

Heat Recovery Burner (HRB)

APPLICATIONS:

- Heat Treatment
- Forging
- Strip lines
- Ceramic kilns
- Crucibles
- Glass pots

FEATURES:

- Integral metallic recuperator
- Medium velocity of 70 m/s
- Suitable for natural gas, LPG, manufactured gas and light oil
- Turndown of 10:1 on natural gas at furnace temperature below 2192°F (1200°C)
- Excess air level up to 500% on natural gas
- Furnace pressure controlled by a modulating eductor air jet mounted in a burner flue
- Normal furnace operating temperatures up to 2282°F (1250°C)
- Recuperator can be used separately: Compact Recuperator (HCR)

BENEFITS:

- Up to 35% - 40% fuel savings
- Associated reductions in CO₂ emission
- Robust burner providing excellent heat transfer to the furnace load
- No conventional flue needed, reducing furnace installation costs
- Lower waste gas temperatures

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.



FUEL CAPABILITIES*

Natural Gas \ LPG \ Manufactured Gas \ Light Oil

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



BURNER IGNITION

Premix Pilot



CONTROLS

Modulating: Pressure Balanced \ Modulating: Mass Flow



FLAME MONITORING

UV Detector



OPTIONS

Extended flue option for maximum heat recovery \
Dual fuel \ Long flame burner design \ Remote heat exchanger

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HRB Series

Heat Recovery Burner

In a furnace without heat recovery equipment operating on natural gas 2192°F (1200°C) with 10% excess air, 63% of the energy input is lost in waste gases and not actually available to the process. With typical air preheats in excess of 1/3 of the furnace operating temperature, the HRB Burner has the ability to recover part of this energy by exhausting hot waste gases through its specially designed quarl and over an integral metallic heat exchanger which, in turn, preheats incoming combustion air. This heat recovery significantly reduces the amount of fuel required for the process and makes the HRB burner ideal for applications where flue gas temperatures are high and load residence time at high temperature is long, such as forging and heat-treatment furnaces or batch-type furnaces.

Exhausting/Furnace Pressure Control

Since the waste gases exhaust through the burner quarl, there is no need for a conventional flue, which speeds up design and installation of the furnace. The furnace pressure is controlled by an air-driven eductor in the burner flue arrangement. Accurate pressure control is achieved by varying the volume of air to the eductor which in turn controls the amount of waste gases drawn out of the furnace. No separate fan is required for the air to the eductor as it is supplied by the combustion air fan.

Medium Velocity

The HRB burner has a medium velocity of 70 m/s which, combined with accurate furnace pressure control and careful burner configuration, ensures even temperature uniformity and excellent heat transfer to the load.

Extended Flue Version

In order to increase the residence time of waste gases exhausting through the burner and maximize the exchange of heat between the exhaust gases and the combustion air, the HRB burners (HRB3.5 to HRB25) can be designed with an extended flue. Please note that these burners require high combustion air and eductor air pressures. Figures are available from Bloom Engineering upon request.

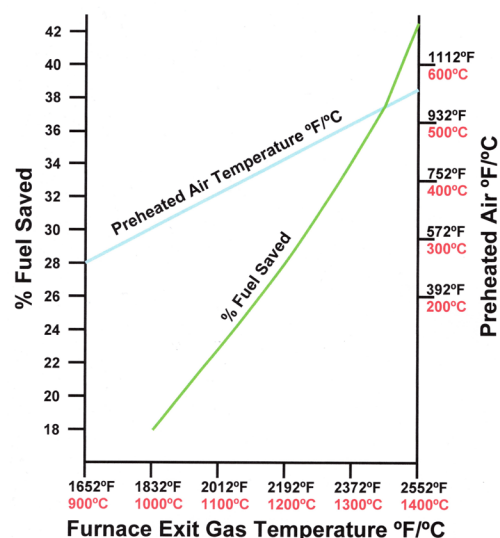
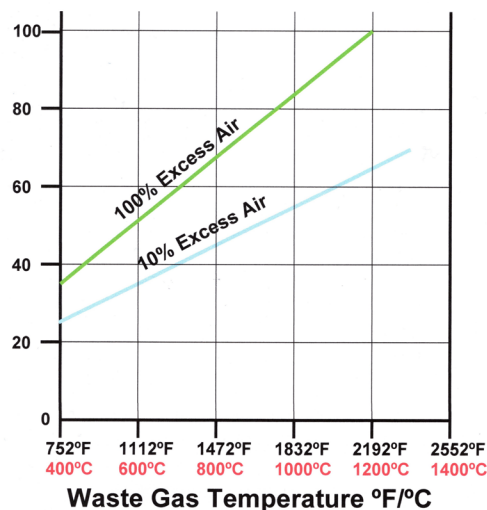
Compact Recuperator (HCR)

The heat exchanger inside the HRB burner is available separately, known as the Compact Recuperator, and can be used in conjunction with a hot air burner such as the **High Velocity Burner (HV)** or the **E-Jet Ultra Low NOx Hot Air Burner (EJ HA)**. Using the recuperator separately gives the possibility of positioning the burner and the exhaust at different locations, which may be required by certain firing patterns such as around a crucible furnace (burner at the bottom, recuperator at the top). It also enables features of certain burners such as the high velocity of the HV burner to be used with higher fuel efficiency.

