

HOT STICKS HEATER SOLUTION GUIDE

SOLUTION	TYPE OF HEATER	SOLUTION	TYPE OF HEATER	SOLUTION	TYPE OF HEATER
Acetic	PTFE* or Quartz	Copper Cyanide	304 St. Steel	Nitric Hydrochloric Acids	PTFE* or Quartz
Acetane 70, 80	PTFE*	Copper Fluoborate	FIFE*	Nitric Phosphoric	Quartz
Actane Salt	PTFE*	Copper Pyrophosphate	304 St. Steel	Oil	Steel
Acid Sulphate	PTFE* or Quartz	Copper Strike	304 St. Steel	Oleic Acid	PTFE* or Quartz
Alcorite	PTFE* or Quartz	Copper Sulphate	PTFE* or Quartz	Paint Stripper (Alkaline)	304 St. Steel
Alkaline Cleaners (Electrified)	304 St. Steel	Cyanide	304 St. Steel	Perchloroethylene	304 St. Steel
Alkaline Soaking Cleaners	304 St. Steel	Deionized Water	316 St. Steel or Titanium	Phosphoric Acid (No Fluoride)	PTFE* or Quartz
Aloidine (most formulas)	316 St. Steel	Deoxiclizer (Etching)	Quartz	Phosphate Cleaner	304 St. Steel
Alstan	304 St. Steel	Deoxiclizer Non Chromated	316 St. Steel	Phosphate	316 St. Steel
Aluminium Anodizing	PTFE* or Quartz	Dichromic Seal	Steel	Potassium Acid Sulphate	PTFE* or Quartz
Aluminium Bright Dip	PTFE* or Quartz	Diethelene Glycol	304 St. Steel	Potassium Cyanide	304 St. Steel
Aluminium Cleaners	304 St. Steel	Diversey, 511, 514	PTFE	Potassium Hydroxide	304 St. Steel
Aluminium Chloride	PTFE* or Quartz	Dow Therm	316 St. Steel	Potassium Hydrochloric	PTFE* or Quartz
Aluminium Sulphate	304 St. Steel	Dye Solutions	304 St. Steel	Potassium Permanganate	PTFE* or Titanium
Ammonia	304 St. Steel	Ebonal C	Titanium	Rhodium	PTFE* or Quartz
Ammonia Persulphate	PTFE* or Quartz	Electroless Copper	PTFE	Rochelle Salt Cyanide	304 St. Steel
Ammonium Bi Fluoride	PTFE*	Electroless Nickel	PTFE* or Titanium	Ruthenium	PTFE* or Quartz
Ammonium Chloride	Titanium	Electroless Tin (Acid)	PTFE* or Quartz	Salt (Actine)	PTFE*
Ammonium Nitrate	316 St. Steel	Electroless Tin (Alkaline)	316 St. Steel	Sea Water	Titanium
Anodizing	PTFE* or Quartz	Electro Cleaner	304 St. Steel	Silver Bromide	316 St. Steel
ARP 28.80 Blackening Salts	PTFE* or Quartz	Electro, Polishing	PTFE* or Quartz	Silver Cyanide	304 St. Steel
Arsenic	304 St. Steel	Enthone 80 Acid	PTFE*	Silver Lume	304 St. Steel
Barium Chloride	Quartz or Titanium	Ethylene Glycol	Steel	Silver Nitrate	316 St. Steel
Benzoic Acid	Titanium	Ferric Nitrate	304 St. Steel	Sodium Bisulphate	PTFE* or Quartz
Black Nickel	PTFE* or Quartz	Ferric Sulphate	304 St. Steel	Sodium Carbonate	Titanium
Black Oxide (Hi Temp)	304 St. Steel	Ferric Ammonium Oxide	316 St. Steel	Sodium Chlorate	Titanium
Black Oxide (Low Temp)	Titanium	Ferric Chloride	PTFE*, Quartz, Titanium	Sodium Chloride	Titanium
Bonderizing	316 St. Steel	Fluorurate	PTFE*	Sodium Cyanide	304 St. Steel
Boric Acid	Titanium	Formic Acid	316 St. Steel	Sodium Dichromate (Hot Seal)	316 St. Steel
