



## Quantz Ultrapure Deionized Water Heater

Trebor's thin film on quartz electric resistive heating technology is ideal for your ultra high purity DI water heating applications when process control, cleanliness, and system uptime are of the utmost importance. This patented technology utilizes GE 214 semiconductor grade quartz tubes bonded with a resistive metallic film. Trebor's patented sealing technology provides an ultrapure flow path with no elastomer o-ring seals or particle traps. This unique design creates a compact, ultra clean heating module with an MTBF greater than 20,000 hours.

- **LEADING EDGE TECHNOLOGY** - Patented thin-film on quartz electrical resistance heater element provides exceptional temperature response and improved reliability over IR heating which requires frequent bulb change outs. The proprietary design has no metal exposure and virtually eliminates contamination risk in the event of element failure, unlike most immersion style heaters. No external air or nitrogen purge is required.
- **VERSATILE CONTROL OPTIONS** - Standard modbus/TCP offers the industry's first DI water heater Ethernet control capability. Many other remote system monitoring and control options available to meet virtually all communication requirements and protocols.
- **COMPACT & CONVENIENT** - The modular element allows for very compact system design and can be changed out in less than 15 minutes when required. LCD color touch screen display provides easy user input and diagnostic feed back.
- **HIGH PERFORMANCE** - Efficient heat transfer and low resident fluid volume produces fast response to changes in flow or temperature set point using multi-loop PID control with zero crossfire SSRs.
- **ULTRA CLEAN DESIGN** - High purity flow path of GE 214 semiconductor grade quartz, PTFE, and PFA with no elastomer o-rings and no NPT threads or dead-legs to create particle traps.
- **SAFETY COMPLIANT** - TUV third party compliance testing and inspection to CE, SEMI S2 & S8, and NFPA79 standards.
- **USER EVENT CONTROL** - Virtually eliminate fluid temperature fluctuations caused by process flow changes. Signal the heater of a flow change and within one second, the heater will automatically adjust to minimize the effect on process temperature.

FEATURES & BENEFITS

U.S. Patent 6,677,053, 6,663,914 6,580,061  
 6,544,583 6,479,094 5,971,402  
 Other patents pending

**TREBOR**  
 Pure Innovation

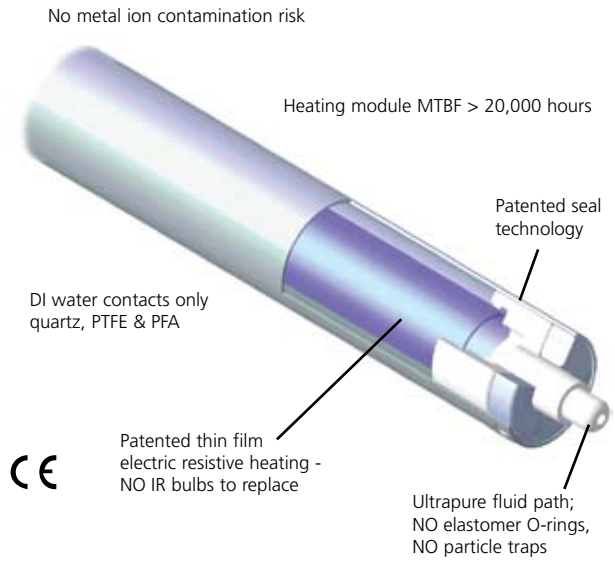
# QUANTUM Quartz Electric DI Water Heater

## WHY USE HOT DI WATER?

Hot DI water greatly improves cleaning effectiveness, thereby reducing throughput times and water consumption. Hot DI water eliminates variable process temperatures common with seasonal fluctuations of ambient water. Hot DI water rinsing before entering hot acid baths reduces thermal shock to wafers.