Fuel Savings

The fuel saving from air preheating depends on how much heat is transferred from the exhaust gases to the combustion air (directly related to the exhaust gas temperature). Experience from operating installations indicates that air preheat temperature will be about 35% of the furnace operating temperature.

Energy Losses in Waste Gases on Furnaces Without Heat Recovery (natural gas fuel)



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

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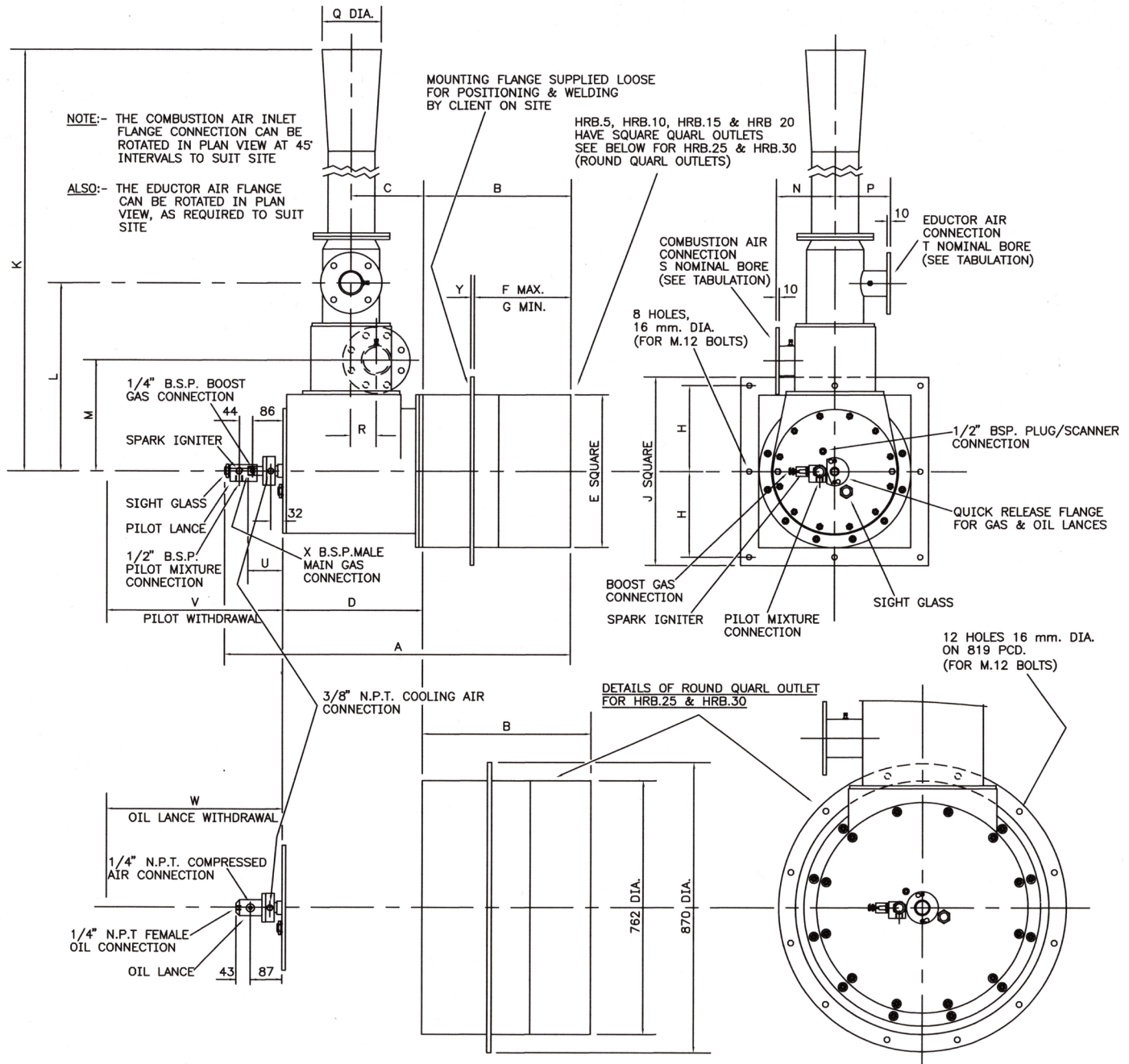
Table 1 - Thermal Ratings and Combustion Data

Burner Designation HRB-	Thermal Rating Maximum		Air Volume (Stoichiometric) Maximum		Eductor Jet Air Volume		Eductor Jet Air Pressure	
	Btu/hr— LHV	kW	SCFH	Nm ³ /hr	SCFH	Nm ³ /hr	inch wc	mbar
2	194,492	57	2,126	57	3,805	102	18.1	45
3.5	351,451	103	3,693	99	8,989	241	28.1	70
5	498,173	146	5,297	142	8,989	241	7.2	18
10	999,757	293	10,556	283	17,941	481	14.9	37
15	1,501,342	440	15,853	425	28,535	765	17.3	43
20	1,999,515	586	21,112	566	36,964	991	32.1	80
25	2,501,100	733	26,408	708	41,217	1,105	20.1	50

