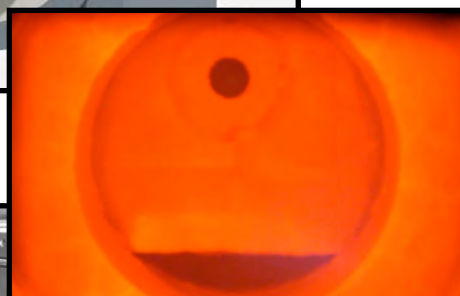
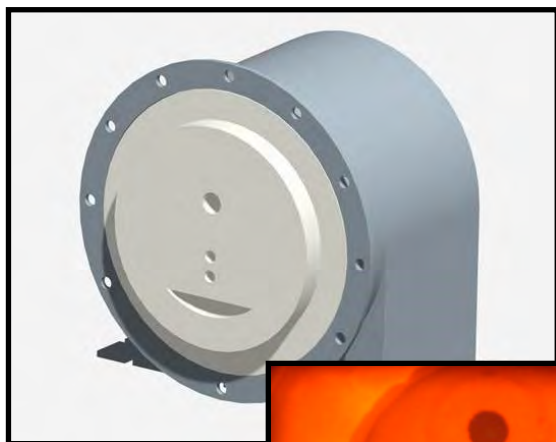


1650 Series

¹1650 REGENERATIVE CYCLOPS™ ULTRA LOW NO_x BURNER



APPLICATIONS

- Steel Reheat Furnaces
- Aluminum Melting and Holding Furnaces
- Forge Furnaces
- Many other new and retrofit applications

FEATURES

- Bloom's Ultra Low NO_x ²1610 Series Cyclops™ non-symmetrical combustion concept coupled with Bloom's proven ³1150 Series Regenerative technology
- No exhaust gas recirculation required to achieve low NO_x
- Hot and Cold Start Designs available

CAPABILITIES

- Extremely low NO_x emissions
- Very High efficiency with corresponding reduced CO₂ emissions
- Excellent Turndown
- Increased production on existing furnaces

¹1650: PATENT PENDING—APPLICATION NO. 61/881,163; International Publication Number WO 2015/042237 A1

²1610: MANUFACTURED UNDER U.S. PATENT NO. 6,471,508 – w/ O₂ enrichment 6,793,486

³1150: MANUFACTURED UNDER U.S. PATENT NO. 5,180,300

www.bloomeng.com

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

ULTRA LOW NO_x PERFORMANCE

Bloom Engineering's 1650 Regenerative Cyclops technology is a tremendous breakthrough in low NO_x performance. It surpasses all other comparable technologies. In fact, NO_x emissions are reduced by nearly a half as compared to Bloom's already market leading 1150 Series burner. Please find relative NO_x emissions graphs below showing the 1650 burner against similar leading technologies*

