252	G2J109	G2J52
	3	76.2	100	34	5.3	C2076101	C2076103	CIR2032	CIR2032	G3A55	G3A137
			150	52	8.1	C2076151	C2076153	CIR2033	CIR2033	G3A121	–
			200	69	10.7	C2076201	C2076203	CIR2031	CIR2031	G3A61	G3A39
			250	86	13.3	C2076251	C2076253	CIR2034	CIR2034	G3A52	G3A54
			300	104	16.1	C2076301	C2076303	CIR20301	CIR20301	G3A73	G3A92
			400	138	21.4	C2076401	C2076403	CIR20302	CIR20302	G3A44	G3A65
			500	173	26.8	C2076501	C2076503	CIR2030	CIR2030	G3A119	G3A120
	3 1/2	88.9	300	87	13.5	C2088301	C2088303	CIR2038	CIR2038	G3J87	G3J68
	3 1/2	88.9	500	144	22.3	C2088501	C2088503	CIR2035	CIR2035	G3J22	G3J63
	4	101.6	150	37	5.7	C2101151	C2101153	–	–	–	–
250			62	9.6	C2101251	C2101253	CIR2042	CIR2042	G4A40	G4A87	
400			99	15.3	C2101401	C2101403	CIR2045	CIR2045	G4A48	G4A44	
500			123	19.1	C2101501	C2101503	CIR2043	CIR2043	G4A96	G4A92	
4 1/2	114.3	300	65	10.1	C2114301	C2114303	CIR20401	CIR20401	G4J54	G4J33	
5	127.0	150	29	4.5	C2127151	C2127153	CIR2055	CIR2055	G5A68	G5A56	
		200	39	6.0	C2127201	C212203	–	–	–	–	
		500	96	14.9	C212501	C212503	CIR2053	CIR2053	G5A38	G5A71	
		750	144	22.3	–	C2127753	–	CIR2054	–	G5A67	

To Order Specify

- Quantity
- Wattage
- Catalog number
- Special features
- Voltage

Table 12 – Standard Watt Density Cartridge Heaters, C Series (cont'd)

(Table 12 continues on page A20)