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Table 4 - General Burner Dimensions - millimeters (inches)

Burner Designation HRB -												
	A	B	C	D	E	F	G	H	J	K	L	M
5	962	460	220	327	381	432	229	229	486	1440	545	249
10	1041	445	214	419	457	419	219	257	565	1640	564	332
15	1105	473	256	459	508	457	270	283	616	1934	613	400
20	1105	473	256	459	508	457	270	283	616	1934	613	400
25	1197	508	256	522	-	489	184	-	-	2448	759	508
30	1197	508	256	522	-	489	184	-	-	2448	759	508

Burner Designation HRB -											
	N	P	Q	R	S	T	U	V	W	X	Y
5	152	146	152	38	50 (2")	50 (2")	98	845	883	(3/4")	10
10	178	165	178	76	80 (3")	80 (3")	102	908	946	(3/4")	10
15	216	165	229	89	100 (4")	80 (3")	102	952	990	(1")	10
20	216	165	229	89	100 (4")	80 (3")	102	952	990	(1")	10
25	298	203	292	124	150 (6")	100 (4")	102	1029	1029	(1 1/2")	12.5
30	298	203	292	124	150 (6")	100 (4")	102	1029	1029	(1 1/2")	12.5

NOTE: Custom designs are available upon request. Please consult a Bloom Engineering Representative for more information.
The data provided is for guidance only and could vary slightly due to manufacturing tolerances.

Table 5 - Flange Dimensions - millimeters (inches)

Size	Outside Diameter	Number of Bolts	Size of Bolts	P.C.D.
50 (2")	165	4	M. 16	125
80 (3")	200	8	M. 16	160
100 (4")	220	8	M. 16	180
150 (6")	285	8	M. 20	240

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To REQUEST A QUOTE: Please Contact your local representative at www.bloomeng.com/contact and provide the following information:

INFORMATION	UNITS
General Information:	
Application	
Burner Input	(MMBtu/hr; kcal/hr; kW) in (HHV or LHV)
Quantity of Burners	
Ignition Type and Fuel	
Main Fuel Information:	
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	
Combustion Air Information:	
Combustion Air Temperature	(°F; °C)
Combustion Air Pressure Available	("w.c.; psi; osi; mbar; kPa)
Minimum / Maximum Excess Air Required	(%)
Flame Information:	
Desired Flame Length	(feet; inches; m; mm)
Desired Flame Diameter	(feet; inches; m; mm)
Furnace / Combustion Chamber Information:	
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)
Other Information:	
Operational / Control Requirements (i.e. Turndown, Control Type)	
Emissions Requirements (NO _x , 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.**

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Extend the life of your burners and valves with Bloom Engineering's Aftermarket Repair and Rebuild Service Program

Our aftermarket Repair and Rebuild Service Program delivers the same high-quality Bloom Engineering products at a significant fraction of the cost of new equipment. All of our repairs and rebuilds include an additional one year of warranty coverage. Simply follow the steps below to get started.

1

CONTACT BLOOM ENGINEERING

Email orders@bloomeng.com for your Return Material Authorization (RMA) number. Please provide a brief item description, the part number, quantity, and/or the original order number(s) of the items being returned.

2

RETURN YOUR PRODUCT

After an RMA number has been provided, please ship items **PREPAID** to:

Bloom Engineering Company, Inc.

100 Vista Drive

Charleroi, PA 15022

Attention: REPAIR PROGRAM

MK: RMA# _____ (see step 1 above)

**TO AVOID DELAYS IN PROCESSING YOUR
RETURN, YOU MUST INCLUDE YOUR
RMA NUMBER WHEN YOU SHIP!**

SHIPPING NOTES:

- To ensure the safety of our material handler, please be sure items are securely packaged on a pallet using metal bands.
- Any products unable to be safely unloaded will be returned to the sender.
- Bloom Engineering's receiving hours are M-F 7am-3pm.
- All valves must be cleaned of debris before shipment.
- Removing refractory from burners before shipment to Bloom Engineering will reduce freight costs.
- **Please provide tracking information once available.**

3

INSPECTION AND ASSESSMENT

Once your items have been received, a shop inspection will be scheduled and performed by a Bloom Engineering Technician. Once the assessment is complete, the results of the assessment will be provided to you by your Bloom Engineering contact to determine next steps.

A repair or rebuild estimate will be prepared based on the results of the inspection and the proposal will be sent to the original requester. The price for a new product will also be provided as a comparison to the Repair/Rebuild price. Bloom Engineering will proceed with the Repair/Rebuild based on customer's approval by confirming change order or purchase order.

QUESTIONS?

Please contact orders@bloomeng.com and reference **"REPAIR PROGRAM"** in your email subject line.