Engineering Data

Recommended Sheath Materials



Sheath Material Selection Guide

CORROSION POLICY

TEMPCO cannot warrant any electric immersion heater against failure by sheath corrosion if such failure is the result of operating conditions beyond the control of the heater manufacturer. The facts and recommendations appearing in the TEMPCO catalog or any other literature published by TEMPCO are based on our own research and the research of others, and are believed to be accurate. We cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used.

Examples of process variables that can affect heater sheath selection

- ★ Heater watt density
- * Solution contamination
- * Heating cycle (time-on, time-off)

Maximum Recommended Watt Densities for Various Materials

Temperature

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* Solution chemistry

- Galvanic behavior Degree of aeration
- Key to Notes in Sheath Material Selection Guide:
- **1.** This solution contains a mixture of various chemical compounds whose identity and proportions are unknown or subject to change. Check with chemical supplier to confirm suitability of sheath material chosen.
- **2.** Caution–flammable material.

* Flow rate (velocity) past heater

- **3.** Chemical composition varies widely. Check supplier for specific recommendations.
- 4. Direct immersion heaters not practical. Use clamp-on heaters on outside surface of cast iron pot.
- 5. Element surface loading should not exceed 20 watts per square inch.
- 6. For concentrations greater than 15%, element surface loading should not exceed 20 watts per square inch.
- 7. See suggested watt density chart.
- 8. Remove crusts at liquid level.
- 9. Clean often.
- **10.** Passivate stainless steel, Inconel[®] and Incoloy[®].

Material Being Heated	Maximum Operating Temperature °F	Maximum Watt Density W/in ²
Acid Solutions	180	40
Alkaline Solutions, Oakite	212	40
Ammonia Pltg. Solution	50	25
Asphalt, Tar or Heavy		
Compounds	200-500	4-10
Caustic Soda 2%	210	45
10%	210	25
75%	180	25
Degreasing Solution Vapor	275	20
Electroplating Solution	180	40
Ethylene Glycol	300	30
Fatty Acids	150	20
Fuel Oils		
Light Grade	180	25-30 circ.
Heavy (Bunker C)	160	8
Gasoline	300	23
Glycerine	500	10

Maximum Maximum Operating Watt Density Temperature °F Material Being Heated W/in² Machine Oil SAE 30 250 15-20 non-circ. Metal Melting Pot 500-900 20-27 Mineral Oil 400 16 Molasses 100 4-5 20 Molten Tin 600 20 Oil Draw Bath 600 Paraffin or Wax 150 16 Potassium Hydroxide 160 25 Propylene Glycol 150 20 Steel Tubing Cast 500-750 50 Into Aluminum Steel Tubing Cast Into Iron 750-1000 55 Trichlorethylene 150 20 100-125 circ. Water (Process) 35-150 75-100 non-circ. 212 75 circ.

We accept NO responsibility for results obtained by the application of this information or the safety and suitability of our products, either alone or in combination with other products. It is the responsibility of the Purchaser to make the ultimate choice of sheath material based on his/her knowledge of the chemical composition of the corrosive solution, character of materials entering the solution, and controls, which he/she maintains, on the process.

SHEATH MATERIAL SELECTION GUIDE

50 non-circ.