

Screw Plug Immersion Heaters Selection Guidelines

Selecting a Screw Plug Heater

The selection of the proper screw plug immersion heater requires critical engineering judgement. After determining the heat requirement (see the Technical section of this catalog), the proper selection of the screw plug material, heating element sheath material and correct watt density is critical for long life of the heater. The following table may be used as a guide to this selection, along with the Technical Information at the back of this catalog. Ultimate choice is determined by the knowledge of the process and engineering acumen of the plant engineer.

Application Factors

Heater application is influenced by the following parameters.

- ① The heated media, viscosity, specific heat, density and corrosive properties.
- ② Contaminants or pH present in the media.
- ③ The corrosion resistant properties of heater sheath material.
- ④ Watt density of the heating element—the heat output per square inch.
- ⑤ Screw plug material.

Typical Applications

See screw plug immersion heater selection guide below for your application.

- Hot Water Storage Tanks
- Warming Equipment
- Preheating all Grades of Oil
- Food Processing Equipment
- Cleaning and Rinsing Tanks
- Heat Transfer Systems
- Process Air Equipment
- Boiler Equipment
- Freeze Protection of Any Fluid

Screw Plug Immersion Heaters — Selection Guidelines

	①	②	③	④	⑤
Application	Solution or Heater Type	Alkaline or Acid Content (Est. % by Volume)	Sheath Material	Watt Density (W/in ²)	Screw Plug Material
Water & Very Mild Solutions	Clean Water	pH6 to pH8 Neutral	Copper	45	Brass
	Process Water or Very Weak Solutions	pH5 to pH9 2-3%	Stainless Steel ¹	45	Stainless Steel
	Weak Solutions	5-6%	INCOLOY®	45	Stainless Steel
	Demineralized, Deionized water	—	INCOLOY® Stainless Steel ¹	45	Stainless Steel Stainless Steel
Corrosive & High Viscous Solutions	Mild Corrosive Solution	5-15%	INCOLOY® or Stainless Steel ¹	23	Stainless Steel
	Severe Corrosive Solution	16% or more	INCOLOY®, Stainless Steel or Titanium	15	Stainless Steel
Oil Heating	Low Viscosity Oil	—	Steel	23	Steel
	Medium Viscosity Oil	—	Steel	15	Steel
	High Viscosity Oil	—	Steel	6	Steel
Specialty Heaters	Small Tanks	pH5 to pH9	Stainless Steel ¹	45	Brass Stainless Steel
	Process Water				
	Demineralized Water				
	Low Viscosity Oil				
	Pipe Insert	—	INCOLOY®	12	Steel
	Commercial Equipment	Clean Water	Copper	60	Brass

1. Passivated stainless steel recommended for water applications.

Note — Liquid level controls are suggested for all immersion heating applications. See Controls section in this catalog.



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Application Guidelines

Application Element — Guidelines

Application	Screw Plug Size (In.)	Sheath Material	Screw Plug Material	Heater Model	Integral Thermostat	Page
Clean Water	1	Copper	Brass	ARTM	Yes	B-7
	1-1/4	Copper	Brass	MT-1	No	B-10
	2	Copper	Brass	EMT-3	No	B-15
	2	Copper	Brass	ARMT-2	Yes	B-11
	2	Copper	Brass	MT-2	No	B-13
	2	INCOLOY®	Brass	CH-SD	No	B-16
	2-1/2	Copper	Brass	ARMT-3	Yes	B-17
	2-1/2	Copper	Brass	MT-3	No	B-21
Process Water	1	SS	SS	ARTMS	Yes	B-23
	2	SS	SS	ARMTS-2	Yes	B-27
	2	SS	SS	MTS-2	No	B-29
	2	SS	SS	AREMTS-3	Yes	B-31
	2	SS	SS	EMTS-3	No	B-32
	2-1/2	SS	SS	ARMTS-3	Yes	B-34
	2-1/2	SS	SS	MTS-3	No	B-36
Solution Water	2	INCOLOY®	SS	ARMTI-2	Yes	B-38
	2	INCOLOY®	SS	MTI-2	No	B-40
	2	INCOLOY®	SS	AREMTI-3	Yes	B-41
	2	INCOLOY®	SS	EMTI-3	No	B-42
	2-1/2	INCOLOY®	SS	ARMTI-3	Yes	B-43
	2-1/2	INCOLOY®	SS	MTI-3	No	B-45
Corrosive Solutions	2	SS	SS	AREMTS-3	Yes	B-46
	2	SS	SS	EMTS-3	No	B-47
	2	INCOLOY®	SS	AREMTI-3	Yes	B-48
	2	INCOLOY®	SS	EMTI-3	No	B-49
Severely Corrosive Solutions	2	SS	SS	AREMTS-3	Yes	B-50
	2	SS	SS	EMTS-3	No	B-51
	2	INCOLOY®	SS	AREMTI-3	Yes	B-52
	2	INCOLOY®	SS	EMTI-3	No	B-53
Light Weight Oil	1	Steel	Steel	ARTMO-1	Yes	B-54
	1-1/4	Steel	Steel	MTO-1	No	B-57
	2	Steel	Steel	ARMTO-2	Yes	B-58
	2	Steel	Steel	MTO-2	No	B-60
	2	Steel	Steel	AREMTO-3	Yes	B-61
	2	Steel	Steel	EMTO-3	No	B-62
	2-1/2	Steel	Steel	ARMTO-3	Yes	B-63
	2-1/2	Steel	Steel	MTO-3	No	B-65
Medium Weight Oil	2	Steel	Steel	ARMTO-2	Yes	B-67
	2	Steel	Steel	MTO-2	No	B-68
	2	Steel	Steel	AREMTO-3	Yes	B-69
	2	Steel	Steel	EMTO-3	No	B-70
	2-1/2	Steel	Steel	ARMTO-3	Yes	B-71
	2-1/2	Steel	Steel	MTO-3	No	B-72
Heavy Weight Oil	2	Steel	Steel	ARMTO-2	Yes	B-73
	2	Steel	Steel	MTO-2	No	B-74
	2	Steel	Steel	AREMTO-3	Yes	B-73
	2	Steel	Steel	EMTO-3	No	B-74
	2-1/2	Steel	Steel	ARMTO-3	Yes	B-75
	2-1/2	Steel	Steel	MTO-3	No	B-75
Specialty Heaters — Water, Oil & Corrosive Fluids	1/2	INCOLOY®	Steel	RI	No	B-79
	1/2	SS	Steel	RIO	No	B-79
	1/2	INCOLOY®	Brass	RIN	No	B-80
	1/2	SS	Brass	RINO	No	B-80
	1/2	SS	SS	RIS	No	B-79
	3/4	INCOLOY®	Brass	RIN	No	B-80
	3/4	SS	Brass	RINO	No	B-80
	1	Copper	Brass	TMW-1	No	B-76
	1	Copper	Steel	TM-1	No	B-78
	1	SS	SS	TMWS-1	No	B-76
	1	Steel	Steel	TMO-1	No	B-78
	1-1/4	Copper	Brass	TMW-2	No	B-77
	2	INCOLOY®	Brass	DWH-MR	Yes	B-81
	2	INCOLOY®	Steel	MTO-LT	No	B-82

Note — SS denotes 304 Stainless Steel.