	Sheath Length		Watt Density			Caloritech™ Catalog No.		Chromalox Catalog No.		Watlow Catalog No.	
	in	mm	Watts	W/in ²	W/cm ²	120V	240V	120V	240V	120V	240V
3/8" (9.5 mm) Hole Diameter 0.372"/9.4 mm Sheath Diameter	6	152.4	200	31	4.8	C2152201	–	CIR2064	–	G6A80	–
			250	39	6.0	C2152251	C2152253	CIR2061	CIR2061	G6A40	G6A92
			400	63	9.8	C2152401	C2152403	CIR2065	CIR2065	G6A81	G6A82
			600	94	14.6	C2152601	C2152603	CIR2066	CIR2066	G6A56	G6A51
			750	117	18.1	–	C2152753	–	CIR2062	–	G6A46
			1000	157	24.3	–	C2152103	–	CIR2063	–	G6A83
	7	177.8	250	33	5.1	C2177251	C2177253	CIR2070	CIR2070	G7A40	G7A432
	7	177.8	600	80	12.4	C2177601	C2177603	CIR2076	CIR2076	G7A41	G7A442
	7	177.8	1000	133	20.6	–	C2177103	–	CIR2079	–	G7A43
	8	203.2	300	34	5.3	C2203301	C2203303	CIR2081	CIR2081	G8A54	G8A47
	8	203.2	500	58	9.0	C2203501	C2203503	CIR2085	CIR2085	G8A81	G8A32
	8	203.2	1000	115	17.8	–	C2203103	–	CIR2089	–	G8A45
	10	254.0	600	54	8.4	C2254601	C2254603	CIR2100	CIR2100	G10A35	G10A31
	10	254.0	1000	91	14.1	–	C2254103	–	CIR2101	–	G10A32
	12	304.8	400	30	4.7	C2304401	–	CIR2122	–	G12A45	–
12	304.8	600	45	7.0	C2304601	C2304603	CIR2123	CIR2123	G12A29	G12A46	
12	304.8	1000	75	11.6	–	C2304103	–	CIR2121	–	G12A47	
1/2" (12.7 mm) Hole Diameter 0.497"/12.6 mm Sheath Diameter	1	25.4	50	65	10.1	C3025501	–	CIR3010	–	J1A30	–
	1	25.4	150	193	29.9	C3025151	–	CIR3011	–	J1A31	–
	1 1/4	31.8	125	107	16.6	C3031121	C3031123	CIR3019	CIR3019	J1E51	J1E58
	1 1/4	31.8	200	172	26.6	–	C3031203	–	CIR30121	–	J1E52
	1 1/2	38.1	150	97	15.0	C3038151	C3038153	CIR3015	CIR3015	J1J48	J1J96
	1 1/2	38.1	200	128	19.8	C3038201	C3038203	CIR3018	CIR3018	J1J59	J1J38
	2	50.8	200	86	13.3	C3050201	C3050203	CIR3021	CIR3021	J2A49	J2A75
			250	108	16.7	C3050251	C3050253	CIR30202	CIR30202	J2A85	J2A71
			300	128	19.8	C3050301	C3050303	CIR30203	CIR30203	J2A95	J2A96
			400	171	26.5	C3050401	C3050403	CIR3020	CIR3020	J2A81	J2A82
	2 1/4	57.2	75	28	4.3	C3057751	–	CIR30221	–	J2E86	–
	2 1/4	57.2	125	46	7.1	C3057121	–	CIR30222	–	J2E87	–
	2 1/4	57.2	250	92	14.3	C3057251	C3057253	CIR3022	CIR3022	J2E56	J2E69
	2 1/4	57.2	400	147	22.8	C3057401	C3057403	CIR30223	CIR30223	J2E114	J2E115
	2 3/8	60.3	100	34	5.3	C3060101	C3060103	CIR3026	CIR3026	J2G35	J2G28
	2 3/8	60.3	250	86	13.3	C3060251	C3060253	CIR3023	CIR3023	J2G34	J2G37
	2 1/2	63.5	100	32	5.0	C3063101	C3063103	CIR30255	CIR30255	J2J67	J2J57
	2 1/2	63.5	300	96	14.9	C3063301	C3063303	CIR3028	CIR3028	J2J109	J2J110
	2 1/2	63.5	400	128	19.8	C3063401	C3063403	CIR30253	CIR30253	J2J81	J2J82
	2 1/2	63.5	500	161	25.0	C3063501	C3063503	CIR30254	CIR30254	J2J66	J2J70
	3	76.2	125	32	5.0	C3076121	C3076123	CIR30302	CIR30302	J3A108	J3A109
			250	64	9.9	C3076251	C3076253	CIR3031	CIR3031	J3A107	J3A89
			400	104	16.1	C3076401	C3076403	CIR3033	CIR3033	J3A132	J3A29
			500	129	20.0	C3076501	C3076503	CIR3030	CIR3030	J3A110	J3A111
			600	154	23.9	C3076601	C3076603	CIR3034	CIR3034	J3A51	J3A127
			750	193	29.9	C3076751	C3076753	CIR30301	CIR30301	J3A137	J3A112
		3 1/2	88.9	250	54	8.4	C3088251	C3088253	CIR3035	CIR3035	J3J44
3 1/2		88.9	500	107	16.6	C3088501	C3088503	CIR3037	CIR3037	J3J45	J3J46
4		101.6	150	28	4.3	C3101151	C3101153	CIR3045	CIR3045	J4A117	J4A122
			250	46	7.1	C3101251	C3101253	CIR30402	CIR30402	J4A118	J4A90
	350		65	10.1	C3101351	C3101353	CIR3046	CIR3046	J4A1	J4A103	
	400		74	11.5	C3101401	C3101403	CIR3043	CIR3043	J4A139	J4A68	
	500		92	14.3	C3101501	C3101503	CIR3041	CIR3041	J4A16	J4A92	
	750		138	21.4	C3101751	C3101753	CIR3044	CIR3044	J4A198	J4A119	
1000	184	28.5	–	C3101103	–	CIR30401	–	–	J4A73		
5	127.0	250	38	5.9	C3127251	C3127253	–	–	–	–	
		350	50	7.8	C3127351	C3127353	CIR3051	CIR3051	J5A86	J5A63	
		400	58	9.0	C3127401	C3127403	CIR3054	CIR3054	J5A98	J5A46	
		500	72	11.2	C3127501	C3127503	CIR30501	CIR30501	J5A52	J5A45	
		750	108	16.7	C3127751	C3127753	CIR3050	CIR3050	J5A121	J5A72	
1000	143	22.2	–	C312703	–	CIR30502	–	–	J5A87		

