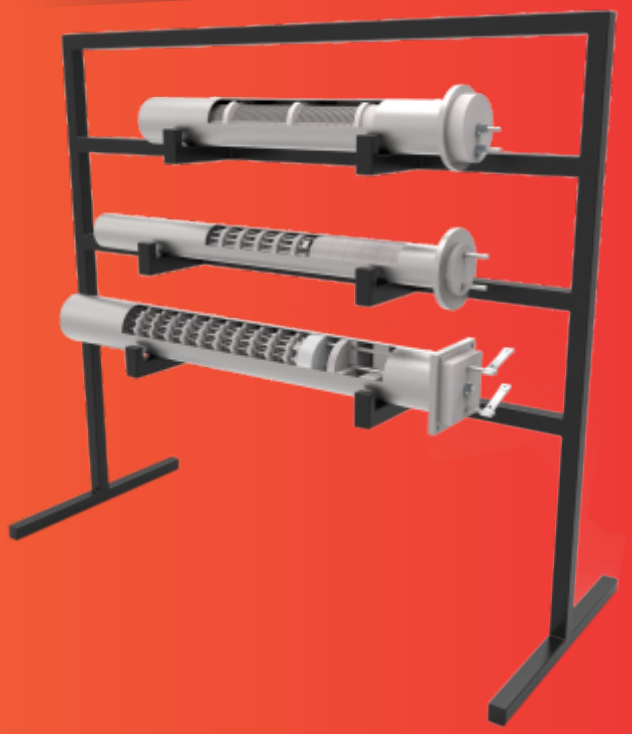
Marathon Temp Watt

Engineered Solution for Heating

RADIANT TUBES



Seamless high temperature tubes made from either iron-chromium-aluminum alloys (Kanthal APM, Kanthal APMT) or heat resistant casting alloys are called radiant tubes. The composition table for various alloys is given:

	KANTHAL APM	INCONEL 600	INCONEL 800	HK - 40	HU	HX	SS 310
Ni	-	72.0 (min.) + Cobalt	30.0 – 35.0	19.0-22.0	37.0-41.0	64.0-68.	19.0-22.0
Cr	20.5 – 23.5	14.0 – 17.0	19.0 – 23.0	23.0-27.0	17.0-21.0	15.0-19.0	24.0-26.0
Al	5.8	-	0.15 – 0.60	-	-	-	-
Fe	Balance	6.0 – 10.0	39.5 (min.)	-	-	-	Balance
Mn	0 – 0.4	1.0 (max.)	1.50 (max)	-	-	-	2.00
Si	0 – 0.7	0.5 (max.)	1.0 (max.)	1.75	2.50	2.50	1.50
C	0 – 0.08	0.15 (max)	0.10 (max)	0.35-0.45	0.35-0.75	0.35-0.75	0.25
P	-	-	-	-	-	-	0.045
S	-	0.015 (max)	0.015(max)	-	-	-	0.030
Cu	-	0.5 (max.)	0.75 (max)	-	-	-	-
Ti	-	-	0.15 – 0.60	-	-	-	-
Temp	1250 ºC	1095 ºC	816 ºC	1093 ºC	1093 ºC	1150 ºC	1200 ºC
Melting Point	1500 ºC	1354-1413 ºC	1357-1385 ºC	1398 ºC	1343 ºC	1287 ºC	1400-1450 ºC

Highly customized to meet specifications, they are mostly used for gas heated or electrically heated furnaces. General designs include straight, U shaped and W shaped radiant tubes in any desired length. The lifetime of radiant tubes in Kanthal APMT and Kanthal APM is often many times longer. Kanthal material allows temperature in the range of 1250°C (2280°F). Used in extremely demanding environments, leak proof and corrosion resistant are other unique features of radiant tubes. Heat resistant casting alloys allow operating temperatures up to 1100 °C. But is inferior to Kanthal material in terms of resistance to sulphurizing and nitriding atmosphere. Radiant tubes can be used as standalone elements or in collaboration with bundle rod heaters. But when used with bundle rod heaters, can be used for temperatures up to 1400 °C and have superior performance. Some of the advantages of radiant tubes include:

- Trouble free, longer service life and provides uninterrupted furnace operation.
- Cost effective solutions for maximized customer productivity and higher power output.
- Installation and replaced relatively easily.

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- High loading potential and ready to install.
- Supplied flanged, with or without inner tubes or electric heating elements as desired.

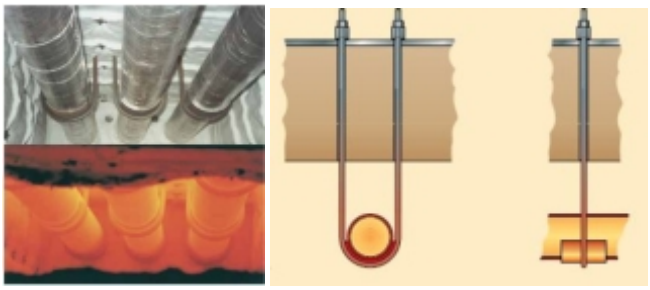
The outer and inner diameters of tube have some standards with respect to the ceramic disc diameter. The heater dimensions fit inside these specifications. Huge deviation from the standard designs, however, will be customized. Standards are given in the form of table:

Outer Diameter of Tube	Inner Diameter of Tube	Ceramic Disc Diameter
100	90	80
128	117	110
146	134	124
154	142	124
178	162	154
198	182	170

APPLICATIONS

- Heat treatment furnaces (carburizing furnaces and galvanizing furnaces)
- Melting, dosing and holding furnaces
- Dental furnaces
- Diffusion furnaces
- Laboratory furnaces

Hangers are preferred with radiant tubes and bundle rod heaters to provide support in case of horizontal or vertical installation. It may be a furnace side wall support, constrained to a wall of the furnace or radiant tube support provided with a heating element. Anti sticking feature between the tubular element and the furnace side wall support is provided for supporting the radiant tube and allowing the lateral oscillation thereof, avoiding the sticking on the furnace side wall support.



The maximum unsupported length above which supports (hangers) for radiant tubes are considered essential is given below:

Temp (tube)	Dia. 100/90		Dia. 128/117		Dia. 146/134		Dia. 154/142		Dia. 178/162		Dia. 198/182	
	0	1	0	1	0	1	0	1	0	1	0	1
800	2.2	2	2.5	2.2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
900	2.2	2	2.3	2.1	2.5	2.3	2.5	2.5	2.5	2.5	2.5	2.5
1000	2	1.9	2.2	2.0	2.5	2.2	2.5	2.3	2.5	2.4	2.5	2.5
1100	1.5	1.3	1.8	1.6	2.2	1.9	2.2	1.9	2.3	2.0	2.3	2
1200	1.2	-	1.4	-	1.5	-	1.5	-	1.6	-	1.7	-

Where 0 stands for only tube (in meter)

1 stands for with bundle rods (in meter)

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