PROCESS TECHNOLOGY

TIH Series
In-Line Chemical Heater

The TIH Series in-line fluoropolymer heater is ruggedly designed for the most demanding recirculation or single pass chemical applications and to provide years of trouble-free performance. The heater is typically used in conjunction with a chemical bath or spray system with an external pump/filter. The heater provides high purity heating of chemistry for the semiconductor, FPD, MEMS, biomedical, photovoltaic and other industries.

TIH Series Applications Include:

- SC1: ammonium hydroxide (NH_4OH), and hydrogen peroxide (H_2O_2)
- SC2: hydrochloric acid (HCl), and hydrogen peroxide
- Buffered oxide etch (BOE) process: hydrofluoric acid (HF) and ammonium fluoride (NH_4F)
- Nitride etch/strip: phosphoric acid (H_3PO_4)
- Various acids such as:
    - Hydrochloric (HCl)
    - Hydrofluoric (HF)
    - Acetic ($C_2H_4O_2$)
    - Nitric (HNO_3)
    - Sulfuric (H_2SO_4)
- Sulfuric acid and hydrogen peroxide
- Sulfuric acid and ozone (O_3)
- Hydrofluoric acid and glycol ($C_2H_6O_2$)
- Potassium hydroxide (KOH)
- Sodium hydroxide (NaOH)
- Electroless nickel
- Electroless copper
- Electroless gold
- Deionized water
- Some solvents (consult factory)

SPECIFICATIONS:

Service: In-line chemical heater with all fluoropolymer wetted surfaces for virtually any wet chemistry application

Temperature Range: Up to 180ºC chemistry

Maximum Working Pressure: 100 PSI (7 Bar) at 25°C, 60 PSI (4 Bar) at 180ºC

Heater Sizes: 1,000 watts up to 18,000 watts

Heater Voltages Available: 200 to 600 volts, single or three phase (12kW and larger require three phase)

Watt Density: 10 watts per square inch (1.5w/cm^2)

Fluid Connections Available:

- ¼-inch (6mm) to 1-inch (25mm) flared
- ½-inch (12mm) to 1-inch (25mm) Super 300 Type Pillar®
- Other connections available, consult factory

Third Party Certifications: CE, UL, Semi S2 and S3

Warranty: One year

Element Purge:

- Small amount of clean dry air (CDA) or N_2 gas flows between the metal grounded element and the PTFE sheath
- Purge minimizes potential for ionic contamination
- Removes chemical permeation for longer service life

0310

SPECIFICATIONS (continued):

Standard Features:

- .027" (.69mm) PTFE sheathed grounded heating element for long service life
- Patented gas-purged element design
- FM4910 compliant materials of construction
- Rugged, heavy-wall chamber construction ¾-inch (19mm) thick
- 10' (3m) FEP sleeved power and control cables
- Process temperature sensors (FEP sheathed 1000 ohm RTD)
- Heater element overtemperature sensors (FEP sheathed 1000 ohm RTD)
- Heater element thermal cutoff device (TCO)
- Junction box, flange cover and mounting brackets FM4910 compliant material

Options:

- Horizontally mounted configuration
- Integral cooling coils
- 100 ohm RTDs or "J", "K", or "E" type process and element thermocouples
- Lower watt density heaters for special applications
- PVDF high temperature mounting brackets
- Capacitive style liquid level verification
- PID temperature control module
- PLC temperature control module with patented Demand Anticipation Control (DAC™)
- Element purge flow regulator panel including:
  - Back pressure switch
  - Flow meter
  - Flow regulator

FEATURES AND BENEFITS:

Faster heatup: Single heater chamber sizes up to 18kW.

Exceptionally clean performance: Thick fluoropolymer sheath minimizes permeation. Element purge monitoring minimizes ionic contamination potential. Cleanroom assembly and testing ensures the highest manufacturing standards.

Long heater life for reduced cost of ownership (COO): Patented heater gas purge system continuously removes any chemical permeation and ensures long element life.

