

# UNIVERSAL SOLVENT HEATER

## Circulation Heater

A cast-in circulation heater with a full array of special features to safely heat volatile solvents.



The Universal Solvent Heater from Cast Aluminum Solutions (CAS) has been designed and tested to perform at the highest levels when heating volatile, low-flashpoint solvents.

The USH features efficient low-watt-density heating elements cast into an aluminum body that also contains two helical-coiled stainless steel tubes; a small cooling tube for water (to reduce solvent temps below flashpoint), and a larger solvent tube (passivated & electro-polished). Solvents are sequestered in this tube, never contacting the heating elements, which prevents contamination and reduces the risk of explosion.

Three J-Type thermocouples sense solvent inlet, outlet and heater core temperatures. A snap-action high limit switch provides safe shutdown of the unit. The electrical enclosure is explosion proof (NEMA 7). To protect it from corrosion, the body is Teflon® coated. This is the ultimate solvent heating device.

### APPLICATIONS:

- Semiconductor Wet Process Systems
- Wafer Cleaning Equipment
- Heating of Photoresist Removal Solvents
- Acid Heating
- Heating Low Flashpoint Solvents
- Safe Heating of Media in Environments Containing Flammable or Explosive Vapors

### SPECIFICATIONS:

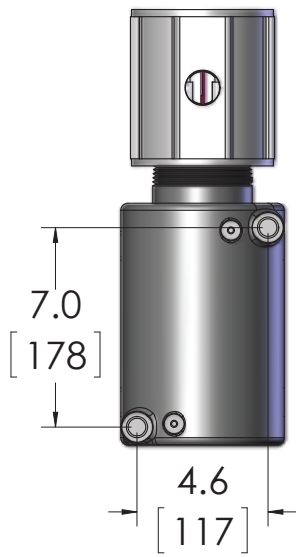
- Power:
    - 6 kW Total to 8 kW Total
    - Voltage Range: 208 - 480 V
    - Max Line Current: 30 A per circuit
  - Tubing (Solvent Tube):
    - .750" OD (3/4") (19.1 mm)
    - .065" Wall (1.7 mm)
    - Overall Process Tube Length: 115.5" (2934 mm)
    - 316L Stainless Steel, Passivated & Electro-Polished
  - Tubing (Cooling Tube):
    - .250" OD (1/4") (6.3 mm)
    - .035" Wall (0.9 mm)
    - Overall Process Tube Length: 86.25" (2190 mm)
    - 316L Stainless Steel
  - Max Pressure: 3300 psi (227 bar)
  - Enclosures:
    - NEMA 7 (explosion-proof)  
(Class 1, Div. 1 and 2, Groups B, C and D)
  - Max Working Temperatures: 392°F (200°C)
- Published temperatures are for housing at 12 o'clock position; higher temps may be possible at 6 o'clock position. See factory for details.
- Sensors:
    - Two J-Type Thermocouples (cast in)
    - One J-Type Thermocouple (removable)
    - Snap Action High Limit Switch (with auto reset)
  - Fittings:
    - Solvent Tube: Flaretek®-Compatible or Swagelok® VCR
    - Cooling Tube: NPT or Swagelok® VCR
  - Accessories:
    - Insulating Jacket

### FEATURES & BENEFITS:

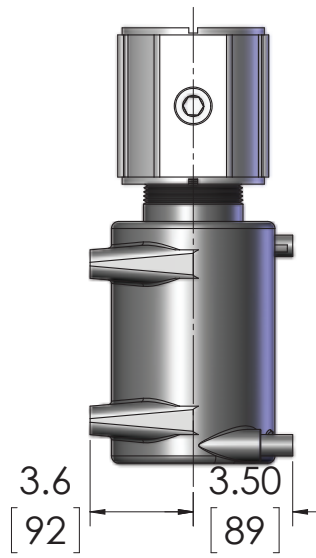
- Provides Safe & Efficient Heating Low Flashpoint Solvents
- Solvents Never Contact Heating Elements  
(isolated fluid path reduces possibility of explosion & contamination)
- NEMA 7 Explosion-Proof Electrical Enclosure
- Design is Self-Draining (eliminating trapped debris)
- Solvent Tubes are Passivated and Electro-Polished
- Cooling Tube Quick Reduces Heat Below Flashpoint
- Equipped with 3 Thermocouples & 1 Limit Switch
- Compatible with High Pressure Applications