Brass Cyanide	304 St. Steel	Glycerol	304 St. Steel	Sodium Hydroxide	Steel
Bright Nickel	PTFE*, Quartz, Titanium	Immersion Gold	304 St. Steel	Sodium Hypochlorite	PTFE*
Bright Copper Cyanide	304 St. Steel	Gold Acid	PTFE*, Quartz, Titanium	Sodium Persulphate	PTFE* or Quartz
Bronze	304 St. Steel	Gold Cyanide	304 St. Steel	Stannate	Steel
Brown Oxide	Titanium	Grey Nickel	PTFE*, Quartz, Titanium	Stanostar	PTFE* or Quartz
Burnite	PTFE* or Quartz	Hot Seal Dichromate	316 St. Steel	Stearic Acid	Quartz
Butyric acid	Titanium	Hydrogen Peroxide	PTFE* or Quartz	Sulphamate Nickel	PTFE*, Quartz, Titanium
Cadmium Black	PTFE* or Quartz	Hydrochloric Acid	PTFE* or Quartz	Sulphur	PTFE* or Quartz
Cadmium (Alkaline)	304 St. Steel	Hydrochloric Acid	PTFE*	Sulphuric Acid	PTFE* or Quartz
Cadmium Fluoborate	PTFE*	Indium	PTFE* or Quartz	Sulphur Peroxide	PTFE* or Quartz
Calcium Chloride	Titanium	Iridite (4-75, 4-73, 14, 14-2, 14-9)	316 St. Steel	Sulphamic Acid	PTFE* or Quartz
Calcium Hypochlorite	Titanium	Indite (1, 2, 3, 4-C, 7, 8, 15)	PTFE* or Quartz	Tannic Acid	Titanium
Carbonic Acid	Titanium	Iron Fluoborate	PTFE*	Tin Nickel	PTFE*
Caustic Etch	Steel	Iron Phosphate	316 St. Steel	Tin Plating (Acid)	
Caustics	Steel	Isoprep (186, 187, 188)	316 St. Steel	(Stanus/Sulphate)	PTFE* or Quartz
Caustics (highly concentrated 20% & over)	Steel	Isoprep Acid Salts	PTFE*	Tin Plating Acid (Fluorurate)	PTFE*
Chlorine/Wet	PTFE* or Quartz	Jetal	304 St. Steel	Tin Plating (Alkaline)	304 St. Steel
Chloride	PTFE*, Quartz, Titanium	Lead Acetate	304 St. Steel	Trichlorethylene	316 St. Steel
Chlorosulphuric Acid	Titanium	Lime Saturated Water (Alkaline)	316 St. Steel	Trioxide (Pickle)	PTFE* or Quartz
Chromic Anodizing	PTFE* or Quartz	Linseed Oil	304 St. Steel	Turco (4181, 4338)	316 St. Steel
Chromic Acetate	PTFE* or Quartz	Magnesium Hydroxide	304 St. Steel	Unichrome	PTFE* or Quartz
Chromic Nickel	PTFE* or Quartz	Magnesium Nitrate	PTFE* or Quartz	Water	316 St. Steel or Quartz
Chromium (No Fluorides)	PTFE*, Quartz, Titanium	Manganese Phosphate	316 St. Steel	Woods Nickel Strike	PTFE*, Quartz, Titanium
Chromium (Fluoride)	PTFE*	McDermid 629	PTFE*	Yellow Dichromate	PTFE* or Quartz
Citric Acid	Titanium	Mercuric Chloride	Titanium	Zinc Acid	PTFE* or Titanium
Clear Chromate	PTFE* or Quartz	Muriatic Acid	PTFE* or Quartz	Zinc Ammonium Chloride	Quartz or Titanium
Cobalt Nickel	PTFE*, Quartz, Titanium	Nickel (Plating Solution)		Zinc Cyanide	304 St. Steel
Cobalt Plating	304 St. Steel	(Watts)	PTFE*, Quartz, Titanium	Zinc Phosphate	316 St. Steel
Cobalt Etch	PTFE*	Nickel Acetate Seal	316 St. Steel	Zincate	304 St. Steel
Copper Acid	PTFE* or Quartz	Nickel Chloride	Titanium		
Copper Bright Acid	PTFE* or Quartz	Nitric Acid	PTFE* or Quartz		