Rugged construction: Thick walled chamber provides long service life in the harshest high temperature applications.
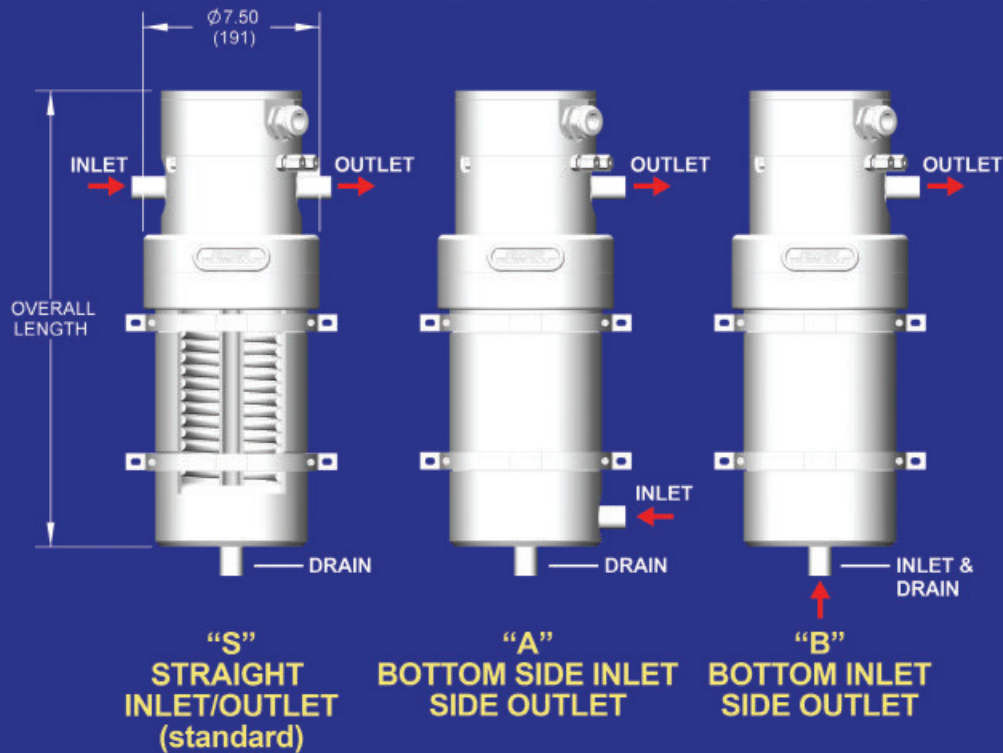
Rapid installation: Customized plumbing connections available to match existing plumbing and simplify installation.

Outstanding chemical compatibility: All fluoropolymer wetted parts compatible with virtually any chemistry.

Excellent temperature stability: Low watt density design enables accurate control of process temperature.
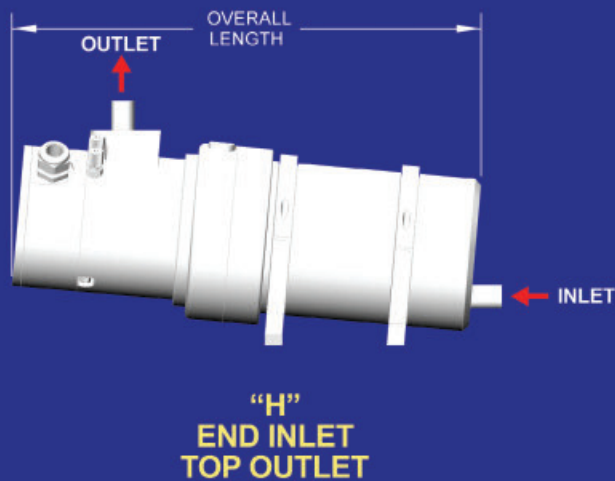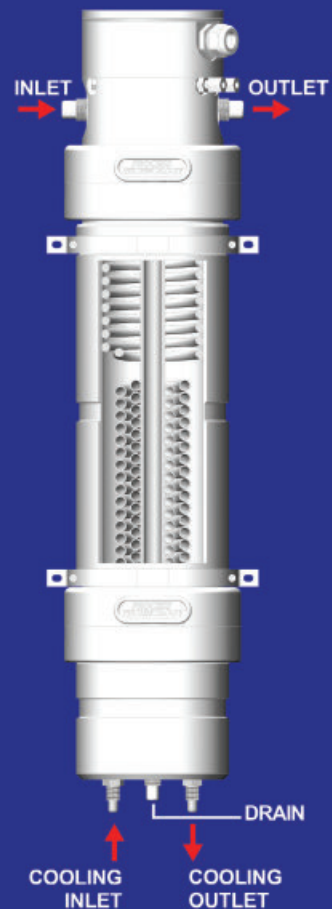
VERTICAL CONFIGURATIONS

