



# UNIVERSAL SOLVENT Circulation Heater

### SAFE HEATING OF VOLATILE SILICON WAFER CLEANING SOLVENTS

The Cast Aluminum Solutions universal solvent circulation heater consists of a cylindrical-shaped cast part with helical coiled tubes and formed tubular heating elements cast-in. Three Type J thermocouples sense the solvent inlet, solvent outlet and casting core temperatures. The universal solvent circulation heater operates at near 100 percent efficiency while reducing the risk of solvent contamination.

The universal solvent circulation heater provides a safe and efficient means of heating low flash point solvents. Both the heating elements and the solvent tube are cast into the aluminum. The heating elements provide heat to the aluminum mass and the mass transfers this heat to the tube carrying the solvent. The casting can also be surrounded by insulation to minimize heat loss and keep equipment cabinet temperatures low. A secondary chilled water tube is also cast-in. This tube quickly cools the casting for routine maintenance or lowers the solvent below the flash point.

Safety features of the universal solvent circulation heater include a NEMA 7 rated (explosion proof) enclosure box covering the electrical connections and a snap-action over temperature protection switch to provide safe shut down. The casting body is Teflon® coated to protect the aluminum in case of accidental contact with solvents.

The universal solvent circulation heater is appropriate for numerous applications and may be customized to meet specific customer needs. For additional options, please contact Cast Aluminum Solutions.

### APPLICATIONS

**Semiconductor Wet Process Systems    Wafer Cleaning Equipment (wet bench systems)**

**Post Etch Wet Strip and Photoresist Removal Applications**

**Heating of Low Flash Point Solvents Such as EKC, ACT & NMP**

### FEATURES AND BENEFITS

**Fluid path constructed independent from heater sheath**

Allows solvent to never be in contact with heater element  
Eliminates hot spots caused by poor flow or start up conditions

**Cast aluminum construction**

Allows accurate process temperature control  
Provides rugged design and durability  
Higher reliability due to fewer components and nonwelded construction  
Ensures longer heater life

**Material compatibility with most semiconductor solvents**

316L Stainless Steel passivated and electropolished solvent tube  
Ensures contamination resistant surface for heated solvent  
Assures higher reliability and cleanliness due to seamless tubing

**Operates to 1500 psi or greater with appropriate fittings**

Enables economic high pressure operation

**Self-draining construction when mounted vertically**

Eliminates trapped material that may add contamination to the process  
Saves on operating time

**Agency ratings to comply with safety standards**

UL®/CSA recognized heater elements  
NEMA 7 Class I, Div. 1 and 2, Groups B, C and D electrical enclosure  
Reduces risk of accidental combustion of solvent vapors



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## SPECIFICATIONS

### Operating Temperatures

-Ambient to 392°F (200°C)

### Electrical

-208 to 240V $\bar{A}$ (ac) and 6000 to 8000W single-phase  
-208 to 480V $\bar{A}$ (ac) and 7500W three-phase

### 316L Stainless Steel Seamless Tubes

-0.75 in. (19 mm) O.D., solvent tube - passivated and electropolished  
-0.25 in. (6 mm) O.D., cooling water tube

### Fitting Connections

-Flaretek® or Swagelok VCR fittings on solvent tube  
-National Pipe Thread (NPT) or Swagelok VCR fittings on cooling tube

### Optional Features

-Insulating jacket, max temperature 400°F (204°C)  
-Contact CAS for custom inquiries

### Sensors/Switches

-2 cast-in Type J thermocouples sense solvent tube inlet and outlet temperatures  
-1 replaceable Type J thermocouple senses casting core temperature  
-Mechanical snap action switches for over temperature protection

### Casting Dimensions

-Height 8.5 in. (216 mm)  
-Diameter 5.75 in. (146 mm)  
-Dimensions above do not include tube fittings and mounting bosses