DO NOT USE ELECTRIC IMMERSION HEATERS TO HEAT FLAMMABLE SOLUTIONS!

Solutions requiring derated heaters are indicated by **bold type**.

The data listed is provided gratis and is offered as a guide only. It is not intended to be used as the sole basis of advice specification limits. TEE assumes no obligation or liability for any advice furnished by it or for results obtained from use. Due to the complexities of solutions and applications. It is the customers responsibility to contact their chemical supplier for heater material compatibility and recommendations. For applications involving solution concentrations exceeding 50%, consult factory for watt density recommendations. * PTFE is a polytetrafluoroethylene fluoropolymer. Copyright 2000: Mijell Enterprises Pty Ltd



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Mijell Elements

Hot Stick Heaters

Mijell Elements



Hot Stick Heaters

The Hot Sticks range of heaters is made for use in the electroplating, metal finishing and chemical industry. It is an over the side type heater and is available in three different sheaths.

The main criteria for selecting the appropriate Hot Stick is to know what solution it will be heating. Please refer to the Immersion Heater Solution Guide at the back of this brochure to determine the correct sheath material.

The wattage required to heat the load to the desired temperature and in an acceptable amount of time must also be determined. Please consult your supplier if you require any assistance.

The depth of the tank being used and the level of the liquid being heated also needs to be considered. The heated section must be covered by liquid at all times, refer to level and temperature controls sections.

The following table shows the Hot Sticks dimensions and accompanying elements.

HS SHEATHS ONLY				HS SERIES		Sheath Watts Density kW/M ²
Vitrosol (Quartz) Cat. No.	Stainless Steel Cat. No.	Titanium Cat. No.	Total Length in mm	Heated Length in mm	Elements to suit	
HSVS0300	HSSS0300	HSTS0300	300	200	HSE 10-300 - 1000W	40
HSVS0500	HSSS0500	HSTS0500	500	300	HSE 15-500 - 1500W	40
HSVS0600	HSSS0600	HSTS0600	600	400	HSE 20-600 - 2000W	40
HSVS0750	HSSS0750	HSTS0750	750	500	HSE 15-750 - 1500W	23
					HSE 30-750 - 3000W	48
HSVS1000	HSSS1000	HSTS1000	1000	750	HSE 15-1000 - 1500W	16
					HSE 30-1000 - 3000W	31
					HSE 40-1000 - 4000W	42
					HSE 50-1000 - 5000W	53



A typical installation will require the following selections to be made:

For example when ordering a 3kW Vitrosol Hot Stick for a 1000mm deep tank the following parts need to be ordered:

- Vitrosol sheath (1000mm) HSVS1000
- Element (3kW) HSE30-1000
- Lead assembly (2m long) HRC2

Other components to consider:

- Heater guard (PVC or Polypropylene - see table)
- Mounting bracket
- Liquid level and temperature control (if required, see table)

Lead Assembly

Lead assembly for the Series Hot Stick heaters - Cat. No. HRC2 - 2.8mm². 3 core flexible (2 metres long), acid and oil resistant and heat stabilised cable (temperature range minus 30°C to 85°C).

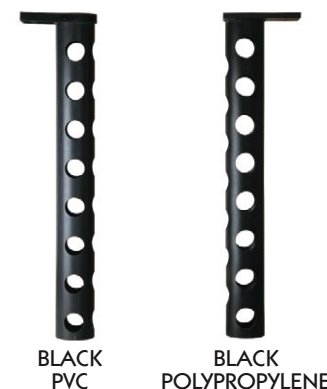
Heater Guards

Vitrosol (Quartz) HSV and coiled Teflon HSTEFTE sheaths require a fully enclosed protective guard.

Use PVC for solutions below 70°C and Polypropylene for solutions up to 100°C. (Except for chrome and nitric solutions).

Standard Guards

PVC	POLYPROPYLENE	LENGTH
HSGPV0300	HSGPP0300	300
HSGPV0500	HSGPP0500	500
HSGPV0600	HSGPP0600	600
HSGPV0750	HSGPP0750	750
HSGPV1000	HSGPP1000	1000



*OPERATING TEMPERATURES UP TO:
60°C 100°C

Mounting Brackets

Mounting brackets are supplied complete with stainless steel mounting bolts. Stainless (HRS) and Titanium (HRT) sheaths require either a PVC or Polypropylene mounting bracket. The mounting brackets are also suitable for mounting level and temperature sensors.

PVC - For Nitric and Chrome solutions. Polypropylene - For most other solutions.

CATALOGUE No.	SIZE
PVC HRBPVC - STD	170 x 100 x 20
POLYPROPYLENE HRBPOLY - STD	180 x 100 x 10

Mini Hot Sticks

For other applications where smaller immersion heaters are required there is a Mini Hot Stick range available. These applications may include: P.C board production, large fish tanks, laboratories, pilot plants and the jewellery industries.

Mini Hot Sticks are supplied complete with their in built heating element and PVC mounting bracket.

VITROSOL CAT. NO.	STAINLESS STEEL CAT. NO.	TITANIUM CAT. NO.	TOTAL WATTS	TOTAL LENGTH	HEATED LENGTH
MHSV0450	MHSS0450	MHST0450	450	250	160
MHSV0600	MHSS0600	MHST0600	600	300	200
MHSV0700	MHSS0700	MHST0700	700	350	250

Mini Heater Guards

When using Vitrosol and coiled Teflon sheathed heaters it is recommended that a guard be used to protect the sheath from mechanical damage.

