

2350 Series

2350 RECUPERATIVE RADIANT TUBE BURNER, FORCED AIR TYPE

Bloomengineering

APPLICATIONS

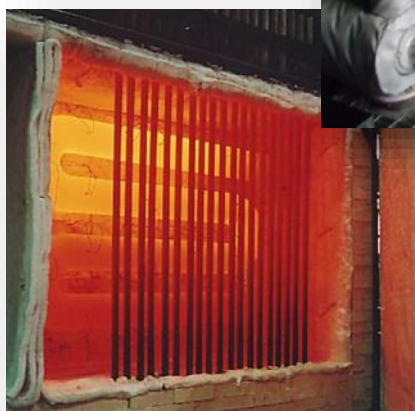
- Annealing Furnaces
- Galvanizing Furnaces
- Silicon Furnaces
- Heat Treating Furnaces

FEATURES

- Rugged construction
- Standard material suitable for exhaust gas temperatures up to 760°C (1400°F)
- Low NOx air staged design available

CAPABILITIES

- Quiet stable operation
- Uniform tube temperature
- Dual fuel (gas and oil) operation available
- Suitable for 127 mm (5") through 203 mm (8") and larger I.D. 'U' Tubes and 'W' tubes

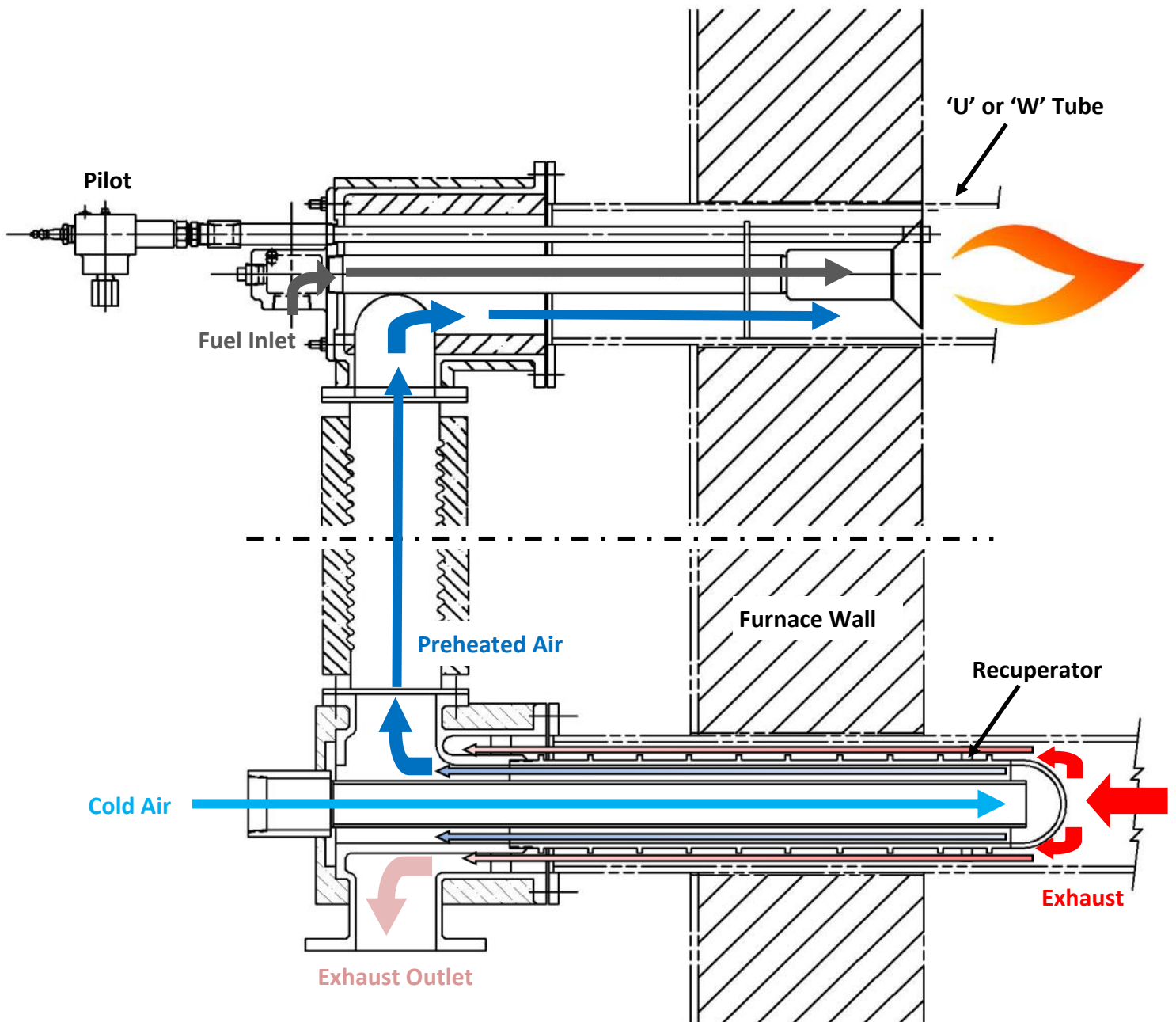


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CAUTION: The improper use of combustion equipment can result in a condition hazardous to people and property. Users are urged to comply with National Safety Standards and/or Insurance Underwriters recommendations

Design Concept

The purpose of radiant tube combustion is to apply fuel fired heating, with the products of combustion isolated and separated from the furnace atmosphere. The 2350 Series RRT