Table 12 – Standard Watt Density Cartridge Heaters, C Series (cont'd)

(Table 12 continues on page A21)

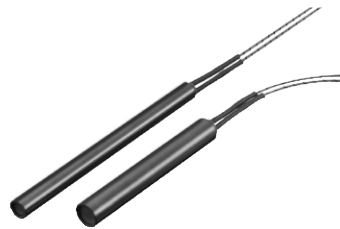
Sheath Length		Watt Density			Caloritech™ Catalog No.		Chromalox Catalog No.		Watlow Catalog No.			
in	mm	Watts	W/in ²	W/cm ²	120V	240V	120V	240V	120V	240V		
1/2" (12.7 mm) Hole Diameter 0.497"/12.6 mm Sheath Diameter	5 1/2	139.7	500	64	9.9	C3139501	C3139503	CIR3055	CIR3055	J5J43	J5J33	
	5 1/2	139.7	750	97	15.0	C3139751	C3139753	CIR3057	CIR3057	J5J44	J5J45	
	6	152.4	300	35	5.4	C3152301	C3152303	CIR3061	CIR3061	–	J6A66	
	6	152.4	500	59	9.1	C3152501	C3152503	CIR3062	CIR3062	J6A115	J6A94	
	6	152.4	750	88	13.6	C3152751	C3152753	CIR3063	CIR3063	J6A99	J6A90	
	6	152.4	1000	117	18.1	C3152101	C3152103	CIR3064	CIR3064	J6A53	J6A36	
	6 1/2	165.1	1000	108	16.7	–	C3165103	–	CIR30601	–	J6J27	
	7	177.8	500	50	7.8	C3177501	C3177503	CIR3071	CIR3071	J7A80	J7A57	
	7	177.8	1000	99	15.3	–	C3177103	–	CIR3075	–	J7A81	
	8	203.2	300	26	4.0	C3203301	C3203303	CIR3085	CIR3085	J8A71	J8A111	
			500	43	6.7	C3203501	C3203503	CIR3084	CIR3084	J8A64	J8A66	
			1000	86	13.3	C3203101	C3203103	CIR3080	CIR3080	J8A84	J8A60	
			1500	129	20.0	–	C3203153	–	CIR3082	–	J8A100	
	9	228.6	500	38	5.9	–	C3228503	–	CIR3090	–	J9A35	
			1000	76	11.8	–	C3228103	–	CIR3091	–	J9A58	
	10	254.0	500	34	5.3	C3254501	C3254503	CIR3103	CIR3103	J10A61	J10A62	
	10	254.0	1000	68	10.5	C3254101	C3254103	CIR3101	CIR3101	J10A63	J10A42	
	10	254.0	1500	102	15.8	–	C3254153	–	CIR3102	–	J10A33	
	10	254.0	2000	136	21.1	–	C3254203	–	CIR3105	–	J10A64	
	12	304.8	550	30	4.7	C3304551	C3304553	CIR3121	CIR3121	J12A63	J12A76	
			1000	56	8.7	C3304101	C3304103	CIR3122	CIR3122	J12A40	J12A49	
			1500	84	13.0	–	C3304153	–	CIR3120	–	J12A37	
			2000	112	17.4	–	C3304203	–	CIR3125	–	J12A89	
	14	355.6	2300	110	17.1	–	C3355233	–	CIR3142	–	J14A39	
	18	457.2	1700	62	9.6	–	C3457173	–	CIR3180	–	J18A23	
	5/8" (15.9 mm) Hole Diameter 0.622"/15.8 mm Sheath Diameter	1 1/4	31.8	50	34	5.3	C4031501	–	CIR4011	–	L1E26	–
