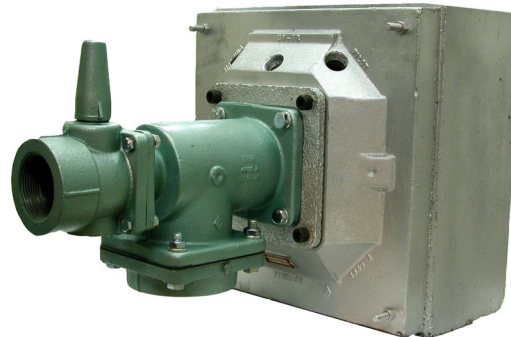


RED-EYE GAS RADIANT CONE & EXCESS AIR BURNER

MODEL: 3504

Revision: 0

BULETIN
3504



FEATURES

- Parabolic focusing radiant cone burner
- Simplified nozzle-mix construction - no flashbacks
- Standard refractory blocks rated to 3000°F.
- Pilot, flame detector and sighting ports
- Flanged air and gas connections with pressure tips

APPLICATIONS

Intense combustion, in the radiant parabolic focusing cone, drives concentrated radiant heat to the work at levels higher than furnace chamber temperatures. Cone temperatures are controlled by the percentage of excess air used, while maintaining nearly constant, furnace hot-gas circulation.

Applications include strip annealing, forging, upsetting, frit smelters, billet heaters, oil burn-off operations, reverberatory melters, salt-pot covers, aluminum preheating, sweating, and holding furnaces.

DESCRIPTION

Red-Eye Gas Burners are nozzle-mixing units with a high-velocity, spinning, air flow into the burner block. The swirling air stream produces a negative vortex at the block mouth. Gas enters the vortex, mixing rapidly, producing intense combustion.

The parabolic focusing cone shape of the refractory block works with the vortex to concentrate the flame and accelerate combustion.

CAPACITY TABLE

Catalog No.	Pipe Sizes		ON-RATIO OPERATION 1000's BTU/HR @ Various Air Pressures						
	Air	Gas	0.1 oz.	4 oz.	8 oz.	12 oz.	16 oz.	20 oz.	24 oz.
RE-1	1"	3/4"	10	60	90	110	125	140	150
RE-2	1-1/2"	3/4"	20	125	175	210	250	280	300
RE-3	1-1/2"	1"	30	200	290	350	400	440	490
RE-4	2"	1"	60	400	580	700	800	880	980
RE-5	2-1/2"	1-1/2"	90	600	870	1050	1200	1320	1470
RE-6	3"	1-1/2"	120	800	1160	1400	1600	1760	1960
RE-7	4"	2-1/2"	260	1500	2100	2600	3000	3400	3700

NOTE: Gas pressures required 2 oz. above maximum air pressure used for direct loaded systems. Minimum gas pressure 4" W.C. for bleed loader and excess air systems.

CAUTION: Operation of combustion equipment can be hazardous resulting in bodily injury or equipment damage. Each burner should be supervised by a combustion safeguard and only qualified personnel should install, make system adjustments and perform any required service.



ORDAN THERMAL PRODUCTS LTD.
Combustion Equipment & Controls for Industry
21 Amber St # 9, Markham Ontario Canada L3R 4Z3
Tel: (905) 475-9292 Fax: (905) 475-3286
www.ordanthermal.com

NOTICE: Pyronics practices a policy of continuous improvement in the design of its products. It reserves the right to change the specifications at any time without prior notice.

OPERATION

Maximum furnace temperatures are obtained at high-fire with stoichiometric air and gas flows. Turndown with an "On-Ratio" piping system (Figure 1) maintains the proportions of air and gas at all firing rates while reducing total flows.

Modulation of the main air valve, from a temperature controller signal, changes the air pressure and the air flow to each burner. The air pressure signals, impulsed to the Balanced Zero Governor (5101), will modulate gas outlet pressures equal or proportional to these signals.

With equal or proportional air and gas pressure drops across bot orifices, the flows will always maintain correct ratios.