# UNIVERSAL SOLVENT HEATER Circulation Heater

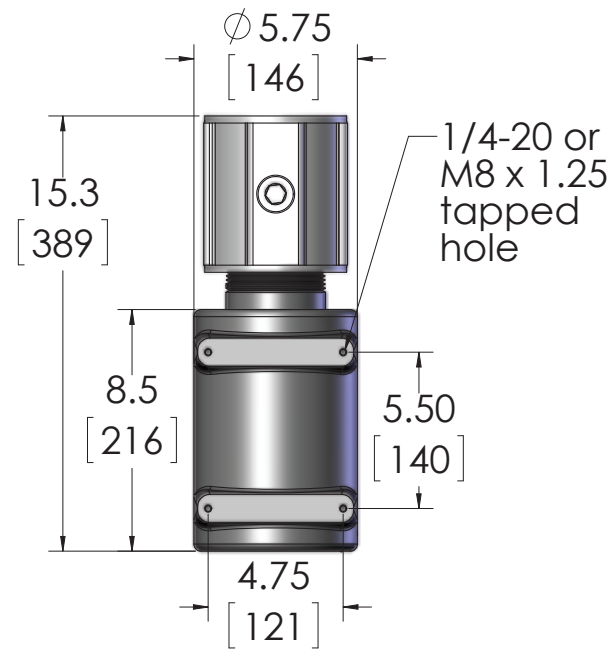
FRONT VIEW



SIDE VIEW

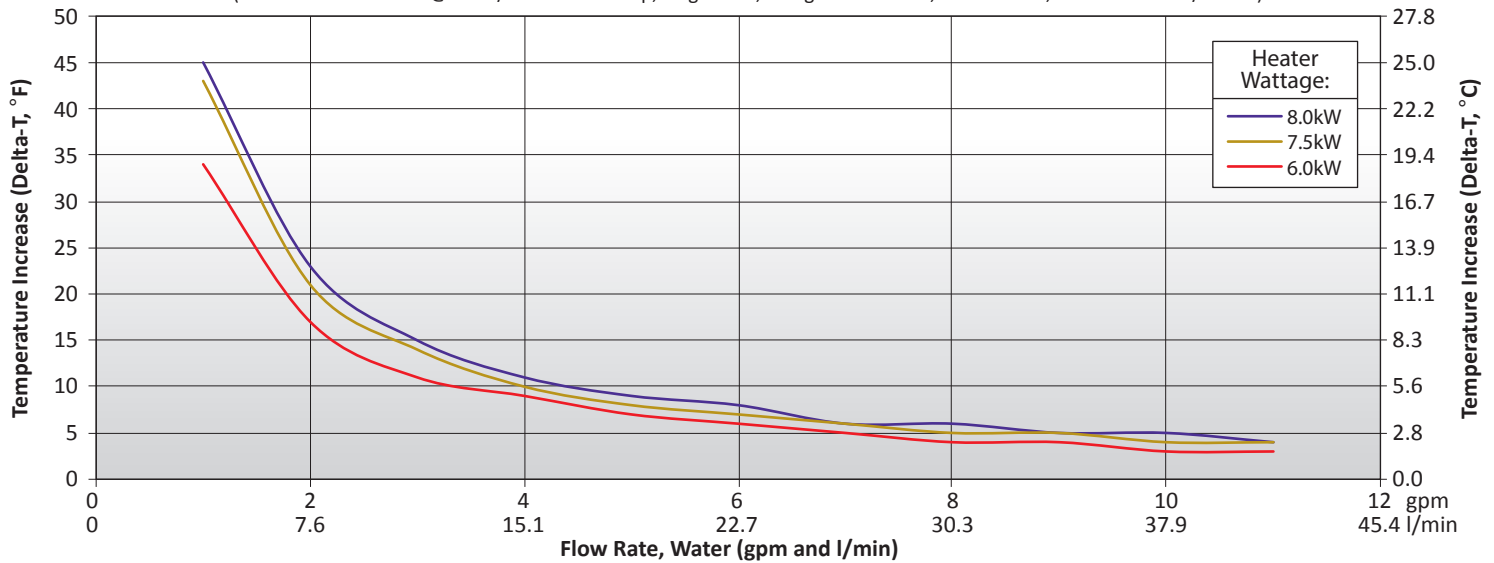


REAR VIEW



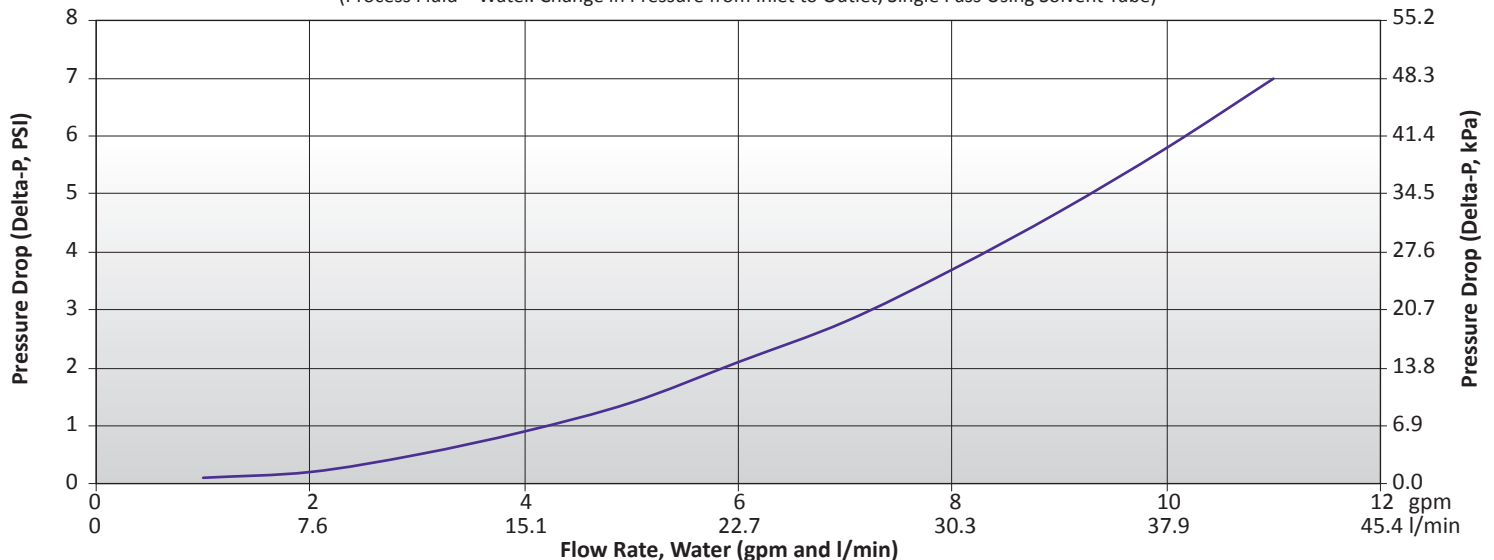
Universal Solvent Heater Heating Profile: Delta-T Water

(Process Fluid = Water @ 42°F / 5.6°C Inlet Temp, Single Pass, Using Solvent Tube, 100% Power, Set Point 752°F / 400°C)

