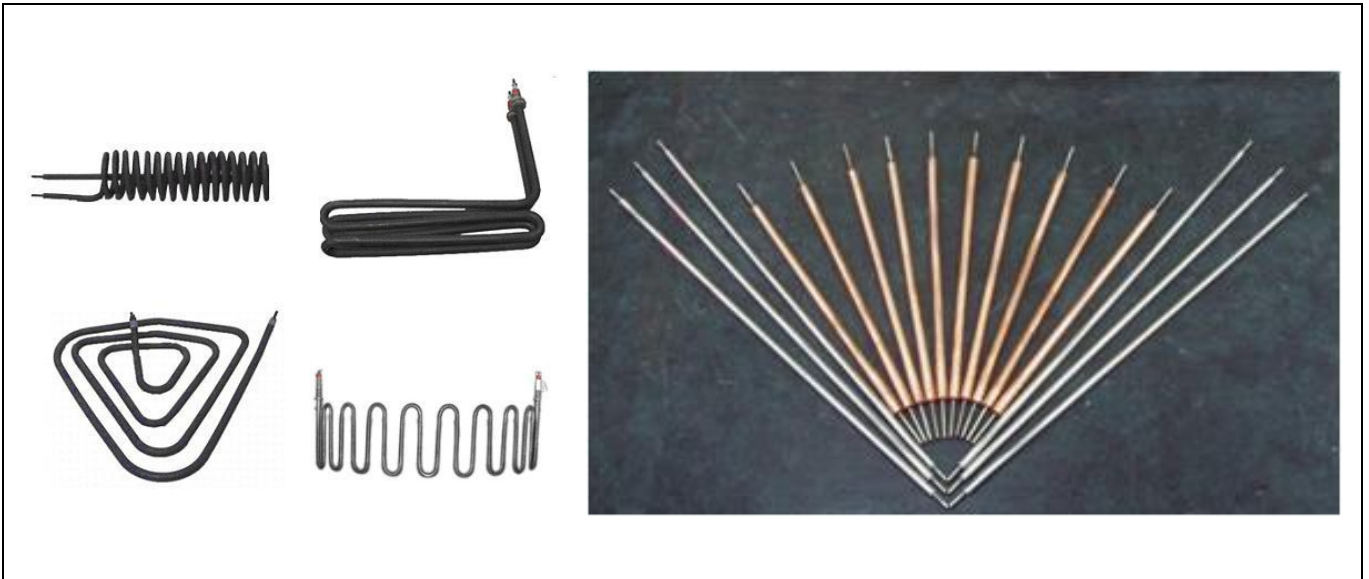


Tubular Heater and Immersion Heater



Application

Liquid Heating, Air Heating, Food Equipment, Package Equipment, Ovens, Tanks, Electroplating and Electrolytic Equipment etc.

Material

Material	Application	Operating Temperature	Option
Copper coated with nickel	Used in water.	Up to 100°C	Optional
SUS 304	Used in water, oil, air.	Up to 500°C	Standard
SUS 316	Used in mild acid and alkaline circumstance.	Up to 200°C	Optional
Incoloy	Used in mild acid and alkaline circumstance.	Up to 800°C	Optional
Titanium	Used in acid and alkaline circumstance.	Up to 600°C	Optional
Teflon protected	Used in strong acid circumstance.	Up to 100°C	Optional

