Tubular Heater Standard Specifications

Element Diameter in	Element Diameter mm	Maximum Voltage	Maximum Amperage	Resistance in Ohms per Heated Inch min	Resistance in Ohms per Heated Inch max	Sheath Length min. in	Sheath Length min. mm	Sheath Length max. in	Sheath Length max. mm
.260	6.6	250	15	.100	17	11	279	200	5080
.315	8.0	480	30	.060	21	11	279	200	5080
.375	9.5	600	30	.040	21	11	279	200	5080
.430	10.9	600	40	.040	21	11	279	255	6477
.475	12.1	600	40	.040	21	11	279	255	6477
.625	15.9	600	40	.040	17	11	279	255	6477

Table 1 Electrical Limitations and Minimum/Maximum Sheath Lengths

Length in	Length mm	Sheath Length Tolerance (±) in	Sheath Length Tolerance (±) mm	Heated Length Tolerance (±) in	Heated Length Tolerance (±) mm	Minimum Unheated Length Each End in	Minimum Unheated Length Each End mm
11-20	279-508	3/32	2.4	1/4	6	1	25
20-50	508-1270	1/8	3.2	1/2	13	1-1/4	32
50-80	1270-2032	5/32	4.0	7/8	22	1-1/2	38
80-110	2032-2794	3/16	4.8	1-1/8	29	1-5/8	42
110-140	2794-3556	7/32	5.6	1-3/8	35	1-3/4	44
140-170	3556-4318	1/4	6.4	1-5/8	41	2	51
170-200	4318-5080	3/8	9.5	1-7/8	48	2-1/4	57
200-up	5080-up	1/2	12.7	2-3/8	60	2-1/2	64

Table 2 Sheath and Heated Length Tolerance
(applicable for all diameters)

Tubular Heater Standard Sheath Materials

The selection of a sheath material should be made based on the chemical composition of the gas or liquid being heated, the characteristics of the materials entering the solution, and the processes controls. A material selection guide can be found on page 16-12.

NOTE: The best source for chemical/sheath compatibility is the supplier of the gas or liquid to be heated.

The following are the most common tubular element sheath materials. For other materials consult Tempco.

Incoloy® 840: Nickel 18-20%, Chromium 18-22%, Iron balance. Has about 10% less nickel than Incoloy 800. Used in many air heating applications, where it has exhibited superior oxidation resistance at less cost than Incoloy 800.
Maximum Sheath Temperature: 1600°F / 871°C

Incoloy® 800: Nickel 30-35%, Chromium 19-23%, Iron balance. The high nickel content of this alloy contributes to its resistance to scaling and corrosion. Used in air heating and immersion heating of potable water and other liquids.
Maximum Sheath Temperature: 1600°F / 871°C

316 Stainless Steel: Chromium 16-18%, Nickel 11-14%, Iron balance. Modified with the addition of Molybdenum (2-3%) to improve corrosion resistance in certain environments, especially those which would tend to cause pitting due to the presence of chlorides. Applications include deionized water.
Maximum Sheath Temperature: 1200°F / 649°C

304 Stainless Steel: Chromium 18-20%, Nickel 8-11%, Iron balance. Used in the food industry, medical, and chemical heating.
Maximum Sheath Temperature: 1200°F / 649°C

321 Stainless Steel: Chromium 17-20%, Nickel 9-13%, Iron balance. Modified with the addition of Titanium to prevent carbide precipitation and resulting intergranular corrosion that can take place in certain mediums when operating in the 800-1200°F (427-649°C) temperature range.
Maximum Sheath Temperature: 1200°F / 649°C

Copper: Standard Copper Alloy
A low temperature, inexpensive material used mainly for clean water heating.
Maximum Sheath Temperature: 350°F / 177°C

Steel: Low Carbon
Used for high to low viscosity oils, asphalt, tar, wax, molten salt, heat transfer liquid media and other compatible solutions.
Maximum Sheath Temperature: 750°F / 399°C

Other Sheath Materials: Available for a limited number of diameters. Consult Tempco for more information.

Inconel® 600: Iron 6-10%, Chromium 14-17%, Nickel balance
Maximum Sheath Temperature: 1800°F / 982°C

Incoloy® 825: Nickel 38-46%, Chromium 19.5-23.5%, Molybdenum 2.5-3.5%, Iron balance
Maximum Sheath Temperature: 1100°F / 593°C

CAUTION

Maximum Sheath Temperature refers to the maximum temperature of the element sheath material.
Consideration must be given to the maximum temperature that can be safely applied to the heated material.
See **Watt Density** on the previous page for additional information.