		1 1/4	31.8	200	137	21.2	C4031201	–	CIR4012	–	L1E24	–
		1 1/4	31.8	250	171	26.5	C4031251	–	CIR4013	–	L1E27	–
2		50.8	100	34	5.3	C4050101	–	CIR40201	–	L2A48	–	
2		50.8	200	68	10.5	C4050201	C4050203	CIR4020	CIR4020	L2A49	–	
2 1/4		57.2	100	29	4.9	C4057101	–	CIR4023	–	L2E49	–	
2 1/4		57.2	350	103	16.0	C4057351	C4057353	CIR4029	CIR4029	L2E40	L2E51	
2 3/8		60.3	280	77	11.9	C4060281	C4060283	CIR4024	CIR4024	L2G18	L2G19	
3		76.2	150	31	4.8	C4076151	–	CIR4035	–	L3A81	–	
3		76.2	250	51	7.9	C4076251	C4076253	CIR4031	CIR4031	L3A82	L3A9	
3		76.2	500	102	15.8	C4076501	C4076503	CIR4030	CIR4030	L3A113	L3A33	
3		76.2	750	154	23.9	–	C4076753	–	CIR4034	–	LEA71	
3 3/4		95.3	525	82	12.7	C4095521	C4095523	CIR4037	CIR4037	L3N12	L3N1	
4		101.6	250	37	5.7	C4101251	C4101253	CIR4044	CIR4044	L4A99	L4A104	
			400	58	9.0	–	C4101403	–	CIR4045	–	L4A47	
			500	73	11.3	C4101501	C4101503	CIR4041	CIR4041	–	L4A53	
			600	88	13.6	C4101601	C4101603	–	CIR4046	–	L4A44	
			750	110	17.1	C4101751	C4101753	CIR4040	CIR4040	–	L4A100	
			1000	146	22.6	–	C4101103	–	CIR4042	–	L4A71	
5		127.0	250	28	4.3	C4127251	C4127253	CIR4056	CIR4046	L5A76	L5A107	
5		127.0	500	57	8.8	C4127501	C4127503	CIR4051	CIR4051	–	L5A24	
5		127.0	750	86	13.3	C4127751	C4127753	CIR4050	CIR4050	–	L5A31	
5		127.0	1000	114	17.7	–	C4127103	–	CIR4052	–	L5A77	
5 5/8		139.7	285	32	5.0	C4139281	C4139283	–	–	–	–	
6		152.4	300	28	4.3	C4152301	C4152303	CIR4067	CIR4067	L6A28	L6A64	
6		152.4	500	47	7.3	C4152501	C4152503	CIR4061	CIR4061	–	L6A73	
6		152.4	1000	93	14.4	C4152101	C4152103	CIR4060	CIR4060	–	L6A71	
6		152.4	1500	140	21.7	C4152151	C4152153	CIR4062	CIR4062	L6A163	L6A94	
7	177.8	500	39	6.0	C4177501	C4177503	CIR4072	CIR4072	L7A42	L7A15		
7	177.8	1000	79	12.2	–	C4177103	–	CIR4070	–	L7A37		
7	177.8	1500	118	18.3	–	C4177153	–	CIR4071	–	L7A12		
8	203.2	500	34	5.3	C4203501	C4203503	CIR4085	CIR4085	L8A96	L8A46		
8	203.2	850	58	9.0	–	C4203853	–	CIR4088	–	L8A115		
8	203.2	1000	68	10.5	–	C4203103	–	CIR4083	–	L8A10		
8	203.2	1500	102	15.8	–	C4203153	–	CIR4084	–	L8A37		