Typical maximum watt density

For Water = 65 w/inch² or 10 w/cm²

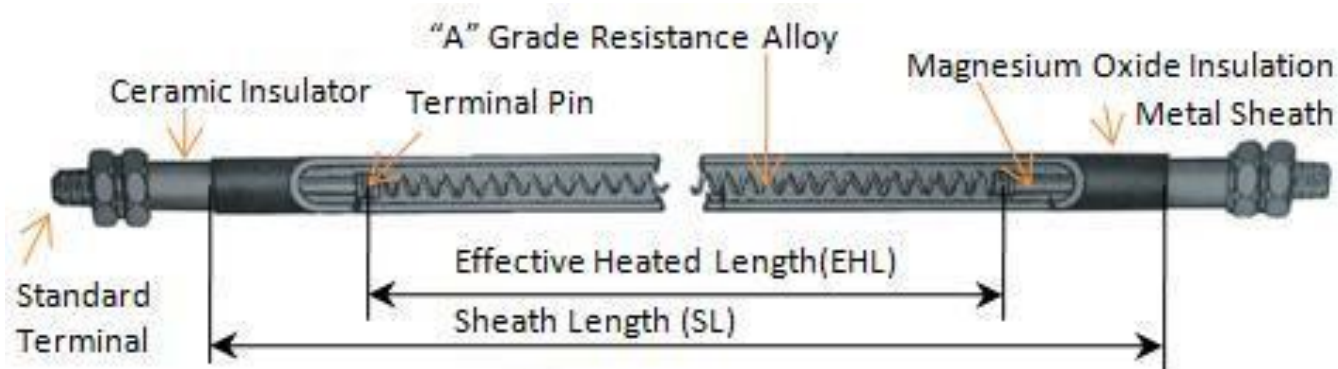
For Air = 32 w/inch² or 5 w/cm²

For Oil = 20 w/inch² or 3 w/cm²

Minimum unheated section on each end

minimum 50 mm

Standard Specification



Tubular Heater Tolerances	
Diameter	±0.1mm
Wattage	+5%
	-10%
Resistance	+10%
	-5%
Sheath Length	±1~2%
Effective Heated Length	±1~2%

W D L	8mm			11mm			13.8mm		
	Air	Water	Oil	Air	Water	Oil	Air	Water	Oil
300mm	200	600	300	300	800	400	400	1000	520
500mm	370	1000	500	500	1300	700	650	1700	860
600mm	450	1200	600	620	1600	800	780	2100	1050
800mm	600	1600	800	830	2200	1100	1000	2800	1400
1000mm	750	2000	1000	1000	2700	1380	1300	3400	1700
1200mm	900	2400	1200	1200	3300	1650	1550	4200	2100
1400mm	1050	2800	1400	1450	3800	1900	1800	4800	2400
1600mm	1200	3200	1600	1650	4400	2200	2100	5400	2700
1800mm	1350	3600	1800	1800	4900	2480	2350	6200	3100
2000mm	1500	4000	2000	2000	5500	2750	2600	7000	3500
2200mm	1650	4400	2200	2280	6000	3000	2900	-	3800
2400mm	1800	4800	2400	2480	6600	3300	3100	-	4150
2600mm	1950	5200	2600	2700	-	3600	3400	-	4500
2800mm	2100	-	2800	2900	-	3900	3650	-	4850
3000mm	2250	-	3000	3100	-	4100	3900	-	5200
3200mm	2400	-	3200	3300	-	4400	4150	-	5500
3600mm	2700	-	3600	3700	-	5000	4700	-	6200
4000mm	3000	-	4000	4100	-	5500	5200	-	7000

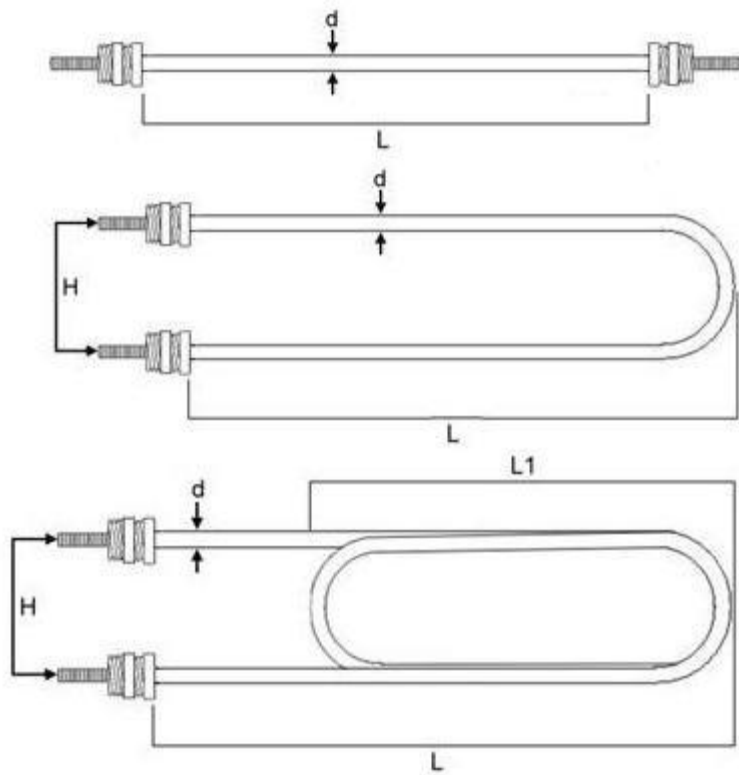
Capacity Calculating Formula

$$\frac{Dia. (mm) \times \pi(3.1416) \times Length (mm)}{100} \times Watt Density$$

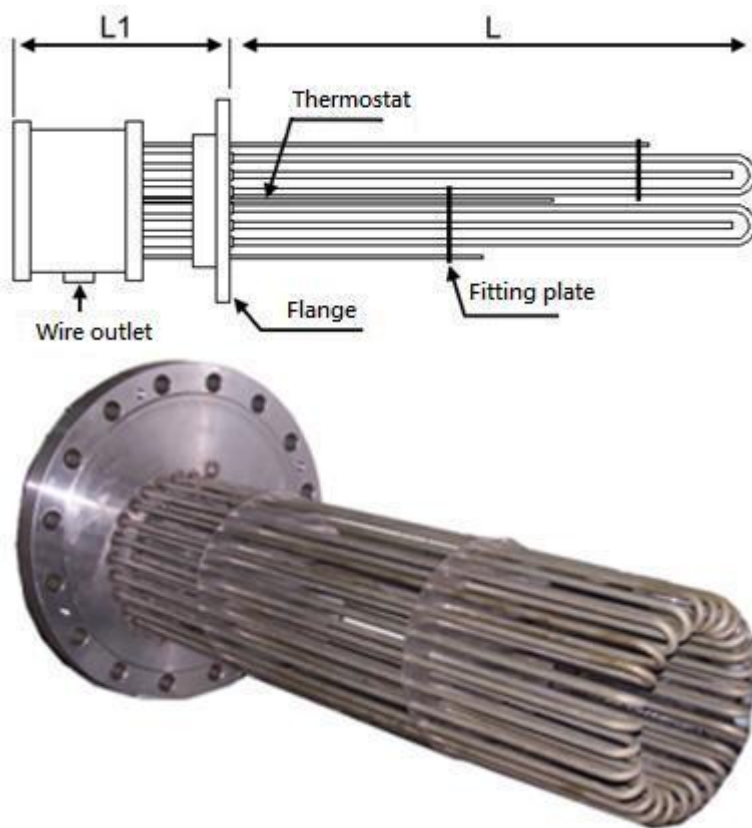
= Wattage (Maximum 7kw for 200V up, 3kw for 100/100V)

Termination type

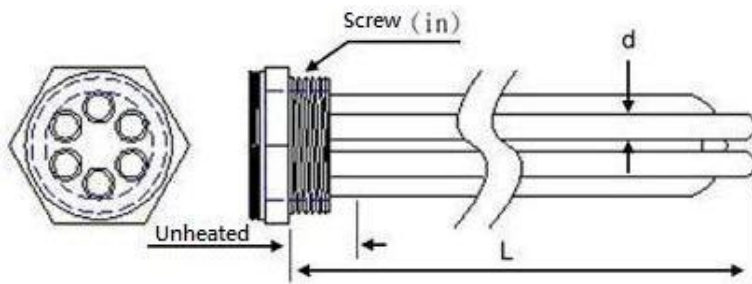
- a. Tubular heater terminal with SUS 304 thread connection, $\varnothing 8\text{-M12}$, $\varnothing 11\text{-5/8''}$, $\varnothing 13.8\text{-3/4''}$



b. Immersion heater flange: Iron, SUS 304, SUS316, from 2" to 12"