## WHY QUANTUM HEATERS ARE BETTER

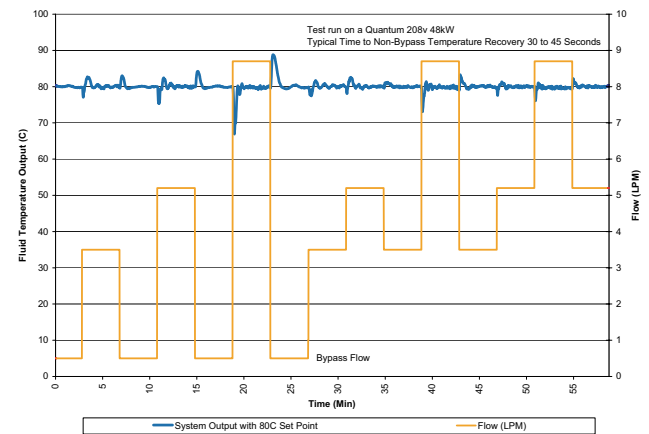
Quantum DI water heaters use a patented resistive thin film coating on quartz heating element that provides unmatched temperature response to changes in flow rate or process set point. This is accomplished with highly efficient heat transfer from the low thermal mass heating element and minimal hold-up volume in the module, unlike competing technologies that are often prone to extreme temperature overshoot or sluggish response. This fast response improves your throughput and minimizes DI water consumption. Furthermore, Quantum heating elements are fail-safe with no metal exposure or disruption to the flow path in the event of element failure. With an element MTBF exceeding 20,000 hours, Quantum heaters will provide you with the industry's most reliable and responsive quartz heating solution available today.



## SPECIFICATIONS

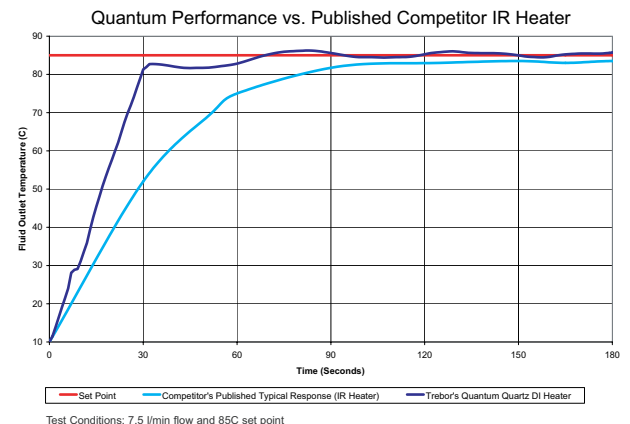
<b>Heater Type</b>	Thin film on quartz electric resistive heating
<b>Voltages</b>	208, 380, 415, 480 Volt; 50/60 Hz
<b>Temperature Limit</b>	95°C
<b>Temperature Control</b>	± 0.5°C in most conditions
<b>Pressure Range</b>	15 to 60 PSI DI water supply
<b>Flow Rate</b>	1 to 45 LPM (.25 to 12 GPM); systems may be combined to achieve higher flows (Multiple output systems available)
<b>Efficiency</b>	>98%
<b>Element Life</b>	>20,000 hrs, heating modules are factory re-buildable with hardware exchange
<b>Control System</b>	Zero crossfile SSRs with multi-loop PID control
<b>Communication Options</b>	Ethernet enabled, modbus/TCP (standard), modbus/RTU, RS-232, RS-485, DeviceNet
<b>Wetted Surfaces</b>	GE quartz, PTFE, & PFA - no elastomer O-rings
<b>Safety Features</b>	Low pressure shutdown Low liquid level detection shutdown Redundant over temperature protection Over pressure relief Open thermocouple detection Liquid spill detection Automatic power shutdown EMO GFI/Earth Leakage
<b>Certifications</b>	SEMI S2-0703                      CE SEMI S8-0701                      NFPA79 Modules FM compliant
<b>Warranty</b>	Two-year standard, extended warranties available

## TEMPERATURE RESPONSE CHART

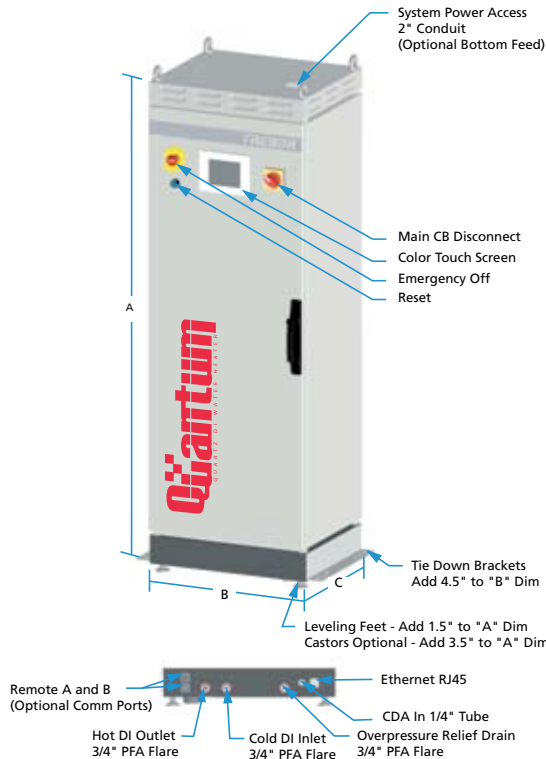


Test run on Quantum 208V 48 kW system. Typical recovery time is 30 to 45 seconds.