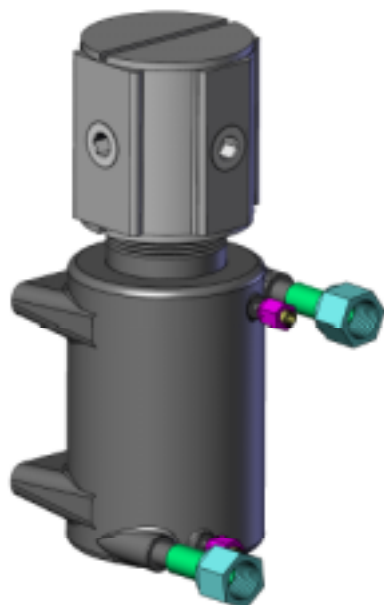


Universal Solvent Heater Heating Profile: Delta-P Water

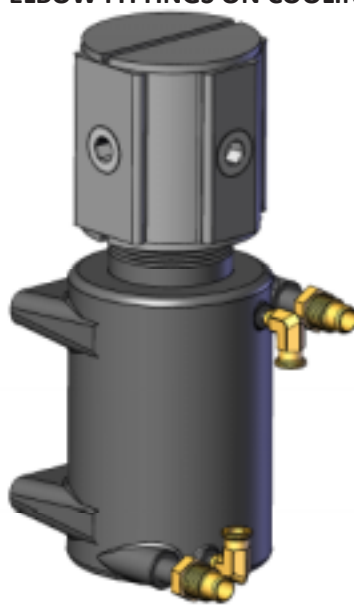
(Process Fluid = Water. Change in Pressure from Inlet to Outlet, Single Pass Using Solvent Tube)



**SWAGELOK® VCR FITTINGS  
ON SOLVENT TUBE AND COOLING TUBE**



**FLARETEK®-COMPATIBLE FITTINGS  
ON SOLVENT TUBE AND  
NPT 90° ELBOW FITTINGS ON COOLING TUBE**

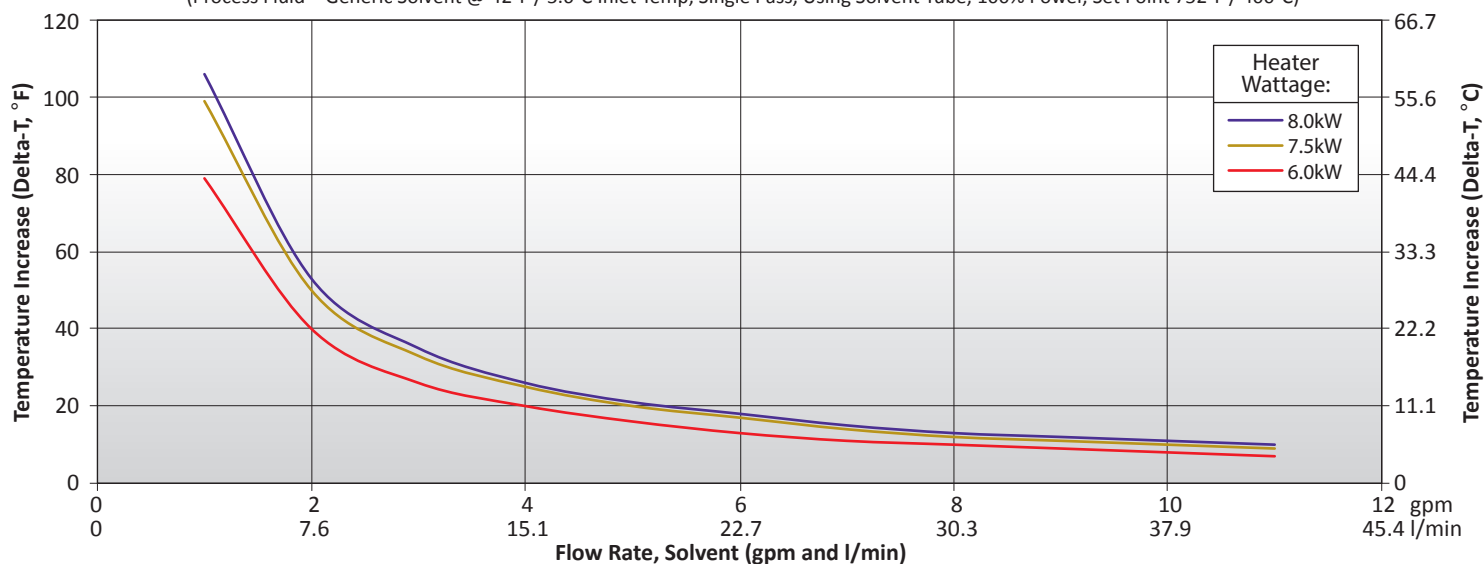


Tube Fittings to Meet Any Need

Our Universal Solvent Heater offers an array of high-performance tube fittings. Each fitting was chosen for its ability to meet the unique specifications of solvent heating applications.

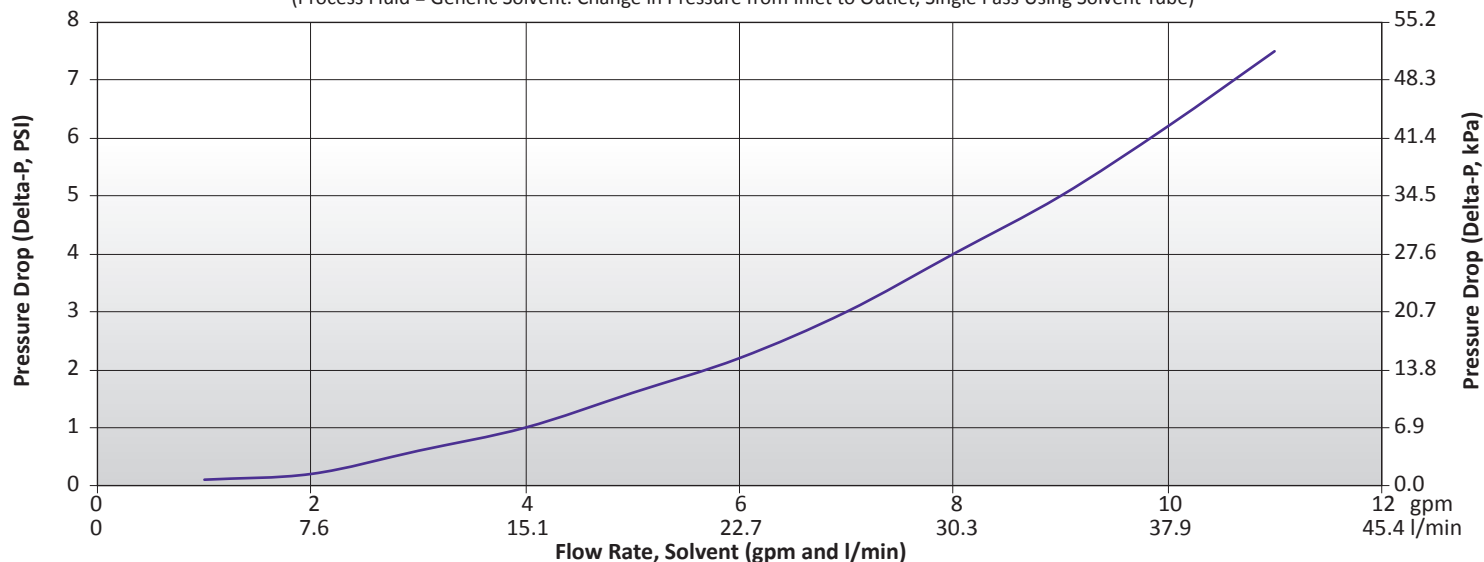
**Universal Solvent Heater Heating Profile: Delta-T Solvent**

(Process Fluid = Generic Solvent @ 42°F / 5.6°C Inlet Temp, Single Pass, Using Solvent Tube, 100% Power, Set Point 752°F / 400°C)



**Universal Solvent Heater Heating Profile: Delta-P Solvent**

(Process Fluid = Generic Solvent. Change in Pressure from Inlet to Outlet, Single Pass Using Solvent Tube)



**BX8J5N100A-BCDEF**

Base Circulation Heater \_\_\_\_\_

Heater Power \_\_\_\_\_

Solvent Tube Fitting \_\_\_\_\_

Cooling Tube Fitting \_\_\_\_\_

High Limit Switches \_\_\_\_\_

Accessories \_\_\_\_\_

Metric Mountings \_\_\_\_\_

Building a Universal Solvent Heater Part Number

Use these graphs to build your Universal Solvent Heater  
Assigning numbers for sections A, B, C, D and E.

If you need metric mountings, assign "M" to section F.  
If metric mounts are not required, leave section F blank.

For assistance, please contact CAS directly.