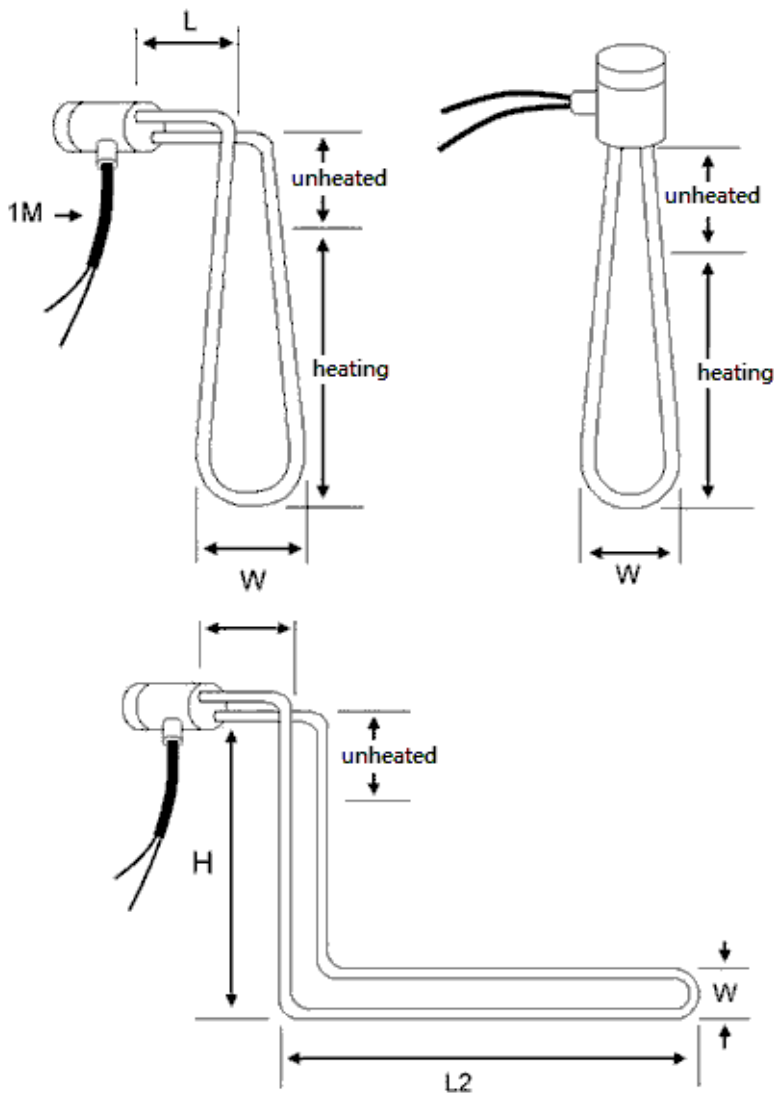
c. Immersion heater thread connector: Brass, SUS 304, SUS316, from 1 1/2" to 2"



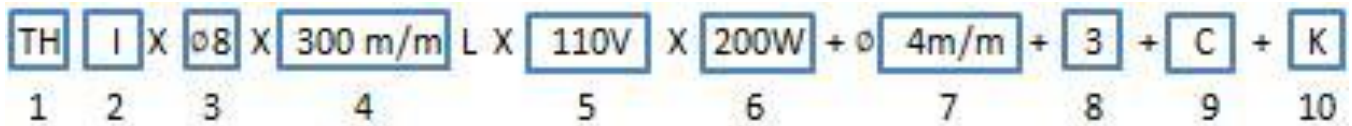
d. Immersion heater terminal box: Bakelite



e. Hanging type



Order information



- (1). Tubular Heater.
- (2). Shape I or U (refer to drawing).
- (3). Tubular diameter (ø 8, ø 11, ø 13.8).
- (4). Tubular length.
- (5). Voltage (100V~480V).
- (6). Total wattage.
- (7). Terminal screw-nut size ø 8-4m/m (5/32"), ø 11up-5mm/m (3/16").
- (8). Number of tubular in a unit.
- (9). Termination type (b.c.d.e)(if not mentioned, a 2" brass thread connector will be produced).
- (10). With thermo-couple K or J (if desired).

※(8), (9) and (10) are for immersion heater use only.

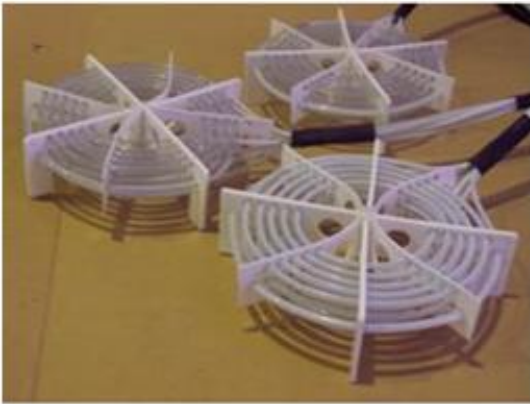
Remark :

If possible, when you want to order the heater please indicating working temperature and circumstance in order to design proper products and keep long life for use.

Special immersion heater for optical electronic industry use

Special immersion heater for optical electronic industry use (picture A, B,C, are made with Teflon, D is made with quartz tube).

A.



C.



B.



D.



Technical Information

(1). How to calculate required wattage :

$$Kw = \frac{M \times Cs \times \Delta T}{864 \times t(h)} (1 + H \text{ loss})$$

M : Weight of heating object. t(h) : Time(hour).

Cs : Heating rate. 864 : Rate of K cal. change to K watt.

ΔT : Temperature difference. H loss : Heating loss (about 20%~30%).

(2). Various material character and heating rate sheet :

Material	Weight rate (kg/dm ²)	Heating rate (KCal/Kg°C)	Melted temp.°C
Water	1.00	1.000	0
Iron,cast	7.20	0.120	1176
Inconel 600	8.41	0.126	1371
Incoloy 800	8.00	0.130	1371
Gold	19.32	0.032	1062
Silver	10.49	0.057	960
Brass-yellow	8.47	0.096	932
Copper	8.91	0.095	1082
Steel	7.86	0.122	1515
Stainless steel 304	7.91	0.120	1398
Stainless steel 430	7.61	0.110	1454
Lead liquid	10.71	0.037	
Lead solid	11.34	0.032	326
Magnesium	1.74	0.270	650
MgO (Compaced)	3.10	0.209	
Nickel 200	8.88	0.120	1435
Nichrome 80/20	8.35	0.110	1398
Tin liquid	7.00	0.065	
Tin solid	7.27	0.052	232
Solder(Sn-Pb5%)	8.92	0.051	182
Aluminum	2.71	0.240	643
Cement board	1.94	0.250	
Brickwork	2.10	0.220	
Asphalt	2.10	0.400	
Molybdenum	10.21	0.071	2621
Mica	2.82	0.210	
Paraffin	0.88	0.690	56
Steatite	2.60	0.200	
Teflon	2.15	0.250	
Platinum	21.45	0.035	1773
Phenolic	1.27	0.400	
Monel 400	8.82	0.110	1315
Tantalum	16.60	0.035	2996
Tungsten	19.30	0.040	3410

Zinc	7.17	0.096	419
Titanium	4.53	0.130	1668
Sulfur	2.07	0.175	119
Zirconium	6.47	0.067	1848

Contact

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