Individual burner air valves are used to set initial heat balance between burners. The adjustable gas orifice is set at high-fire for proper flame, and locked.

Calibrated orifice plate flow meters (5702) are suggested for each burner to permit measuring air and gas flows.

TYPICAL PIPING FOR AN ON-RATIO SYSTEM

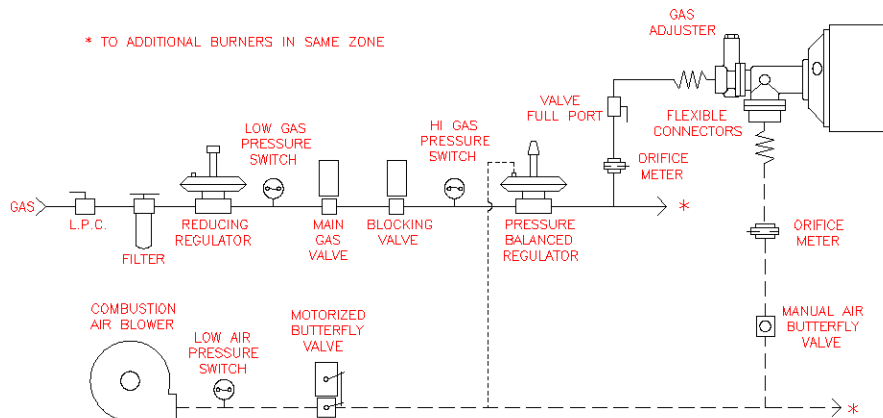


Fig. 1

Excess air or constant air flow piping systems are shown in Figure 2.

Maximum heat input and furnace temperature are obtained at stoichiometric fuel-air ratios by setting adjustable gas orifice at high-fire. On turndown, gas flow only is reduced to lower flame temperature.

With constant air flow, total volume of combustion products and discharge heat patterns will remain nearly constant. Furnace heat transfer patterns are maintained while temperatures are modulated.

TYPICAL PIPING FOR A CONSTANT AIR SYSTEM

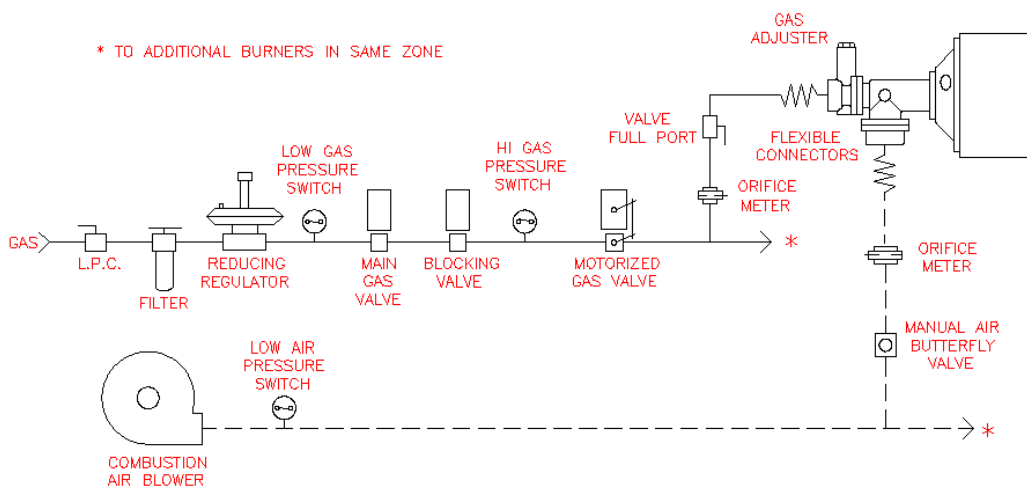


Fig. 2

IGNITION

Lighting of all sizes of Red-Eye Gas Burners is smooth at all firing rates by a manual power torch or a blast pilot installed in the threaded opening in the block holder. Blast pilots may be manually or spark ignited.

Recommended pilots are: 62 PBST for RE-1, RE-2, and RE-3, 64 PBST for sizes RE-4 through RE-6 and 86 PBST for RE-7.