Ø7.50
(191)

INLET OUTLET

OUTLET

OUTLET

OVERALL
LENGTH

INLET

DRAIN

DRAIN

INLET &
DRAIN

"S"
STRAIGHT
INLET/OUTLET
(standard)

"A"
BOTTOM SIDE INLET
SIDE OUTLET

"B"
BOTTOM INLET
SIDE OUTLET

kW	VERTICAL LENGTH In./(mm)
1 2 3	18.25" (463)
4.5 6	26.25" (667)
9 12	34.25" (870)
13.5*	40.25" (1022)
18*	42.25" (1073)

HORIZONTAL CONFIGURATION

OVERALL
LENGTH

OUTLET

INLET

"H"
END INLET
TOP OUTLET

kW	HORIZONTAL LENGTH In./(mm)
1 2 3 4.5	20.00" (508)
6	24.75" (629)
9 12	33.25" (845)
13.5* 18*	42.00" (1066)

HEATING/COOLING CONFIGURATION

INLET OUTLET

DRAIN

COOLING
INLET

COOLING
OUTLET

For heating/cooling units, please contact factory for dimentions

TYPICAL INSTALLATION (Electrical)

POWER MODULE

CONTROL CABLE

POWER CABLE

CONTROL MODULE

PROCESS OUT

PURGE/LEVEL MODULE

PROCESS IN

LEGEND

BLACK	LINE VOLTAGE
GREEN	EARTH GROUND
RED	PROCESS/OVERTEMP SENSORS
ORANGE	OVERTEMP TCO
BLUE	GAS PURGE
CYAN	LEVEL SENSOR
VIOLET	INTERFACE CABLE
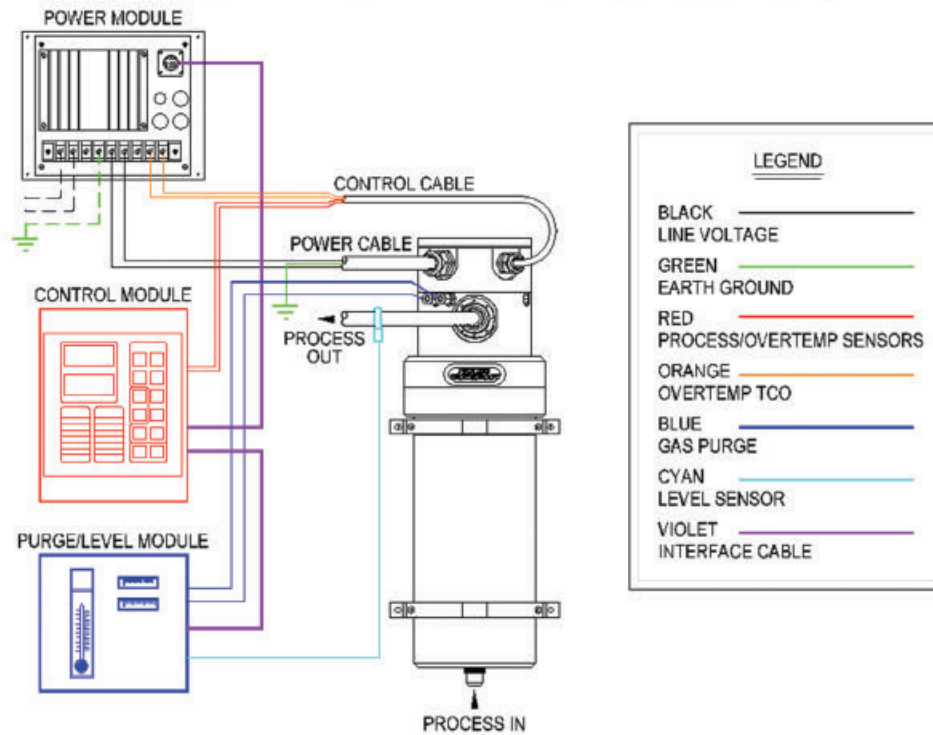
TYPICAL RECIRCULATION LOOP

PUMP

OUTLET   INLET

RECIRCULATION TANK

OUTLET   INLET

TIH HEATER

FILTER

PROCESS TECHNOLOGY