**VOLTAGE, POWER, CIRCUIT TYPE**

Section "A"	Volts (V)	Watts (kW)	Circuit Type	Amps (A) per circuit
A	208	8	TWO SINGLE-PHASE CIRCUITS	19.2
C	208	6	TWO SINGLE-PHASE CIRCUITS	14.4
E	208	7.5	ONE THREE-PHASE WYE	20.8
B	240	8	TWO SINGLE-PHASE CIRCUITS	16.7
D	240	6	TWO SINGLE-PHASE CIRCUITS	12.5
F	240	7.5	ONE THREE-PHASE WYE	18.0
G	380	7.5	ONE THREE-PHASE WYE	11.4
H	480	7.5	ONE THREE-PHASE WYE	9.0

**SOLVENT TUBE FITTING**

Section "B"	Description
1	FLARETEK®-COMPATIBLE, 1" OD, 20 THREADS PER INCH, MALE / PAIR
2	SWAGELOK® VCR FITTINGS / PAIR

**COOLING TUBE FITTING**

Section "C"	Description
1	NPT (NATIONAL PIPE THREAD) FITTINGS, 1/4", 90° ELBOW, FEMALE / PAIR
2	SWAGELOK® VCR FITTINGS / PAIR

**SNAP ACTION HIGH LIMIT SWITCHES**

*Pilot duty only*

Section "D"	Switch
1	AUTOMATIC RESET, 212°F (100°C)
2	AUTOMATIC RESET, 365°F (185°C)

**ACCESSORIES**

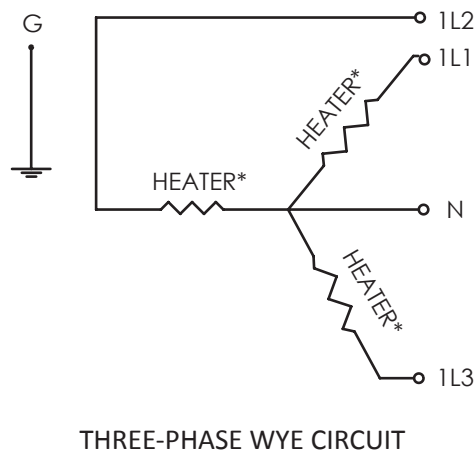
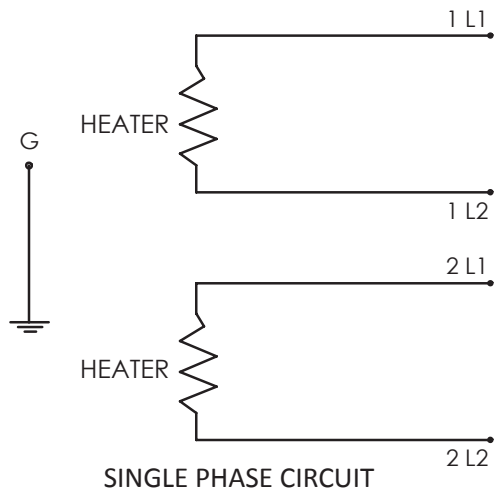
Section "E"	Component
0	NONE
1	INSULATION JACKET, MAXIMUM TEMPERATURE 400°F (204°C)

**METRIC MOUNTING HOLES**

*Place an "M" in section F if metric mounting holes are required.*

*If standard Imperial mounting holes are desired, section F can be left blank*

Section "F"	Metric Mounting Holes
M	M8 x 1.25 Metric Tapped Mounting Holes



#### Universal Solvent Heater Available Circuit Types

The Universal Solvent Heater is manufactured with these types of circuit configurations.

\*Wiring schematic only shows heater elements. Refer to I&M Manual for further details on wiring of snap-action switches (if applicable).



UNIVERSAL SOLVENT HEATER WITH SWAGELOK® FITTINGS ON BOTH THE SOLVENT TUBE AND THE SMALLER COOLING TUBE.



UNIVERSAL SOLVENT HEATER WITH FLARETEK®-COMPATIBLE FITTINGS ON SOLVENT TUBE AND NPT FITTINGS ON COOLING TUBE



# SOUTHEAST THERMAL SYSTEMS

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