## TIME TO TEMPERATURE COMPARISON



# QUANTUM DI Water Heater



Power	System Dimesions (in/cm)			System Weight
	A	B	C	lbs/kg
30 kW	69.0 in 175.3 cm	24.0 in 61.0 cm	20.0 in 50.8 cm	200 / 91 to 250 / 114
36 kW				
40 kW				
50 kW				
60 kW				
72 kW	69.0 in 175.3 cm	38.0 in 96.5 cm	20.0 in 50.8 cm	410 / 186 to 530 / 240
70 kW				
80 kW				
90 kW				
100 kW				
108 kW				
110 kW	Consult Factory			
120 kW				
144 kW				
180 kW				
216 kW				

Power	Voltage (50/60 Hz)		Current Rating (Amps)	Heating Modules
	380	415		
30 kW			45	3
30 kW			40	3
30 kW	208		100	3
36 kW			45	3
40 kW	208		125	4
50 kW	208		155	5
60 kW	380	415	95	6
60 kW			75	6
60 kW	208		185	6
72 kW			90	6

70 kW	208			215	7
80 kW	208			245	8
90 kW		380	415	140	9
90 kW				110	9
90 kW	208			275	9
100 kW	208			305	10
108 kW				135	9
110 kW	208			335	11
120 kW		380	415	185	12
120 kW				150	12
120 kW	208			370	12
144 kW				180	12
180 kW		380	415	480	15
216 kW				480	18

\* Refer to back page for determining the right heater size for your application.

## HOW TO ORDER

**HEATER**

Use the code numbers for ordering the proper configuration for your Quantum heater.

**QTM** Quantum Deionized DI Water Heater

**POWER**

- 030** 30 Kw
- 036** 36 Kw
- 040** 40 Kw
- 050** 50 Kw
- 060** 60 Kw
- 070** 70 Kw
- 072** 72 Kw
- 080** 80 Kw
- 090** 90 Kw
- 100** 100 Kw
- 108** 108 Kw
- 110** 110 Kw
- 120** 120 Kw
- 144** 144 Kw
- 180** 180 Kw
- 216** 216 Kw

**VOLTAGE**

- V208** 208VAC 50/60 Hz, 3 Phase
- V380** 380VAC 50/60 Hz, 3 Phase
- V415** 415VAC 50/60 Hz, 3 Phase
- V480** 480VAC 50/60 Hz, 3 Phase

**OPTIONS**

- A** Titanium J-type, fast acting
- B** PFA coated J-type

Options are available at an additional cost:  
Contact factory for part number when requesting options.

- Castors (Replace feet)
- Modbus / RTU
- Device Net
- Analog Interface / Remote EMO
- Dual Outlet Plumbing

Example of an order number based on configuration options:

**QTM 060 V480 A**

## SIZING FORMULA

Required kW = 0.264(Flow)(Temp Delta)

Conversion Calculations:

GPM = LPM x 3.8

°C = 5/9( °F - 32)

### Heater Sizing Formula Example

Ambient Water Temp = 25 °C

Desired Process Temp = 70 °C

Temperature Delta = 45 °C

Required kW = 0.264(4 GPM)(45 °C) = 47.5 kW

For optimal temperature response and to compensate for seasonal changes in ambient water temperature, we recommend adding 20% excess heating capacity.

47.5 kW(1.2) = 57 kW >>> Trebor recommends a 60 kW heater for this application

**TREBOR**  
Pure Innovation

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ISO 9001:2000  
FM 69754

# Q-Series DI Water Heater



## Benefits of Using Hot DI Water

- ▶ Improved cleaning efficiency
- ▶ Faster substrate drying times
- ▶ Better process consistency
- ▶ Increased production throughput
- ▶ Reduced water consumption

## How to Size Your Heater

In order to determine which heater size you need, determine the kW required with the following formula:

$$\text{Required kW} = 0.264 (\text{Flow}) (\text{Temp Delta } ^\circ\text{C})$$

### Heater Sizing Formula Example

Ambient Water Temp = 25 °C  
 Desired Process Temp = 70 °C  
 Temperature Delta = 45 °C

$$\text{Required kW} = 0.264 (4 \text{ GPM}) (45 ^\circ\text{C}) = 47.5 \text{ kW}$$

For optimal temperature response and to compensate for seasonal changes in ambient water temperature, we recommend adding 20% excess heating capacity.

47.5 kW(1.2) = 57 kW >>> Trebor recommends a 60 kW heater for this application

## Options and Ordering

Use the code numbers for ordering the following options for your Q-Series Heater.		
HEATER	Q	Q-Series Batch Heater
POWER	030	30 kW
	036	36 kW
	060	60 kW
	072	72 kW
	090	90 kW
	108	108 kW
	120	120 kW
VOLTAGE	V208	208VAC 50/60 Hz, 3 Phase
	V380	380VAC 50/60 Hz, 3 Phase
	V415	415VAC 50/60 Hz, 3 Phase
	V480	480VAC 50/60 Hz, 3 Phase
PLUMBING	A	All PFA
	B	PVDF and PFA
OPTIONS	00	No option added

Q 144 V480 B 00

Example of an order number based on configuration options.

## Ultrapure Heating for Batch Manufacturing Process

Trebor's exclusive electric quartz DI water heating technology is trusted for long life, low maintenance and high purity. This market-leading technology is now available in the affordable Q-Series heater – a system ideal for batch cleaning applications requiring a steady flow of high purity DI water on demand. Hot DI water has been proven to improve cleaning efficiency, enhance process stability, and increase production throughput.

The modular Q-Series heater has a high purity flow path of quartz and fluoropolymer components and versatile configurations to meet a broad range of wattage and voltage requirements. A straight-forward user interface and multiple remote control options ensure that we have a system compatible with your manufacturing process.

Contact your local Trebor representative to see how the Q-Series can provide the best value solution for your high purity DI water heating applications.

### Market Applications

- ▶ Semiconductor
- ▶ Solar Cell (PV)
- ▶ MEMS
- ▶ Flat Panel
- ▶ Optoelectronics



1. U.S. Patents 6,674,053; 6,663,914; 6,580,061; 6,544,583; 6,479,094; 6,433,319; 5,971,402; Other patents pending  
 2. ©2008 Trebor, Inc., A Unit of IDEX Corporation. Trebor and the Trebor logo are registered trademarks of Trebor, Inc. All other trademarks belong to their respective owners.  
 3. Sheet Number and Created or Revised on 03/14/2008



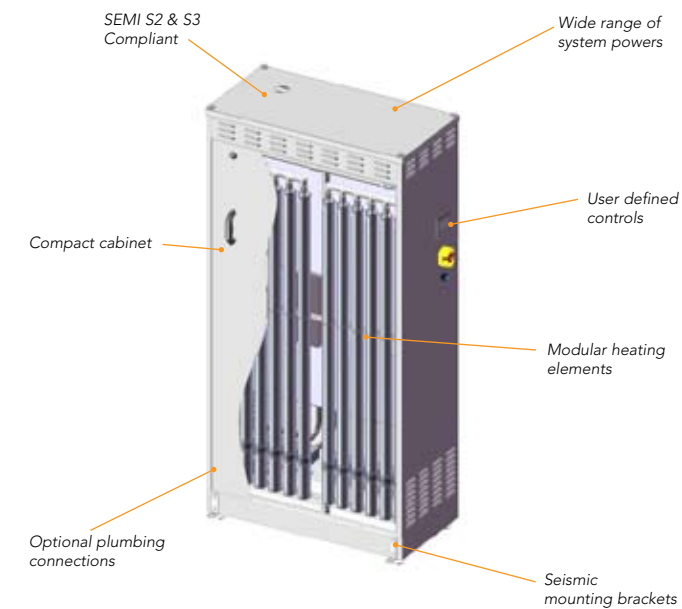
## Features

- ▶ **LEADING EDGE TECHNOLOGY** - Patented thin-film on quartz electrical resistance heater element provides exceptional temperature response and improved reliability over IR heating which requires frequent bulb change outs. The propriety design has no metal exposure and virtually eliminates contamination risk in the event of element failure, unlike most immersion style heaters. No external air or nitrogen purge is required.
- ▶ **VERSATILE CONTROL OPTIONS** - Standard Modbus/RTU - serial communication. Many other remote system monitoring and control options available to meet virtually all communication requirements and protocols.
- ▶ **COMPACT & CONVENIENT** - The modular element allows for very compact system design and can be changed out in less than 15 minutes when required. Simple control interface provides easy user input and diagnostic feedback.
- ▶ **HIGH PERFORMANCE** - Efficient heat transfer and low resident fluid volume in each heater module produces fast response to changes in flow or temperature set point using a PID control with zero crossfire SSRs.
- ▶ **ULTRA CLEAN DESIGN** - High purity flow path of GE 214 semiconductor grade quartz, PTFE, PFA, and PVDF with no elastomer o-rings.
- ▶ **SAFETY COMPLIANT** - TUV third party compliance testing and inspection to CE, SEMI S2 & S8, and NFPA79 standards.

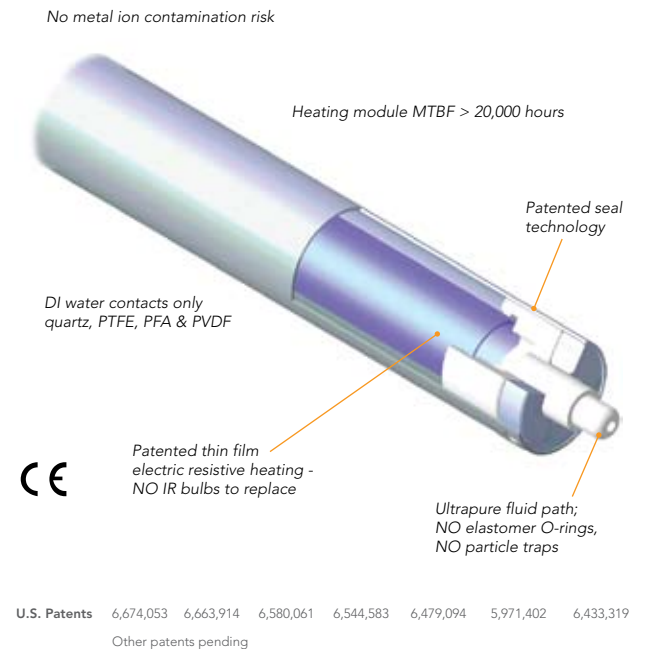
## Specifications

Heater Type	Thin-film on quartz electric resistive heating	
Voltages	208, 380, 415, 480 Volt; 50/60 Hz	
Temperature Limit	95 °C	
Temperature Control	±3 °C in most conditions	
Pressure Range	15 to 60 PSI DI water supply	
Flow Rate	1 to 45 LPM (.25 to 12 GPM); depending on system size	
Efficiency	>98%	
Element Life	>20,000 hrs	
Control System	Zero crossfire SSRs with multi-loop PID control	
Communication Options	Modbus/RTU - Serial (standard), Modbus/TCP - Ethernet, DeviceNet	
Wetted Surfaces	GE 214 quartz, PTFE, PFA, & PVDF - no elastomer O-rings	
Safety Features	Low pressure shutdown Low liquid level detection shutdown Redundant over temperature protection Over pressure relief Open thermocouple detection Liquid spill detection Automatic power shutdown EMO GFI/Earth Leakage	
Certifications	SEMI S2-0703 SEMI S8-0701	CE NFPA79
Warranty	1-year standard, extended warranties available	