PVC	POLYPROPYLENE	LENGTH
MHSGPV0250	MHSGPP0250	250
MHSGPV0300	MHSGPP0300	300
MHSGPV0350	MHSGPP0350	350

Teflon over the side type Immersion Heaters

It is recommended that a fully enclosed guard be used to protect the heaters, where mechanical damage may occur.

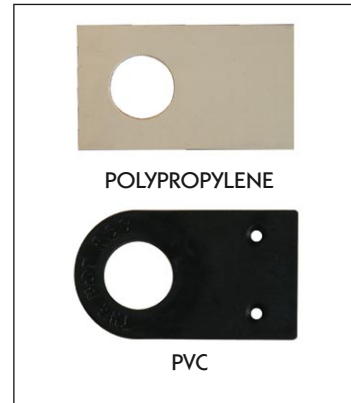
If this is not an issue, heaters can be installed with supplied PVC mounting bracket and stainless steel bolts. *Average sheath watts density for Coils & Banjos is 16Kw/m²

COILED TYPE

CATALOGUE NO.	WATTS	TOTAL LENGTH IN MM	HEATED LENGTH IN MM
HSTE15C 50/30	1500	500	300
HSTE20C 70/40	2000	700	400
HSTE30C 90/60	3000	900	600
HSTE30C 100/70	3000	1000	700
HSTE40C 75/45	4000	750	450
HSTE40C 100/70	4000	1000	700

BANJO TYPE

CATALOGUE NO.	WATTS	TOTAL LENGTH IN MM	HEATED LENGTH IN MM
HSTE15B 60/30	1500	600	300
HSTE20B 75/35	2000	750	350
HSTE30B 75/35	3000	750	350
HSTE40B 80/40	4000	800	400



OTS Heaters

These heaters are intended for solutions which are not injurious to Incoloy 800 and are mainly used for heating clean water as well as mild alkaline solutions and detergent solutions.

The sheath watts density is 62kw/m².

The standard model, as well as the thermostatic model is available from 1000W to 6000W in 1000W steps.

The thermostatically controlled model is fitted with a 0°C - 120°C thermostat. Both models are supplied with a splash proof terminal box, with a 20mm conduit adaptor.

STANDARD MODEL CAT. NO.	WATTS	TOTAL LENGTH	HEATED LENGTH	THERMOSTAT MODEL CAT. NO.
OTS10	1000	540	350	OTS10T
OTS20	2000	730	500	OTS20T
OTS30	3000	870	640	OTS30T
OTS40	4000	1000	770	OTS40T
OTS50	5000	1300	1070	OTS50T
OTS60	6000	1540	1300	OTS60T

Controls

Mijell MC2

This is a liquid expansion type thermostat housed in an acid resistant Poly-carbonate enclosure.

The MC2 is fitted with a 1 metre capillary tube and sensing bulb designed to switch 16 Amps 240 Volt resistive load and comes complete with two indicator lamps, one to indicate supply and the other to indicate whether the load is on.

Special note: If these thermostats are being used to sense solution temperatures other than water, it is recommended you use an appropriate thermostat pocket, or sheath the sensing bulb and capillary with a sleeving compatible to the solution being heated.



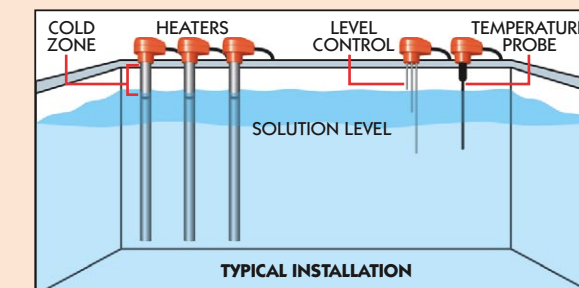
CATALOGUE NO.	TEMPERATURE RANGE
MC2-0-40	0-40°C
MC2-30-110	30-110°C
MC2-50-300	50-300°C



Liquid Level Controller

To maintain correct solution level
Cat. No. HSLC1

Used in conjunction with:



Level Sensing Probes

STANDARD CAT NO.	MINI CAT NO.
HSLPS	MHSLPS

PT100 Temperature Probes

STAINLESS STEEL CAT NO.	LENGTH	HALAR COATED
HSTPS0200	200	HSTPH0200
HSTPS0300	300	HSTPH0300
HSTPS0400	400	HSTPH0400
HSTPS0500	500	HSTPH0500

Temperature Controller

Non indicating. 0 - 100°C
Cat. No. HRTC 100

Used in conjunction with:

