RELIALINE™ 170 HEATING SYSTEM

Modular Line Heating System—Tailored to Quickly Fit Custom Applications while Providing Uniform Temperature

RELIALINE™ 170 heating system from Watlow® is the first modular line heater that can be quickly delivered and easily installed in high performance applications. The RELIALINE™ 170 provides precisely controlled heat distribution and is automatically self regulating to deliver excellent temperature uniformity. It offers a custom thermal solution within a stock product delivery timeframe.

Watlow's newest heating system technology is constructed and designed for adaptability, which is perfect for quick prototyping. This patent-pending technology allows Watlow to configure a product to specific dimensions and three-dimensional installation drawings are provided with quotes.

The heating system improves temperature uniformity by precisely heating individual elbow, tee and VCR® fittings. The temperature compensation feature allows the system to increase wattage in cooler regions and decrease the power in warmer zones thus improving the temperature uniformity of the entire line. This reduces the need for complicated control systems resulting in decreased cost of the entire system.

The RELIALINE™ 170 is pre-formed to fit the outside diameter of standard tubing for intimate contact with maximum surface coverage. The internal rails of this heating system are spring loaded to allow for a "click-on" fit and maximum contact force for improved thermal transfer.

The new insulation system incorporates Watlow's "double pane" design, which uses air as an insulator ensuring touch-safe outside surface temperatures (meets SEMI S2). In addition the air insulation reduces potential outgassing or contamination. Any individual RELIALINE™ 170 heater segment within the system can be removed at any point along the line to speed servicing thus decreasing downtime.

Applications

Gas Delivery Lines: heating process gasses for deposition and etch equipment including:

- Boron trichloride, BCl_3
- Chlorine trifluoride, ClF_3
- Dichlorosilane, (DCS), SiH_2Cl_2
- Tetra ethyl orthosilicate, TEOS
- Tungsten hexafluoride, WF_3
- Process gas line qualification

Heating columns

High pressure liquid chromatograph (HPLC)

Process systems

Features and Benefits

Patent-pending modular design

- Reduces lead times by replacing iterative custom solutions
- Provides quick prototyping and delivery
- Allows for easy field installation
- Incorporates heated elbow, tee and VCR® fittings

Temperature compensating construction

- Adjusts for variations in heat loading
- Improves temperature uniformity throughout the assembly by heating components and fitting segments
- Eliminates the need for complicated control systems
- Reduces cost of the entire line heating system

Compatible with wide variety of simple control systems

- Simplifies and improves system performance
- Allows use of open loop for low performance applications
- Improves temperature reliability utilizing PID control systems with temperature uniformity as good as ±5°C (9°F)

"Double pane" (air gap) insulation design

- Meets SEMI S2 safety requirements for outside temperature
- Improves process yield by removing a contamination (outgassing) source

Tough/durable construction

- Reduces risk of damage in demanding applications

"Click-on" installation design

- Provides feedback when product is properly installed
- Assures intimate contact with maximum surface coverage

Agency recognition and certifications

- SEMI S2 requirements met
- UL® component recognition and CE pending
- RoHS compliant

WATLOW®

Better Thermal Solutions...*Faster*

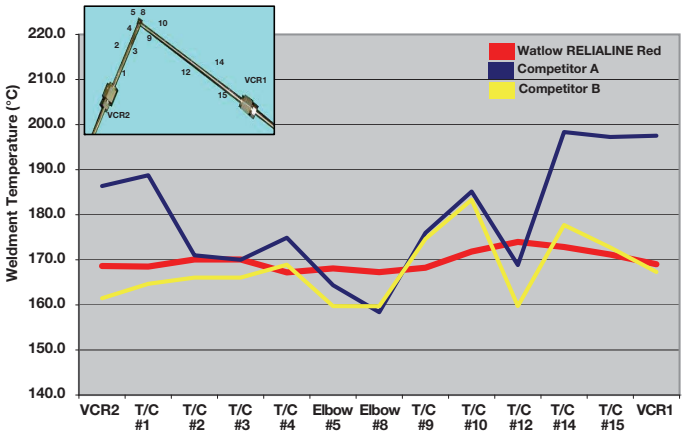
COL-REL-0708

Specifications

Operating temperatures

- Temperature: 40 to 170°C (104 to 338°F)
- Temperature uniformity:
  - First pass uniformity equal to iterative custom systems
  - Typical uniformity
    - ±20°C (36°F) running open loop
    - ±10°C (18°F) with simple feedback control
    - As good as ±5°C (9°F) with short zone closed loop control
  - Typical uniformity performance represented in below graph (results vary with applications)