burner is a forced draft burner (cold combustion air is supplied by a fan/blower). The combustion air is preheated through a parallel heat exchanger (recuperator) where it is mixed with the fuel at the unique flame retention nozzle.



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Advantages

- Flame Retention Nozzle design for flame stability, reliable burner operation and reduced NOx emissions
- Uniform tube temperatures
- Burner flame engineered to a customer's specific radiant tube, achieving minimal HSOA (Hot Spot Over Average) - leading to better heating quality and longer tube life
- Designs backed by (Computational Fluid Dynamics) CFD and laboratory testing
- Designs available for a variety of low calorific mixed gases

Performance

*Burner capacities range from approximately:

58.6 kW (200,000 Btu/hr) to 293.1 kW (1 MMBtu/hr)

*Available Heat (LHV) ranges from:

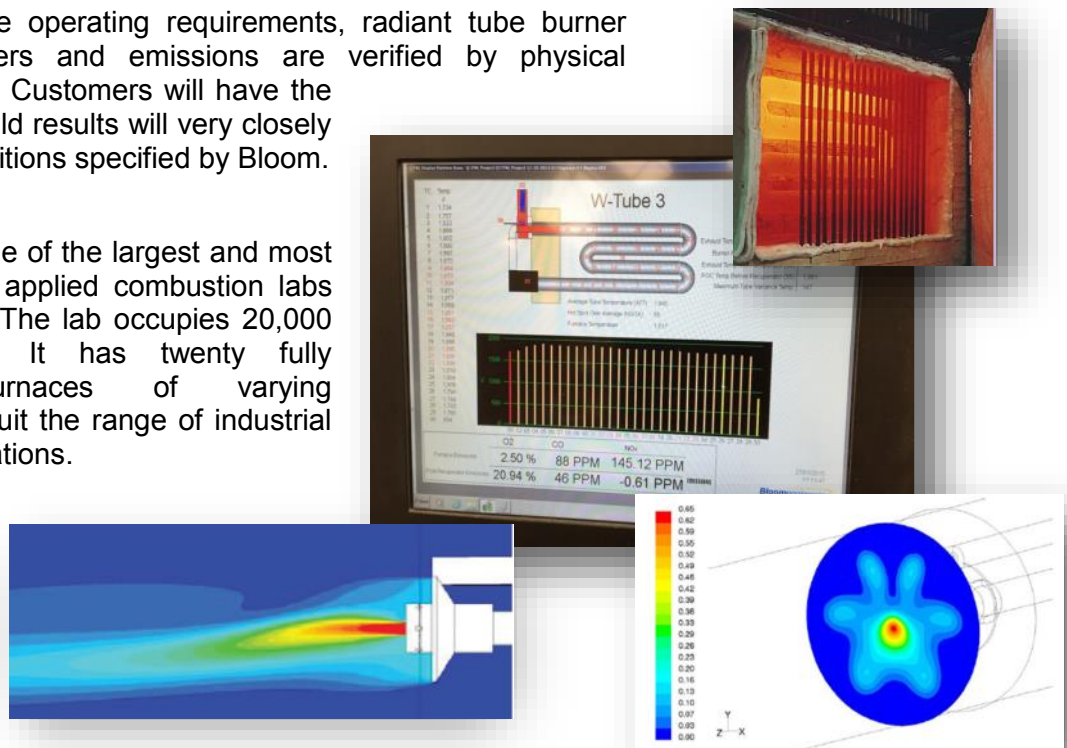
61—77%

**These values are dependent on a variety of factors including the tube size, configuration, average tube temperature, and recuperator length/type.*

Design Verified with Laboratory Testing

Because of unique operating requirements, radiant tube burner design parameters and emissions are verified by physical laboratory testing. Customers will have the confidence that field results will very closely reflect design conditions specified by Bloom.

Bloom operates one of the largest and most advanced private, applied combustion labs in North America. The lab occupies 20,000 ft² (2,000 M²). It has twenty fully instrumented furnaces of varying configurations to suit the range of industrial combustion applications.

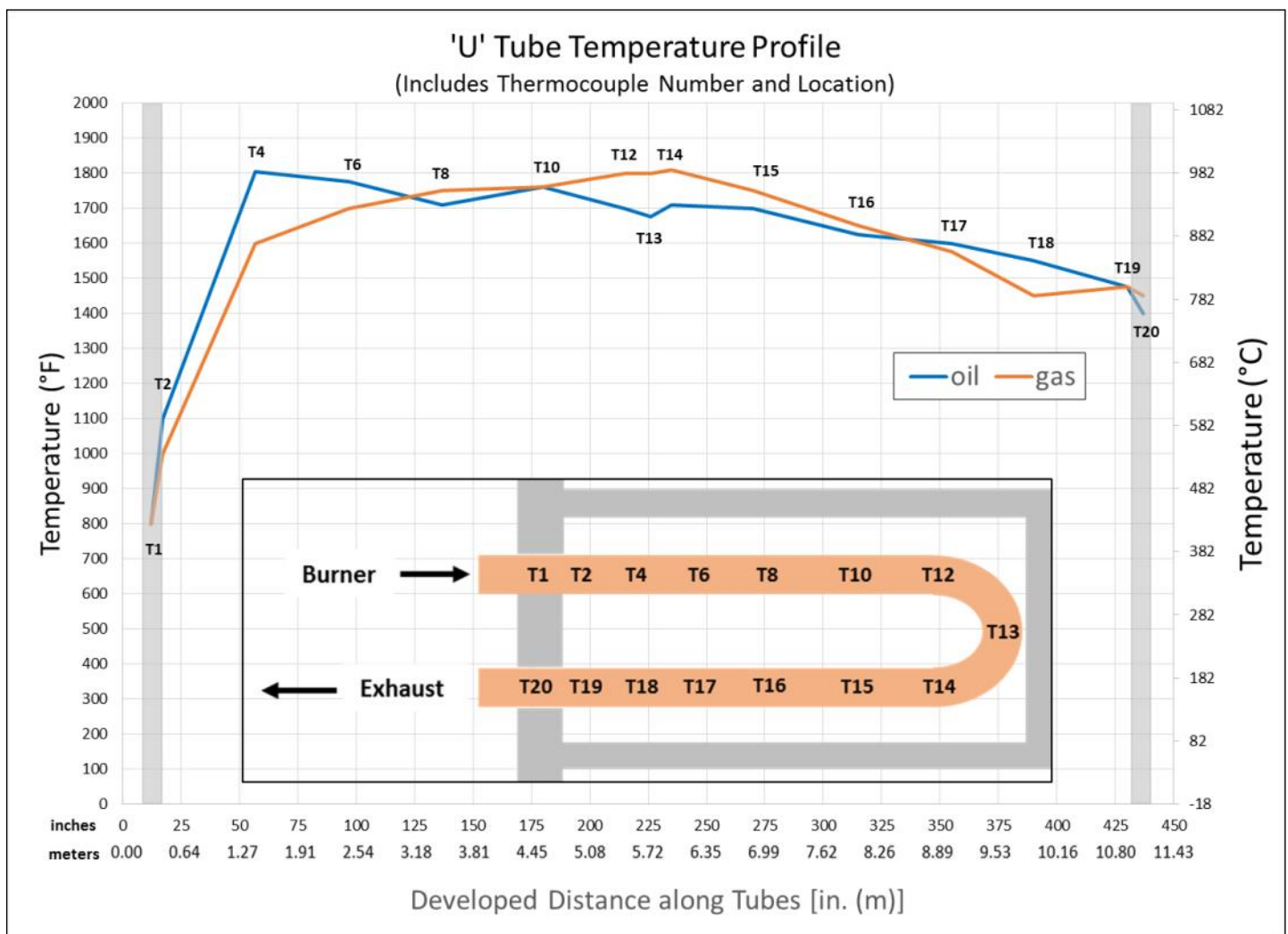


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'U' Tube Configuration

For proper radiant tube life, the maximum operating temperature at any point along the tube must not exceed the design working temperature for the tube material. Tube life can thus be predicted, to a large extent, by its temperature uniformity. **Chart 1** below shows uniform temperature distribution with the 2350 radiant tube burner with a 'U' tube configuration.

CHART 1: 'U' Tube Temperature Profile

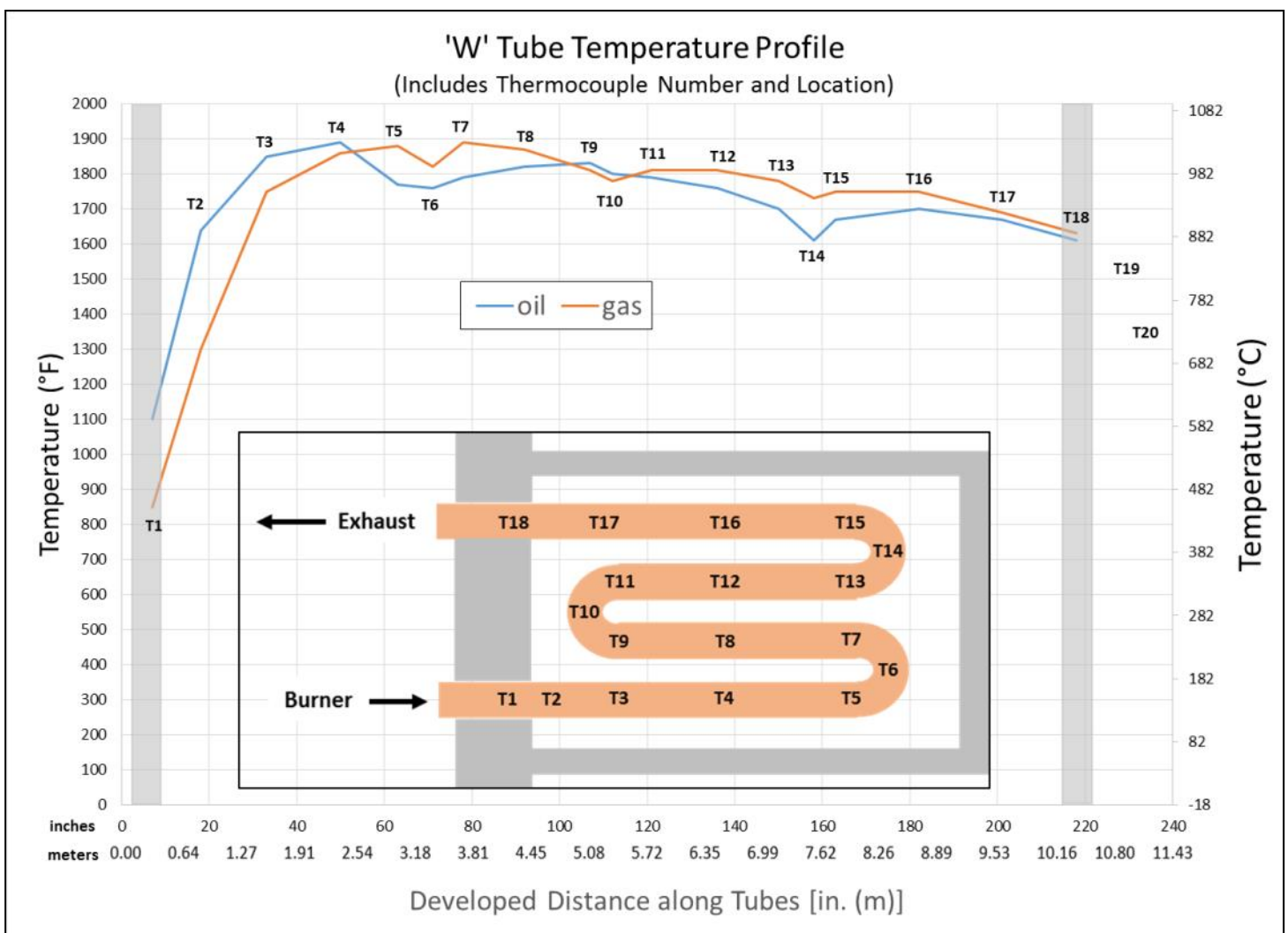


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'W' Tube Configuration

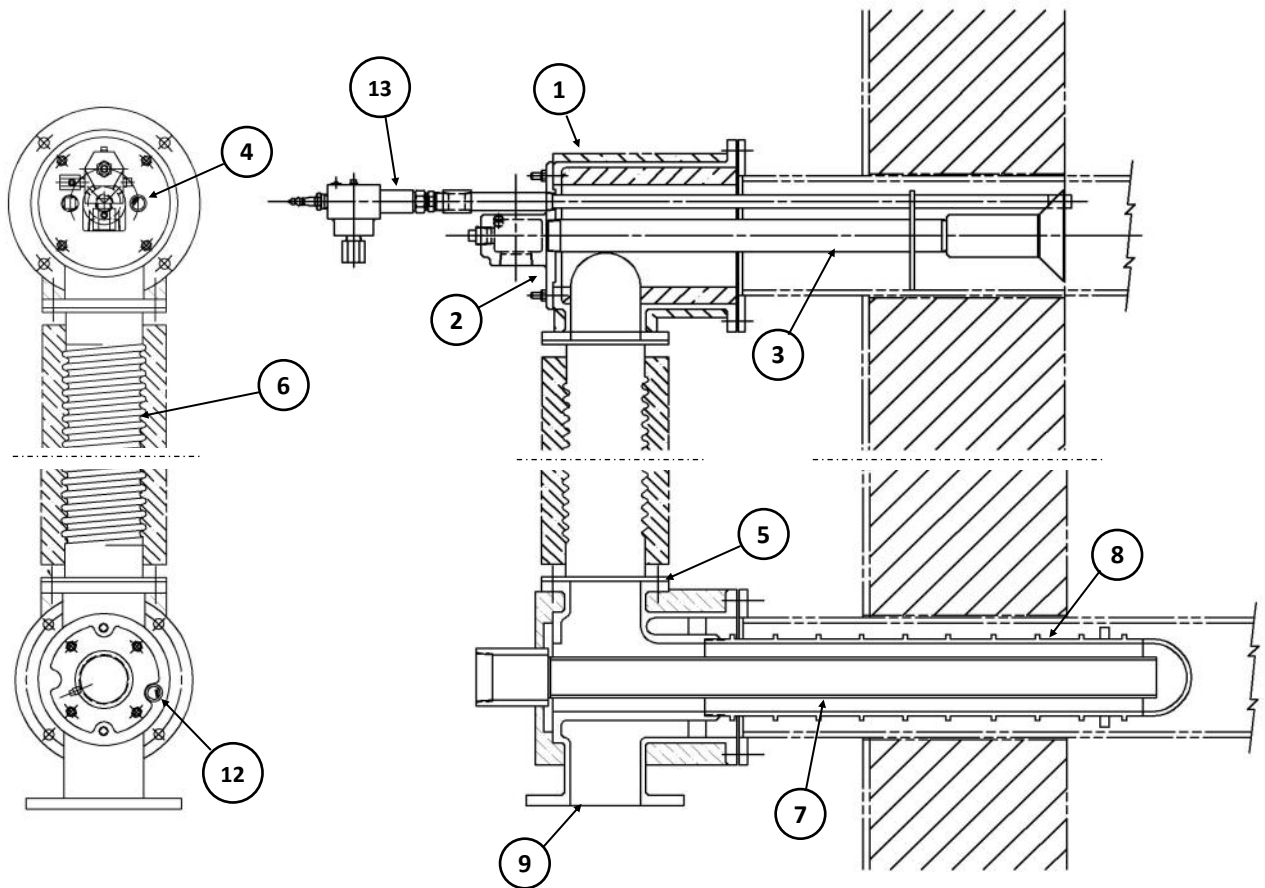
For proper radiant tube life, the maximum operating temperature at any point along the tube must not exceed the design working temperature for the tube material. Tube life can thus be predicted, to a large extent, by its temperature uniformity. **Chart 2** below shows uniform temperature distribution with the 2350 radiant tube burner with a 'W' tube configuration.

