

## FLUENT® In-line Heater

# High Performance Fluid Heating Solution Featuring Watlow's Thermal Spray Technology Improves System Performance

The FLUENT® in-line heater from Watlow® is a small, lightweight, high-performance heater that can replace both a traditional immersion type heater or a heater wrapped around a tube as part of a thermal system. Watlow's FLUENT heater is designed as an integrated solution that replaces multiple components in a system. This heater design reduces overall system cost and complexity. Because of its high watt density, it offers ultra-fast response leading to higher system performance. Featuring Watlow's patented layered heater technology, the heater makes use of its entire surface to produce heat, which optimizes heat transfer and temperature uniformity.



## Features and Benefits

### Small, lightweight, robust heater construction

- Replaces multiple components in a system
- Reduces overall system size
- Lowers total cost of ownership

### Patented circuit patterning process

- Facilitates customizable heating profiles
- Enables distributed wattage and/or multiple zones
- Assures precise and repeatable power distribution

### High watt density, low mass heater

- Contributes to fast response time
- Allows for efficient heat transfer
- Enables on-demand process start-up

## Typical Applications

- Hemodialysis fluid heating
- Food cooking equipment
- Semiconductor purge and carrier gas heating
- Ink preheating systems
- On demand fluid heating

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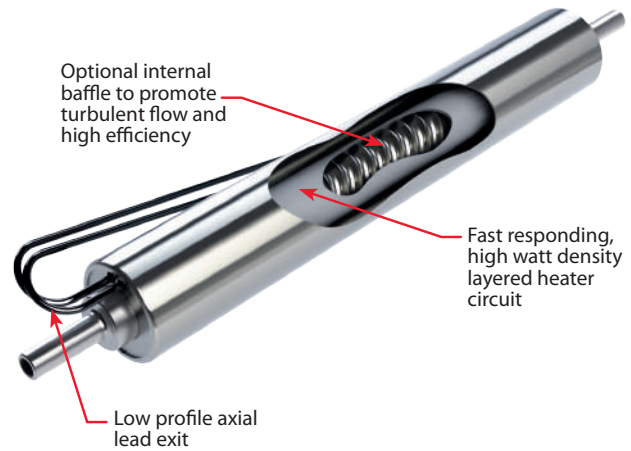
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*Powered by Possibility*

 **WATLOW®**  
*Powered by Possibility* **WATLOW**

## Specifications

- Substrate tube material: 444 SS
- Fitting and baffle material: 316L SS
- Voltage up to 240V
- Amperage up to 15A per zone
- Resistance tolerance +10%, -5%
- Typical maximum watt densities
  - Air 150 W/in<sup>2</sup> (23 W/cm<sup>2</sup>)
  - Water 450 W/in<sup>2</sup> (70 W/cm<sup>2</sup>)
- Maximum pressure: 150psi (10.2 bar)
- Maximum temperature: 662°F (350°C) as measured by internal T/C
- UL®/cUL® and CE



Fast responding, high watt density layered heater circuit

Low profile axial lead exit

## Standard Product Offering: Base Heaters

Volts	Watts	Number of Heating Circuits	Outer Diameter in. (mm)	Protection Tube Length in. (mm)	Watt Density (W/in <sup>2</sup> )
240	500	1	1 (25)	3.00 (76)	210
120	250	1	1 (25)	4.25 (108)	57
240	1000	1	1 (25)	4.25 (108)	228
120	375	1	1 (25)	5.25 (133)	62
240	1500	1	1 (25)	5.25 (133)	247
120	500	1	1 (25)	6.50 (165)	63
240	2000	1	1 (25)	6.50 (165)	250
120	750	2	1 (25)	6.50 (165)	94
240	3000	2	1 (25)	6.50 (165)	375
120	1000	2	1 (25)	7.75 (197)	100
240	4000	2	1 (25)	7.75 (197)	400
240	500	1	1 (25)	6.50 (165)	63
120/240	1000/4000	1	1 5/8 (41)	6.50 (165)	75/300
120/240	1500/6000	2	1 5/8 (41)	10.00 (254)	61/245
120/240	2000/8000	2	1 5/8 (41)	12.00 (304.8)	61/245

## Application Orientation

Gas Heating—  
(Any orientation)

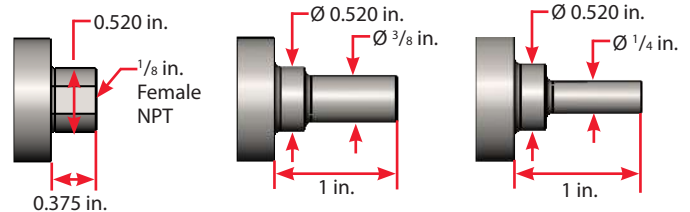


Liquid Heating—  
(Heater must be vertical with inlet at the bottom)

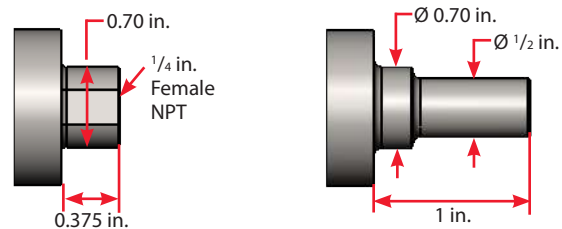


## Inlet/Outlet Fitting Options

### 1 Inch Outer Diameter Heaters



### 1 5/8 Inch Outer Diameter Heaters



## Standard Construction