Temperature Uniformity



Heated line fittings

- Fittings: elbow, tee and VCR®
- Connectors: finger-proof rated

Control

- Open-loop
  - Variable voltage
  - Percent duty cycle (on)
- Thermocouple 0.062 in. (1.6 mm)

Product dimensions (straights)

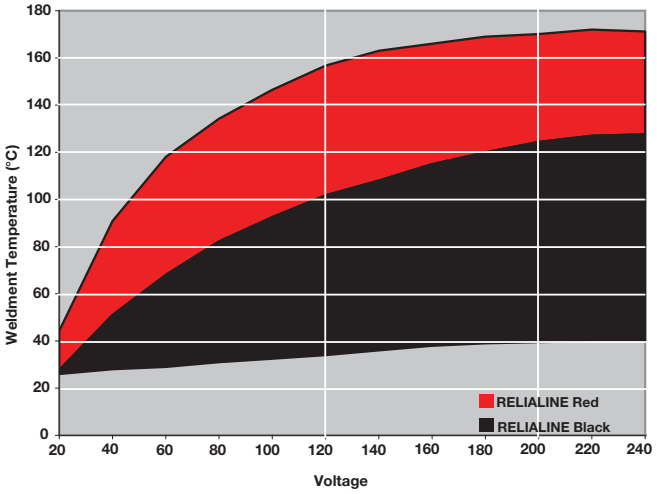
- Min. length: 2 in. (51 mm)
- Max. length: 36 in. (914 mm)
- Line diameter: 0.25 in. (6.4 mm) and 0.50 in. (13 mm)
- Outside dimension:

	0.25 in. (6.4 mm) Tubing Dia.	0.5 in. (13 mm) Tubing Dia.
Straight	1.12 (28.4)	1.39 (35.3)
Elbow/Tee	1.88 L x 2.03 H x 1.99 W (47.8 L x 51.6 H x 50.5 W)	2.17 L x 2.14 H x 2.01 W (55.1 L x 54.3 H x 51 W)
VCR®	2.42 L x 2.20 H x 2.32 W (61.4 L x 55.8 H x 58.9 W)	2.53 L x 2.57 H x 2.71 W (64.2 L x 65.3 H x 68.8 W)

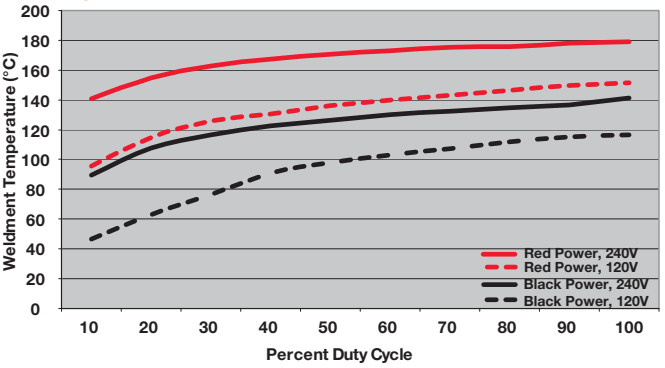
Electrical

- Voltage: as required to achieve temperature per below chart-up to 240V max.
- Amperage: dependent on line length, up to 8A max. for steady state, 15A max. start up (in-rush)
  - Consult factory for exact in-rush current for your system

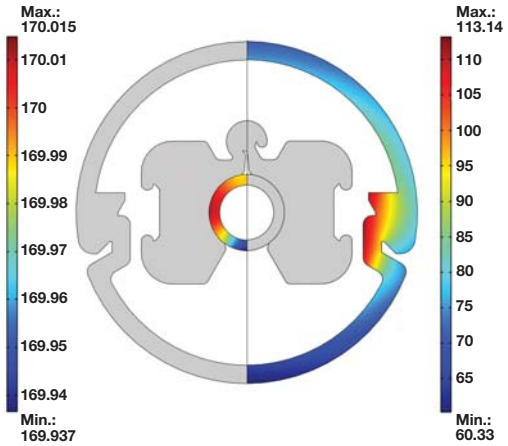
Temperature Coverage/Product Selection



Average Weldment Temperatures at Duty Cycle



Line Temperature Variation at 170°C Operating Temperature



Outside Surface Temperature at 170°C Line Temperature

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