Pilots must be operated on an interrupted basis.

A back pressure is present at high air flow rates in the burner throat and all unused pilot, flame detector and sight ports should be plugged.

FLAME DETECTION

All sizes of Red-Eye Gas Burners have three threaded openings into the burner block for the installation of pilots, flame rod, or ultraviolet flame scanners and peep sights.

Flame-spin is counterclockwise when viewed from rear. Pilots should always be installed in the most clockwise hole so that the pilot flame will pass the flame detection port.

Ultraviolet scanners must be used with interrupted pilots to sight main burner flames.

Flame detection on each burner is recommended for maximum furnace safety and ease of starting all burners. Flame detection systems are required on all excess air arrangements and others that may operate with furnace temperatures below 1400°F.

SENS-A-FLAME with Ultraviolet Scanners are recommended on all multiple-burner systems. Any of the approved single-burner ultraviolet detectors will operate properly on single-burner systems.

CONSTRUCTION

STD refractory burner tiles are 60% alumina. Blocks are formed in rugged cast-iron holders with four stainless steel anchors embedded in the refractory. These threaded anchors extend out from the holder for installation of mounting brackets or lifting lugs.

Refractory has been selected for resistance to spalling at 3000°F temperature in the tile or 2700°F in the furnace chamber.

Burner bodies are cast-iron construction with 4-bolt flanged mounting to the block holder. Air and gas connections are Pyronics' standard 4-bolt flanged type, threaded for pipe connections. No additional pipe unions are required for installation.

Gas entry to the burner body is flanged in the F series and equipped with gas adjusters in the GA series.

INSTALLATION

Red-Eye Gas Burners may be installed in any position. The inside flared face of the tile should be flush with the furnace wall. Burner blocks extend 1/4" beyond the sides of the block holder. Burner blocks may be set in the furnace wall during installation of the refractory.

Wall mounting flanges are available to fasten the block holders to the furnace shell. Wall mounting flanges fit over, and are fastened to, the four studs protruding through the block holder.

When these are used the furnace refractory should be set to leave a 1/2" space on all sides of the block. This space should be packed with a flexible refractory material to allow for expansion of the walls.

Lifting eye-bolt hangers are available and may be mounted on the anchor extensions for furnace roof suspension installations. Tie rods or cables are used to support and position the burners.

Flexible nipples are recommended for air and gas connections at the burners to allow for slight movement or misalignment of the piping.

Gas adjusters, air butterfly valves and flange pressure tapings should be positioned near the burners for convenient use.

CAUTION: Operation of combustion equipment can be hazardous resulting in bodily injury or equipment damage. Each burner should be supervised by a combustion safeguard and only qualified personnel should install, make system adjustments and perform any required service.



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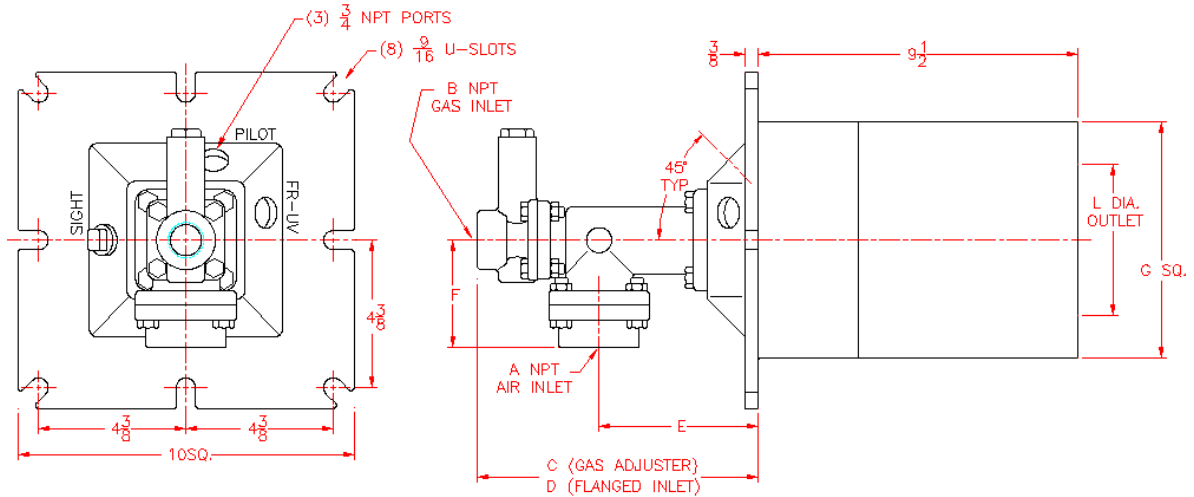
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RED-EYE GAS