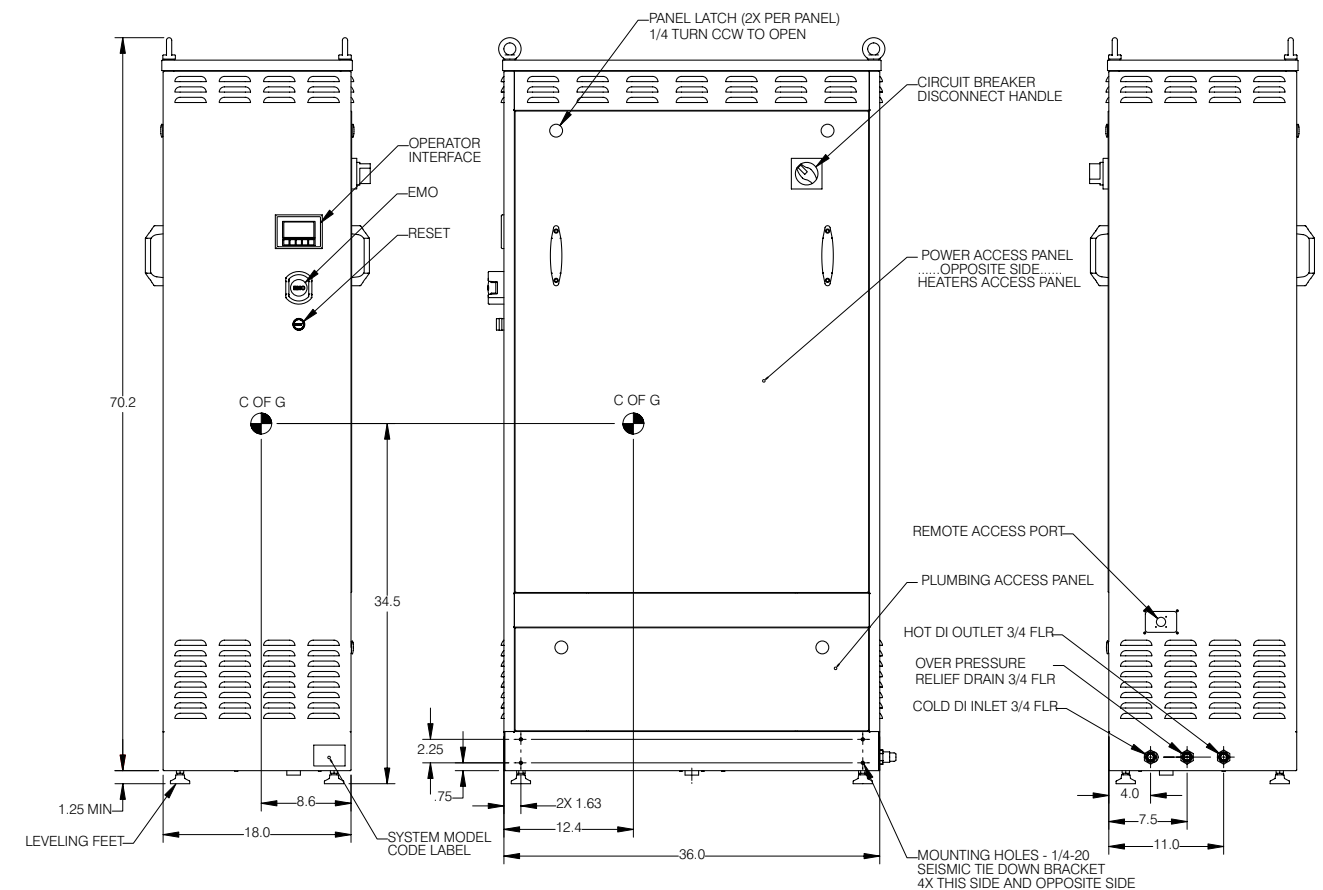
## Q-Series Advantage



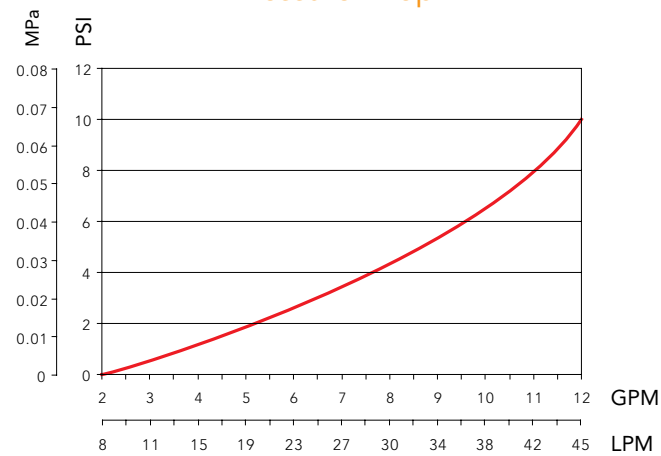
## Patented Heater Technology



## Dimensions

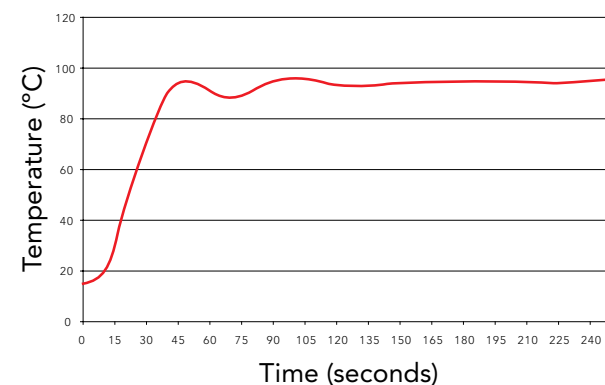


## Pressure Drop



Test conducted with a 144kW Q-Series system.

## Temperature Performance



Test conducted with a 144kW Q-Series system.