

North American Low NO_x Flat Flame™ Gas Burners

- EXCESS AIR OPERATION
- MINIMAL FORWARD FLAME VELOCITY
- PREHEATED AIR TO 750 F

INTRODUCTION

North American 4832 Flat Flame Burners convert the refractory expanse of a furnace wall or roof into a uniform heat radiating surface that is capable of high rates of heat transfer over wide areas.

These burners produce disc-shaped, tangential flames that scrub adjacent refractory and have little forward velocity. The flat flame characteristics of these burners limit the possibility of hot spots caused by flame impingement on work as close as 12 inches away.

The 4832 Burners are used where excess air is required for uniformity and/ or thermal turndown.

CONSTRUCTION

4832 Burners have cast iron bodies and heat resistant cast iron mountings. All internals exposed to radiant heat from furnace are stainless steel. Tile material options include both 3000 F and 3200 F castable refractories. Tiles are available in either 9 or 13 inch lengths. The tiles are supported by alloy anchors attached to the mounting plate. Four hanger rods are furnished with every 4832 Roof Section Burner.

Construction and Installation Notes: The 4832 burners' flame spin creates backpressure within the burner mounting, so any unused holes must be plugged prior to lightoff.

All 4832 burners are shipped with a 3/4" observation port installed as shown in the above photograph. The ignition and supervisory ports are plugged at the factory to protect the threads and keep burner internals clean prior to start-up.

Flexible air and gas connections (Bulletin 8770) are recommended to compensate for expansion of furnaces and piping.



Wall Mounting
(flangeless)



Roof Mounting

OPERATING CHARACTERISTICS

4832 Burners are sealed-in, nozzle mixing burners which can not flash back. Burner turndown will be affected by accuracy of control system, flame supervision device selected, and air/fuel ratio settings. Effective turndown can be extended by use of higher excess air settings.

Burners are normally selected for 12 psi or more air pressure at high fire to allow adequate turndown while still maintaining good flame spin characteristics. Gas pressure requirements are listed in Table 3.

For fuel gas other than natural gas, specify gas composition. Internal construction and gas pressure requirements may vary, especially for coke oven gas.

Flame diameters are indicated in Instructions Sheet 4832-2. Flame depth (forward travel) is less than 6 inches for any size when operated within normal excess air ratings shown in Table 2.

In tight, cold furnaces, 4832 Burners are not stable on stoichiometric air/gas ratio. Alternatives during start-ups until furnace reaches approximately 1400 F:

1. Keep furnace doors open or otherwise provide free air in chamber, or
2. Operate 4832 Burner(s) on lean air/gas ratio, i.e., with excess air through the burner, or
3. Use the 4833 Flat Flame Burner, which has narrower air/gas ratio limits (it is available in the -3, -4, -5, and -6 sizes).
4. Consult North American for special cold, tight versions.

A new-style, three-hole mounting provides for visual observation of pilot and/or main flame, burner ignition, and flame supervision.

Preheated Combustion Air: All standard 4832 burners are capable of operating with preheated combustion air up to 750 F. For burners designed specifically for preheated air (up to 1200 F) consult North American.

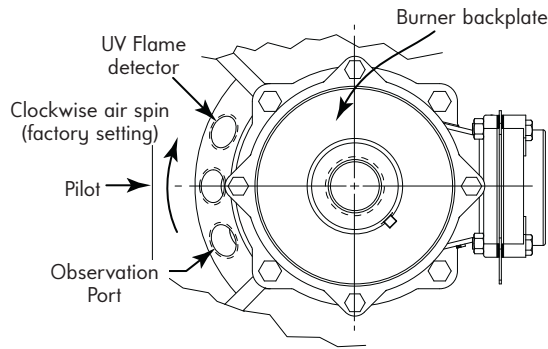


Figure 1. Proper ignition/flame detector placement

Table 1. Recommended Pilots and Igniters

Burner designation	Spark Ignited Pilot Tip	Direct Spark Igniters	
		4055	4051
4832-2	4021-12	-C	-C
4832-3	4021-12	-C	-C
4832-4	4021-12	-C	-C
4832-5	4021-12	-B	-B
4832-6	4021-12	-B	-B
4832-7	4021-12	-B	-B
4832-8-A	4021-12	-B	-B
4832-8-B	4021-12	-B	-B

Burner Placement/Flame Diameters

Instructions 4832-2 lists suggested burner spacing and flame diameters/depths for all types of Flat Flame™ Burners. These figures are general guidelines only. Burner placement is also a function of furnace volume, input required per unit volume, and other factors.

Table 2. Capacities, Limits, Excess Air

Burner designation	Combustion air in scfh (for Btu/hr, multiply by 100)				Max. % excess air without pilot			
	Air pressure drop across the burner in osi							
	1	4	9	16	4	8	12	16
4832-2	585	1 170	1 740	2 340	400	300	250	150
4832-3	885	1 770	2 640	3 540	290	190	150	100
4832-4	1 450	2 900	4 330	5 800	250	220	150	140
4832-5	2 370	4 740	7 050	9 500	250	250	250	300
4832-6	3 710	7 430	11 170	14 800	500	500	500	500
4832-7	6 550	13 080	19 650	26 200	500	500	300	280
4832-8-A	11 000	22 000	33 000	44 000	180	130	110	80
4832-8-B	16 500	33 000	49 360	66 000	120	75	55	35

For burner dimensions, refer to Dimensions 4832.

Table 3. Gas Pressure Requirements
(for stoichiometric operation at
16 osi air pressure)

Burner designation	Gas pressure* ("wc)
4832-2	0
4832-3	0
4832-4	0
4832-5	0
4832-6	0
4832-7	2.0
4832-8-A	1.2
4832-8-B	1.4

* Atmospheric (or negative) gas pressure is normal in the smaller burner sizes due to the open-ended gas tube and combustion air spin.

Ignition and Flame Supervision

The burners can be satisfactorily ignited by either a pilot or a direct spark igniter. See Table 1. Interrupted pilot operation is mandatory when burners are monitored by flame detectors. A 4011-12 pilot set is recommended for individual burner ignition. When multiple burners share a single pilot pre-mix header, a 4021-12 pilot tip per burner with an appropriately sized air/gas mixer is recommended.

4832 burners are supervised by UV flame detectors.

Note: To monitor pilots, flame detectors must be downstream of pilots relative to the direction of flame spin (clockwise as viewed from rear of burner as shipped). See Figure 1.

Low NOx

By their design the 4832 Flat Flame Burners are inherently low NOx. However, emission levels will vary from one application to another. Consult factory for information relating to your operating conditions.

WARNING: Situations dangerous to personnel and property may exist with the operation and maintenance of any combustion equipment. The presence of fuels, oxidants, hot and cold combustion products, hot surfaces, electrical power in control and ignition circuits, etc., are inherent with any combustion application. Parts of this product may exceed 160F in operation and present a contact hazard. Fives North American Combustion, Inc. urges compliance with National Safety Standards and Insurance Underwriters' recommendations, and care in operation.