

North American Low NO_x Flat Flame™ Gas Burners



Roof Mounting

4832 Flat Flame™ Burner

- Excess air operation
- Minimal forward flame velocity
- Preheated air to 750°F

Product Overview | Flat Flame™ Burner

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.

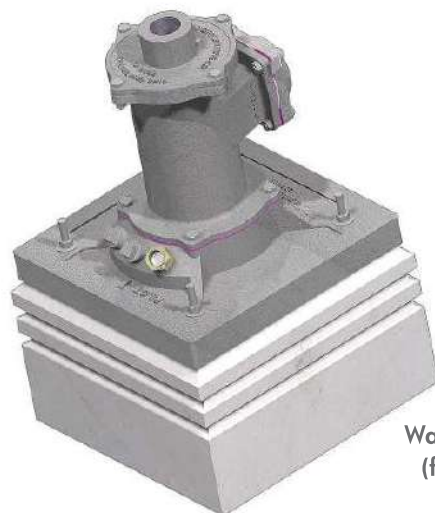
CONSTRUCTION

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 ¾" 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)

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.

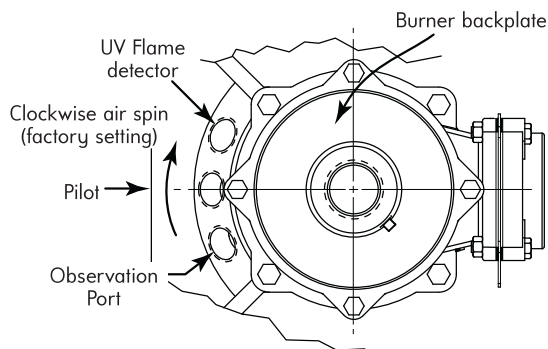


Figure 1. Proper ignition/flame detector placement

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/h HHV, multiply by 100) Air pressure drop across the burner in osi				Max. % excess air without pilot			
	1	4	9	16	4	8	12	16
	4832-2	585	1 170	1 740	2 340	400	300	250
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* ("w.c.)
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. Components in combustion systems may exceed 160°F (71°C) surface temperatures and present hot surface contact hazard. Fives North American Combustion, Inc. suggests the use of combustion systems that are in compliance with all Safety Codes, Standards, Regulations and Directives; and care in operation.

CONTACT

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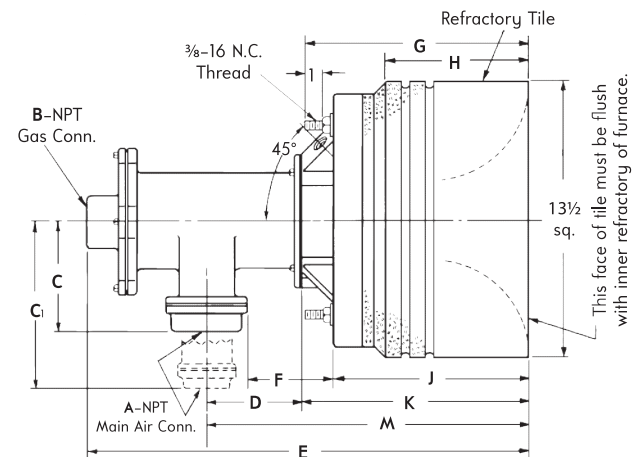
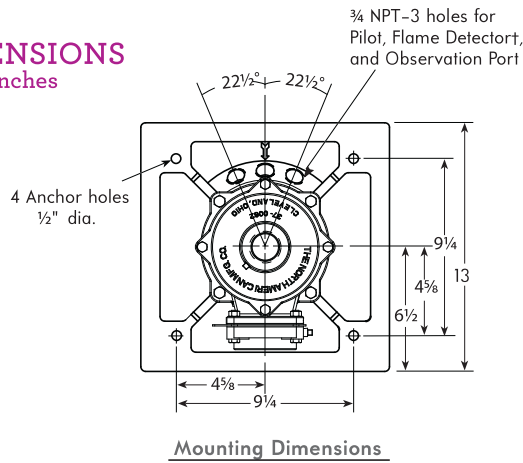
North American Low NOx Flat Flame™ Gas Burners Wall and Roof Mounting

Dimensions 4832

WALL TILE DESIGNS (FLANGELESS MOUNTING)

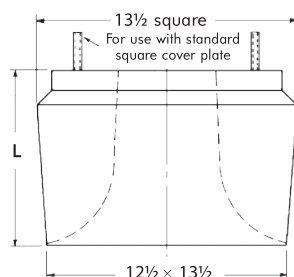
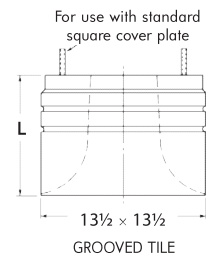
SQUARE TILES 4832- -SG and 4832D- -SG

DIMENSIONS inches



Standard 13 1/2" square tile shown. For dimensions of optional round or tapered tiles, see below or page 2.
All standard tiles are grooved for better resistance to fluing.