Table 12 – Standard Watt Density Cartridge Heaters, Type C (cont'd)

	Sheath Length		Watt Density			Calorittech™ Catalog No.		Chromalox Catalog No.		Watlow Catalog No.	
	in	mm	Watts	W/in ²	W/cm ²	120V	240V	120V	240V	120V	240V
5/8" (15.9 mm) Hole Diameter 0.622"/15.8 mm Sheath Diameter	10	254.0	500	27	4.2	C4254501	C4254503	CIR4103	CIR4103	L10A51	L10A40
			1000	54	8.4	–	C4254103	–	CIR4100	–	L10A52
			1500	81	12.6	–	C4254153	–	CIR4101	–	L10A8
			2000	108	16.7	–	C4254203	–	CIR4102	–	L10A50
	12	304.8	500	22	3.4	C4304501	C4304503	CIR4125	CIR4125	L12A81	L12A80
	12	304.8	1000	45	7.0	C4304101	C4304103	CIR4120	CIR4120	L12A82	L12A34
	12	304.8	1500	67	10.4	C4304151	C4304153	CIR4121	CIR4121	L12A14	L12A39
	14	355.6	3700	140	21.7	–	C4355373	–	CIR4140	–	L14A21
	15	381.0	2400	84	13.0	–	C4381243	–	CIR4150	–	L15A20
	18	457.2	1500	44	6.8	–	C4457153	–	CIR4180	–	L18A32
	18	457.2	3000	87	13.5	–	C4457303	–	CIR4182	–	L18A34
	18	457.2	4700	137	21.2	–	C4457473	–	CIR4184	–	L18A36
20	508.0	4700	123	19.1	–	C4508473	–	CIR4205	–	L20A14	
36	914.4	3000	43	6.7	–	C4914303	–	CIR4361	–	L36A8	
3/4" (19 mm) Hole Diameter (0.747"/18.9 mm Sheath Diameter	2 1/4	57.2	200	49	7.6	C5057201	–	CIR5022	–	N2E8	–
	3	76.2	250	43	6.7	C5076251	–	CIR5031	–	N3A11	–
	3	76.2	500	85	13.2	C5076501	C5076503	CIR5030	CIR5030	–	N3A12
	4	101.6	500	61	9.5	–	C5101503	–	CIR5040	–	N4A17
	4	101.6	1000	122	18.9	–	C5101103	–	CIR5041	–	N4A15
	5	127.0	300	28	4.3	C5127301	–	CIR5052	–	N5A19	–
	5	127.0	500	47	7.3	–	C5127503	–	CIR5051	–	N5A12
	5	127.0	1000	95	14.7	C5127101	C5127103	CIR5050	CIR5050	–	N5A20
	6	152.4	500	39	6.0	C5152501	C5152503	CIR5065	CIR5065	N6A19	N6A20
			1000	78	12.1	–	C5152103	–	CIR5067	–	N6A21
			1500	116	18.0	–	C5152153	–	CIR5068	–	N6A82
			2000	155	24.0	–	C5152203	–	CIR5069	–	N6A22
	7	177.8	500	33	5.1	C5177501	C5177503	CIR5075	CIR5075	N7A15	N7A1
	7	177.8	1000	66	10.2	–	C5177103	–	CIR5072	–	N7A16
	8	203.2	500	28	4.3	C5203501	C5203503	CIR5085	CIR5085	N8A19	N8A20
	8	203.2	1000	57	8.8	–	C5203103	–	CIR5080	–	N8A21
	8	203.2	2000	114	17.7	–	C5203203	–	CIR5082	–	N8A22
	10	254.0	1000	45	7.0	–	C5254103	–	CIR5100	–	N10A15
	10	254.0	2000	90	14.0	–	C5254203	–	CIR5102	–	N10A14
	12	304.8	1000	37	5.7	–	C5304103	–	CIR5120	–	N12A15
	12	304.8	2000	74	11.5	–	C5304203	–	CIR5121	–	N12A24
	12	304.8	4000	148	22.9	–	C5304403	–	CIR5124	–	N12A25
	15	381.0	1500	44	6.8	–	C5381153	–	CIR5150	–	N15A26
	16	406.4	1800	49	7.6	–	C5406183	–	CIR5162	–	N16A26
	18	457.2	2000	49	7.6	–	C5457203	–	CIR5182	–	N18A13
	20	508.0	1150	25	3.9	–	C5508113	–	CIR5202	–	N20A21
	20	508.0	2250	49	7.6	–	C5508223	–	CIR5203	–	N20A22
	20	508.0	5000	115	17.8	–	C5508503	–	CIR5205	–	N20A10
24	609.6	1375	25	3.9	–	C5609133	–	CIR5243	–	N24A24	
24	609.6	2750	50	7.8	–	C5609273	–	CIR5244	–	N24A23	
36	914.4	2500	30	4.7	–	C5914253	–	CIR5362	–	N36A4	
1 19/64" (33 mm) Hole Diameter 1.293"/32.8 mm Sheath Diameter	5	127.0	600	35	5.4	C6127601	C6127603	C806	C806	–	–
	8 1/2	215.9	1000	32	5.0	C6215101	C6215103	C830	C830	–	–
	8 1/2	215.9	1200	39	6.0	C6215212	C6215123	C810	C810	–	–

To Order Specify

- Quantity
- Voltage
- Special features
- Catalog number
- Wattage



Special Designs and Modifications

Mitosis Heaters

See Specialty Tubular/Cartridge - MH on page A39 for ultra high temperature custom designs.

Special Voltages and Wattages

Cartridge heaters can be custom manufactured to voltages and wattages other than those listed. Series connecting cartridges on line voltages above 300 volts is not recommended. For details check factory.