CHART 2: 'W' Tube Temperature Profile



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Parts List



Part Number	Description
01	Burner Body
02	End Plate
03	Gas Nozzle Assembly
04	Observation Port
05	Wire Seal
06	Hot Air Tube
07	Cold Air Tube Assembly
08	Recuperator Assembly
*09	Exhaust Gas Tee
12	Observation Port
13	Pilot Assembly

Part Number must be preceded by catalog number.

EXAMPLE:

To order Part 03—Gas Nozzle Assembly for 2350-060 burner, specify:

2350-060-03

*Specify 'right' or 'left' hand exhaust gas tee (right hand shown)

Application Guidelines *

FUEL CAPABILITIES **:

- Natural Gas
- #2 Fuel Oil
- Propane
- LPG
- Coke Oven Gas (COG)

**Please Consult a Bloom Representative for availability of other fuel types

BURNER IGNITION:

- Direct Spark Ignition (*Recommended*)
 - Pilot
 - Manual
-

CONTROL:

- Volumetric Fuel/Air Ratio
- On-Off (Pulse-Fired)*
- High/Low

*Oil fired burner require on-off control system

FLAME MONITORING:

- UV Detector
 - Flame rod
-

OPTIONS:

- External insulation
 - Right, left, or straight exhaust connections
 - Lower NOx designs
 - Custom designs with lab development capabilities
 - Air staged nozzle
 - 'L' shaped or additional recuperator length for increased efficiency
-

*** NOTE:** Due to continual developments in the Bloom Laboratory and results from field research, the applicability of different fuels and other options listed above are constantly being updated. Please consult a Bloom Representative to inquire about the availability of any guidelines/options that are not shown above.

SPARE OR REPLACEMENT PARTS

Spare Parts and Replacement parts are available for virtually all industrial burners and combustion systems supplied by Bloom Engineering in the past 50 years. Spare and replacement parts are manufactured to original dimensions and tolerances to ensure performance is maintained. For more information, please visit our website at www.bloomeng.com/burner-spare-parts.

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Product Details

The 2350 Series RRT Burner is suitable for operation with light distillate fuel oil and/or gaseous fuels.

Quiet stable operation and uniform tube temperatures are obtained by utilizing the patented Bloom Retention Nozzle. This nozzle distributes the air uniformly around the gas stream while creating a partial vacuum between the two streams and promoting stability.

A variety of ignition systems are also available.

***The following information is required to specify an order:**

1. Fuel type and pressure
2. Maximum heating capacity required
3. Turndown required
4. Proposed method of control
5. Inside and outside diameter of tube
6. Tube length, configuration and distance between center of tube
7. Distance from burner flange to inside face of furnace wall
8. Proposed method of ignition (Manual or spark ignited pilot)
9. Furnace operating temperatures
10. Any restrictions or special requirements

Burner Designation: 235X-XXX

(Example: 2350-074; gas burner with 7.5" (191mm) I.D. tube)

Fourth digit:

XXX0 — Gas Only
 XXX2 — Air staged
 XXX5 — LP oil only
 XXX6 — Combination gas and LP oil
 XXX9 — Special

Last Three Digits:

-ABC—A and B are for inches; C is to the nearest 1/8"
i.e. -074 = 7.5" (191mm) I.D. radiant tube (firing leg)

*Tube Sizes (I.D.)		
Burner Designation 2350 - ____	mm	inches
-040	102	4
-050	127	5
-054	140	5 1/2
-060	152	6
-063	162	6 3/8
-070	178	7
-074	191	7 1/2
-080	203	8

*Designs available for other tube sizes.

Please contact your Bloom representative

* **NOTE:** Information required to process a quote includes, but may not be limited to, the information specified above. Additional details may **also** be required to quote a combustion control system.

Bloom Engineering Company, Inc.
 Corporate Headquarters
 5460 Horning Road
 Pittsburgh, PA 15236-2822
 Main: 412-653-3500
 Email: info@bloomeng.com
 Web: www.bloomeng.com

For more details and a complete listing of products,
 please visit our website at:
www.bloomeng.com/industrial-burners