4832	dimensions in inches															
	A	B	C	C ₁	D	9 [Ⓢ] E 13 [Ⓢ]	F	9 [Ⓢ] G 13 [Ⓢ]	9 [Ⓢ] H 13 [Ⓢ]	9 [Ⓢ] J 13 [Ⓢ]	9 [Ⓢ] K 13 [Ⓢ]	9 [Ⓢ] L 13 [Ⓢ]	9 [Ⓢ] M 13 [Ⓢ]			
-2	1 1/4	1	—	9 1/16	4 3/4	21 1/4 25 1/4	4 7/16	11 15	7 1/4 11 1/4	9 5/8 13 3/8	11 1/4 15 1/4	9 13	16 20			
-3	1 1/2	1	—	9 1/4	4 3/4	21 1/4 25 1/4	4 7/16	11 15	7 1/4 11 1/4	9 5/8 13 3/8	11 1/4 15 1/4	9 13	16 20			
-4	2	1 1/4	5 7/16	—	4 3/4	21 1/4 25 1/4	4 7/16	11 15	7 1/4 11 1/4	9 5/8 13 3/8	11 1/4 15 1/4	9 13	16 20			
-5	2 1/2	1 1/2	—	9 13/16	7 1/4	23 7/8 27 7/8	6 1/8	11 15	7 1/4 11 1/4	9 5/8 13 3/8	11 1/4 15 1/4	9 13	18 1/2 22 1/2			
-6	3	2	6 1/16	—	7 1/4	23 7/8 27 7/8	6 1/8	11 15	7 1/4 11 1/4	9 5/8 13 3/8	11 1/4 15 1/4	9 13	18 1/2 22 1/2			
-7	4	2 1/2	6 1/16	—	7 1/4	23 7/8 27 7/8	6 1/8	11 15	7 1/4 11 1/4	9 5/8 13 3/8	11 1/4 15 1/4	9 13	18 1/2 22 1/2			



TAPERED TILES 4832- -T and 4832D- -T

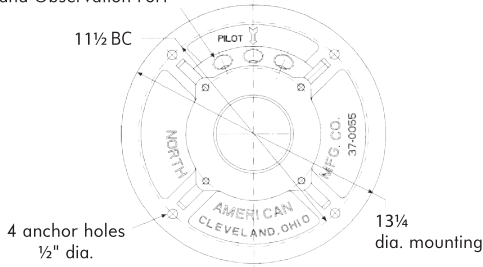
For installation in arches, tapered tiles are available at no extra cost. They are also used in suspended flat roofs with a rammed or cast "collar" surrounding the tile where fluing is a problem or duty is particularly severe.

Tiles are tapered on two sides only and fit standard 4832 square mountings. Unless specified, they are assembled with one tapered side in line with pilot and flame detector holes in mounting. Material is same as standard 4832 tiles.

Tapered tiles are not grooved.

Ⓢ Tiles available in 9" and 13" depth. "D" designation signifies "Deep" (13") tile.
† Detector must be "downstream" of pilot with regard to main air spin (see Bulletin 4832).

3/4 NPT-3 holes for Pilot, Flame Detector, and Observation Port



Mounting Dimensions

ROUND MOUNTING AND TILES
4832- -RG and 4832D- -RG

Round tiles and mountings are available at no extra cost.

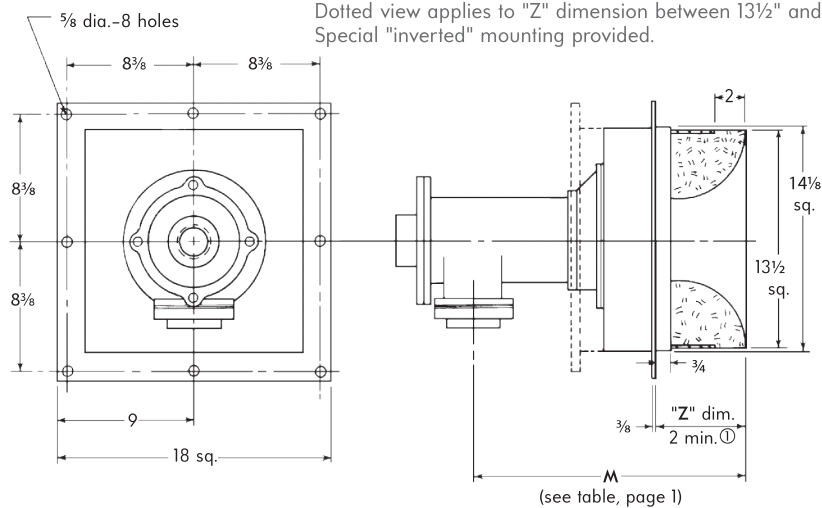
Tiles are 13 3/8" diameter and 9" or 13" deep. They are made of the same refractory as standard square 4832 tiles.