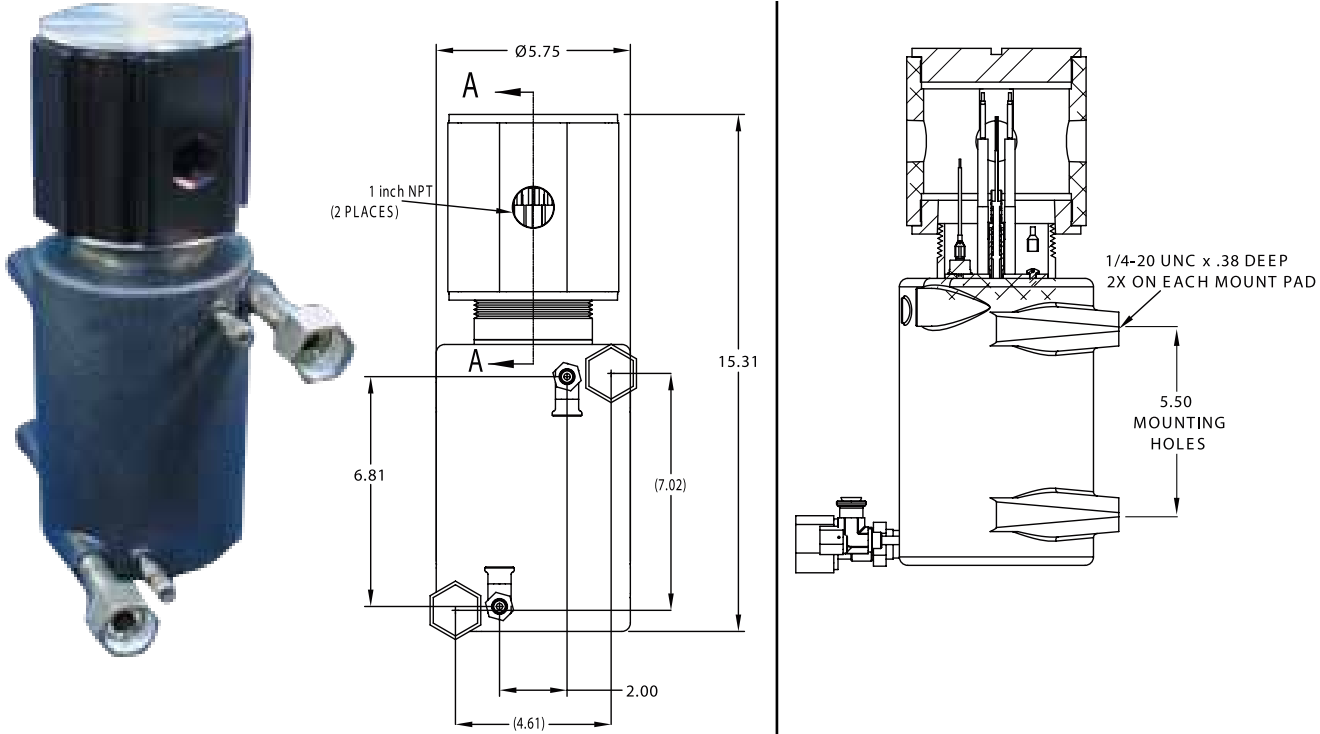
### Enclosure Dimensions

-Enclosure rated for Class I, Div. 1 and 2, Groups B, C and D  
-Height 5 in. (127 mm)  
-Diameter 4.75 in. (121 mm)

### Teflon® Coated Casting/Anodized Electrical Enclosure

-Protects unit from accidental contact with corrosive process solvents

## DIMENSIONS



## ORDERING INFORMATION

To order, complete the number code with the information below.

### Base:

0.75 in. (19mm) O.D. x 0.049 in. (1.25 mm) wall, seamless 316 SS, passivated and electropolished solvent tube. 0.25 in. (6 mm) O.D. x 0.049 in. (1.25 mm) wall, seamless 316 SS, cooling tube. NEMA 7, Class I, Div. 1 and 2, Groups B, C and D rated electrical enclosure. Type J thermocouple sensors at casting core, solvent inlet and solvent outlet. High limit, auto resetting snap-action switch.

### Heater Voltages and Wattages:

**100A** = 208V, 8000W, single-phase  
**100B** = 240V, 8000W, single-phase  
**100C** = 208V, 6000W, single-phase  
**100D** = 240V, 6000W, single-phase  
**100E** = 208V, 7500W, three-phase  
**100F** = 240V, 7500W, three-phase  
**100G** = 380V, 7500W, three-phase  
**100H** = 480V, 7500W, three-phase

### Solvent Fitting:

**1** = Flaretek®  
**2** = Swagelok VCR

### Accessories:

**0** = None  
**I** = Insulating jacket

### Cooling Fitting:

**1** = 90° 1/4 NPT female  
**2** = Swagelok VCR

### High Limit Switch:

**1** = 212°F (100°C)  
**2** = 365°F (185°C)

**B X 8 J 5 N -**



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