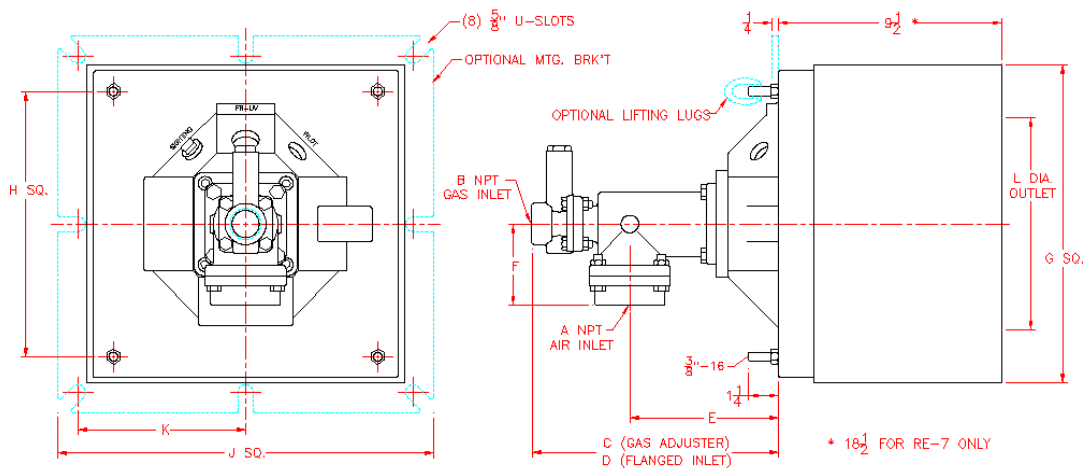
BULLETIN 3504
PAGE NO. 4

DIMENSIONS

RE-1 THROUGH 3



RE-4 THROUGH 7



SIGHT PORT : $\frac{3}{4}$ NPT (TYP. ALL SIZES) AT 60°
FR-UV PORT : 1 NPT (TYP. ALL SIZES) AT 45°
PILOT PORT : $\frac{3}{4}$ NPT (RE-4, 5, 6) AT 60°
1 NPT (RE-7) AT 60°

Model No.	A NPT	B NPT	C (GA)	D (FLG)	E	F	G SQ	H SQ	J SQ	K	L	Weight in Lbs.
RE-1	1-1/2	3/4	8-3/8	7-3/8	4-3/4	3-1/4	7	-	-	-	4-1/2	66
RE-2	1-1/2	3/4	8-3/8	7-3/8	4-3/4	3-1/4	7	-	-	-	4-1/2	64
RE-3	1-1/2	1	8-3/8	7-3/8	4-3/4	3-1/4	7	-	-	-	5-1/2	62
RE-4	2	1	10	9	5-7/8	3-1/2	13-1/2	11-1/4	16	7-1/8	9	140
RE-5	2-1/2	1-1/2	11-7/8	10-3/4	6-5/8	4-3/8	13-1/2	11-1/4	16	7-1/8	11	160
RE-6	3	1-1/2	11-7/8	10-3/4	6-5/8	4-3/8	13-1/2	11-1/4	16	7-1/8	11	160
RE-7	4	2-1/2	15-1/8	12-5/8	7-1/8	5-1/2	21	16	24	11-1/8	16	640

All Dimensions are in inches $\pm 1/8$

ORDERING INFO NOT ON ANY SHEETS AT AXIS DEV