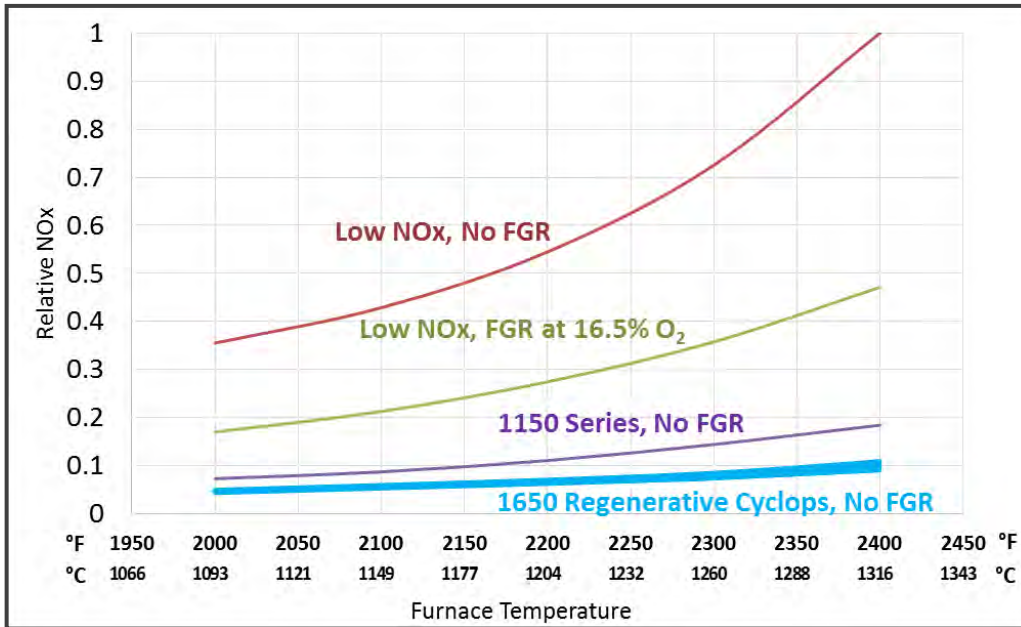


Figure 1

Relative NO_x Comparison between similar Low NO_x technologies

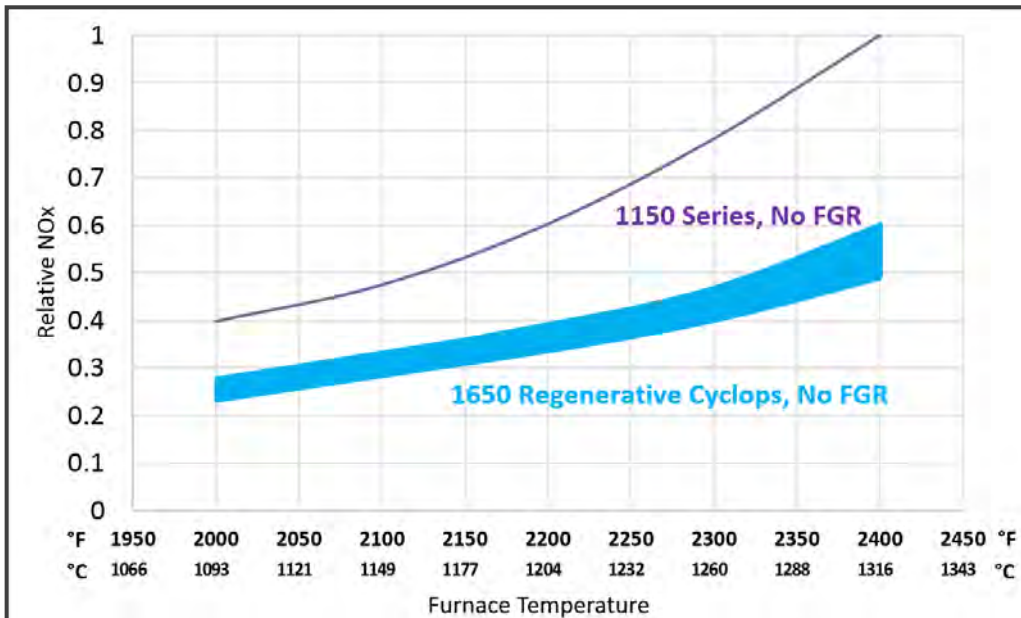


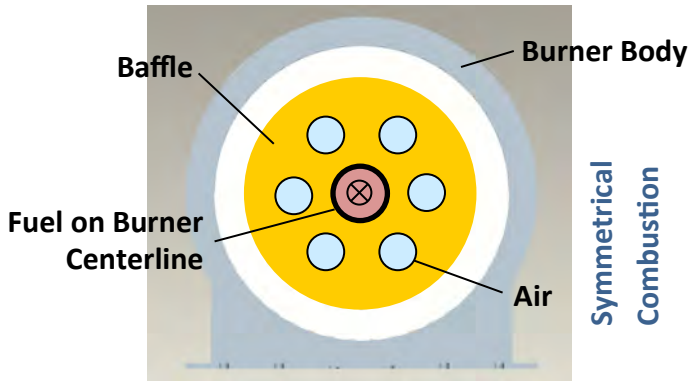
Figure 2

Relative NO_x Comparison between Bloom's 1150 Series and 1650 Series Regenerative Burners

*NO_x comparison between burner technologies utilizes the SAME criteria including: Natural Gas fuel, no tramp air infiltration, 10% excess air, regenerative air preheat temperature levels, and furnace chamber dimensions

Standard *Symmetrical* Design

Conventional industrial burners are typically configured in a *symmetrical* fashion. In this symmetrical configuration, a fuel conduit is generally disposed axially along a centerline of the burner and combustion air is generally introduced immediately about a periphery of the fuel conduit or, with appropriate air ducting, symmetrically about the fuel conduit and radially spaced therefrom. The induction of the products of combustion into the burner tile and subsequent entrainment into the fuel and air streams causes lower flame temperatures and lower NOx production rates.