Special Lengths

Cartridge heaters can be custom manufactured in lengths up to 100 inches. However, drilling and reaming holes accurately in long lengths requires special equipment. If possible shorter heaters from each side are a cost effective solution. An improper fit will reduce heater life.

Special Sheath Materials

Caloritech™ cartridge heaters are manufactured from grade 321 stainless steel; which is suitable for most applications. For special requirements check factory.

Moisture-Resistant

The end cap of the Caloritech™ cartridge heater is welded to form a gas tight seal. Optional lead wire construction includes silicon potting, teflon seals and teflon leads. Check factory for application assistance.

Lead Wire Length

Fibreglass insulated nickel leads, 10" in length, are standard. Cartridge heaters can be manufactured with longer leads or extended leads can be spliced to stock units.

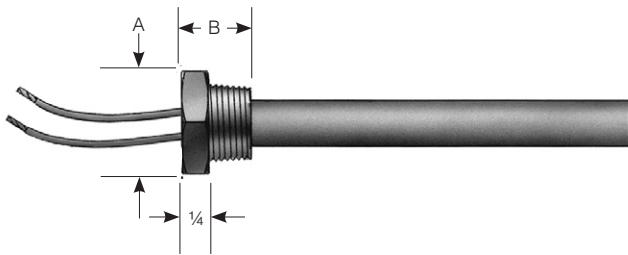


Figure 45

Protective Lead Covering

Armoured cable or wire mesh sleeving is available for additional mechanical protection over lead wires.

Thermocouple

J or K thermocouples can be built into any cartridge heater. See Section F of the Caloritech™ catalog for thermocouple information.

Ground Wire

An additional wire for ground, fixed to the sheath, can be provided for special code requirements.

Threaded Bushing

Welded single-ended and double-ended stainless steel bushings are available for immersion applications. Check factory for suitable densities.

Threaded Bushing (See Figure 45 & Figure 46)

Brass for liquid immersion heating applications under 750°F (399°C). Stainless steel available for applications over 750°F (399°C).

To Order Specify

- Quantity
- Catalog number
- Special features

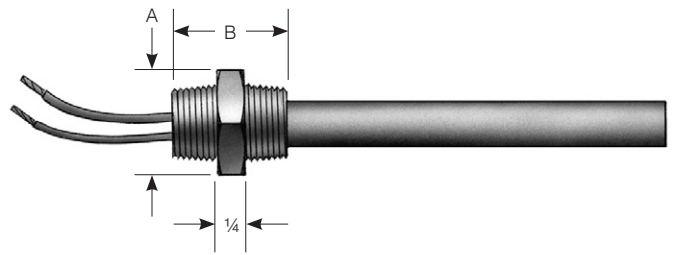


Figure 46

Table 13 – Threaded Bushing (See Figure 45)

Cartridge Diameter		'A' Dim.		'B' Dim.		Standard Taper Pipe Thread
in	mm	in	mm	in	mm	
0.25	6.0	0.47	11.9	0.60	15.2	1/8" NPT
0.38	9.5	0.62	15.7	0.68	17.2	1/4" NPT
0.50	12.0	0.68	17.2	0.85	21.7	3/8" NPT
0.63	16.0	0.89	22.5	0.95	24.2	1/2" NPT
0.75	18.0	1.06	26.8	1.04	26.5	3/4" NPT
1.30	33.0	1.75	44.5	1.37	34.9	1 1/4" NPT

Table 14 – Threaded Bushing (See Figure 46)

Cartridge Diameter		'A' Dim.		'B' Dim.		'C' Dim.		Standard Taper Pipe Thread
in	mm	in	mm	in	mm	in	mm	
0.25	6.0	0.47	11.9	0.98	24.8	0.38	9.6	1/8" NPT
0.38	9.5	0.62	15.7	1.09	27.6	0.41	10.4	1/4" NPT
0.50	12.0	0.68	17.2	1.40	35.6	0.55	13.9	3/8" NPT
0.63	16.0	0.87	22.1	1.50	38.2	0.63	16.0	1/2" NPT
0.75	18.0	1.06	26.8	1.70	43.2	0.66	16.7	3/4" NPT
1.30	33.0	1.75	44.5	2.37	60.3	1.00	25.1	1 1/4" NPT