Regenerative Cyclops *Non-Symmetrical* Design

The Regenerative Cyclops burner uses **non-symmetrical** combustion to obtain NOx levels lower than standard designs. The fuel conduit is coaxial with a line spaced from the central axis of the burner. The air conduit is placed on the opposite side of the burner central axis from the fuel conduit. This configuration delays mixing of the fuel and air. This allows for further vitiation of the air by the recirculated products of combustion before mixing with the fuel and acts to reduce NOx during combustion. Some cooling air to protect the gas nozzle is required for operation.

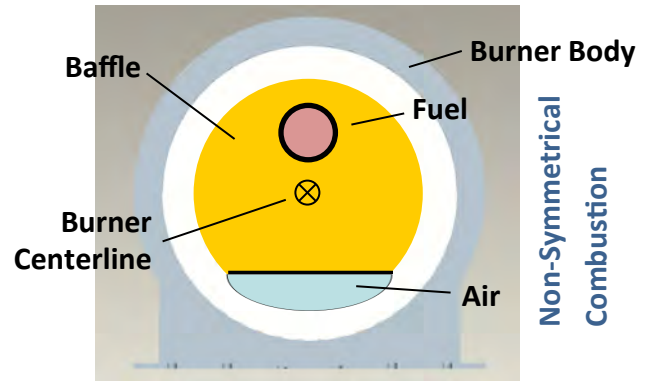


TABLE 1: Nominal Capacities - Natural Gas with 10% Excess Air

Burner Designation 1650 - ____	² Nominal Capacity		Standard Port ID	
	MMBtu/hr	MMkcal/hr	inches	mm
-025	2.5	0.63	11.50	292
-035	3.5	0.88	13.50	343
-050	5	1.26	16.00	406
-075	7.5	1.89	20.00	508
-100	10	2.52	22.50	572
-150	15	3.78	27.50	699
-200	20	5.04	32.00	813
-250	25	6.30	35.50	902
-300	30	7.56	39.00	991
-350	35	8.82	42.00	1067

¹ Burner designation corresponds to approximate burner rating in MMBtu/hr (e.g. 1650-100 --> 100 MMBtu/hr)

² at 2200°F (1204°C) Furnace Temperature and 18" w.c. (45 mbar) DP Air at the media case

NOTE: General Dimension Information. See Bloom Representative for certified dimensions for construction

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

Application Guidelines *

FUEL CAPABILITIES **:

- Natural Gas

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

BURNER IGNITION:

- Pilot
-

CONTROL:

- Volumetric Fuel/Air Ratio (recommended)
 - Impulse
-

FLAME MONITORING:

- UV Detector

NOTE: Individual UV detectors for the pilot and main flame are used.

OPTIONS:

- Quick opening door
 - Quick change media case
 - Angled Firing
 - Roof mounted media case
 - Dual Burner head arrangement (2 burner heads per 1 media case)
-

* 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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To **REQUEST A QUOTE** *, Please Contact your local representative at www.bloomeng.com/locate-arep
and provide the following information:

INFORMATION	UNITS
<i>General Information:</i>	
Application	-
Burner Input	(MMBtu/hr; kcal/hr; kW) in (HHV or LHV)
Quantity of Burners	-
Ignition Type and Fuel	-
<i>Main Fuel Information:</i>	
Fuel (s) and Heating Value (s)	(Btu/ft ³ ; kcal/Nm ³ ; MJ/Nm ³) in (HHV or LHV)
Fuel Flow	(scfh; Nm ³ /hr)
Available Fuel Pressure	("w.c.; psi; mbar; kPa)
Fuel Constituents	-
<i>Combustion Air Information:</i>	
Combustion Air Temperature	(°F; °C)
Combustion Air Pressure Available	("w.c.; psi; osi; mbar; kPa)
Minimum / Maximum Excess Air Required	(%)
<i>Flame Information:</i>	
Desired Flame Length	(feet; inches; m; mm)
Desired Flame Diameter	(feet; inches; m; mm)
<i>Furnace / Combustion Chamber Information:</i>	
Wall thickness	(feet; inches; m; mm)
Burner Assembly / Connection Requirements	-
Furnace / Chamber Dimensions or Drawings for Emissions estimate	-
POC (Products of Combustion) / Furnace Temperature	(°F; °C)
<i>Other Information:</i>	
Operational / Control Requirements (i.e. Turndown, Control Type)	-
Emissions Requirements (NOx, CO)	-
Chamber Backpressure	-
Oil / Atomizing agent Details	-
Any other special requirements	-

* **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.

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

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