Round mountings fit standard 4832 Burner bodies.

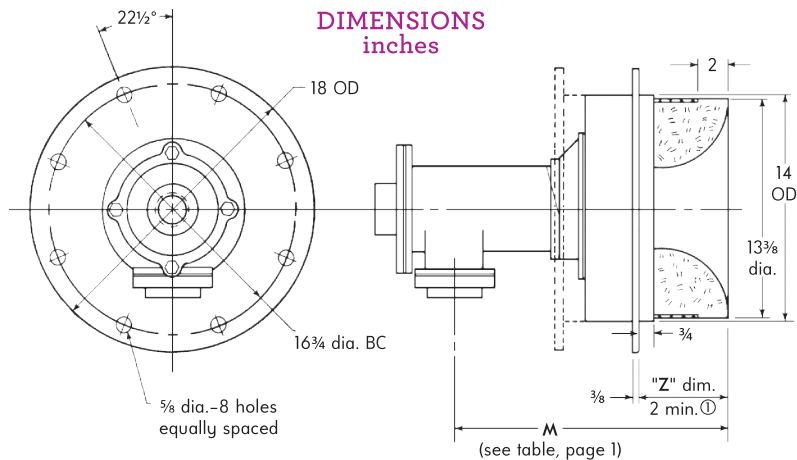
FIBER LINED FURNACE DESIGNS
(FLANGED FABRICATED MOUNTING)

For fiber lined furnaces, 4832 Burners are available with either square or round mountings and tiles. All but 2" of burner tile is encased in an expanded metal jacket. Tile must be installed so jacket does not exceed 1800 F--refer to Supplement DF-M2 for installation information. Since tile face must be flush with inside face of furnace wall, mounting flange location on jacket must be specified. "Z" dimensions are available from 2" to 15 1/2", in 1/2" increments.

Square
4832- -SZ (9" Tile)
4832D- -SZ (13" Tile)



Round
4832- -RZ (9" Tile)
4832D- -RZ (13" Tile)

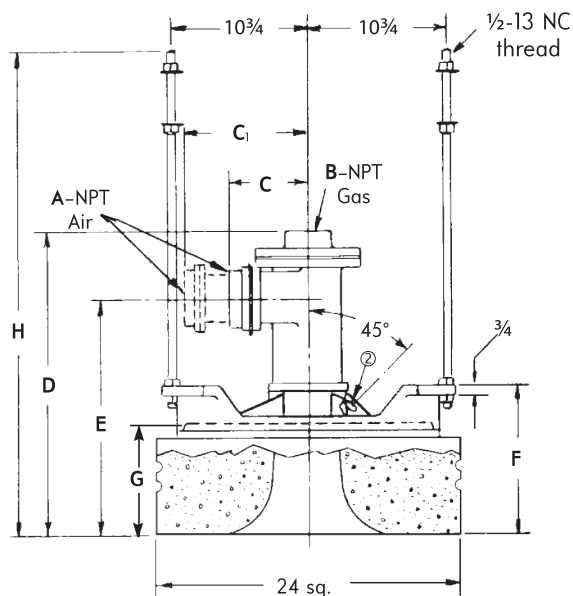


① 9" deep tile supplied for "Z" (2"-9"). 13" deep tile supplied for "Z" (9 1/2"-15 1/2").

SQUARE ROOF ("R" SERIES) TILE DESIGNS

4832-2 thru -7-SGR (9" Tile)
4832D-2 thru -7-SGR (13" Tile)
(formerly 4836-2 and -7)

DIMENSIONS
inches



4832	dimensions in inches													
	A	B	C	C ₁	D ^①		E ^①		F ^①		G ^①		H ^①	
					9 ^①	13 ^①	9 ^①	13 ^①	9 ^①	13 ^①	9 ^①	13 ^①	9 ^①	13 ^①
-2	1 1/4	1	-	9 1/16	21 1/4	25 1/4	16	20	12 3/16	16 3/16	9	13	38	42
-3	1 1/2	1	-	9 1/16	21 1/4	25 1/4	16	20	12 3/16	16 3/16	9	13	38	42
-4	2	1 1/4	5 7/16	-	21 1/4	25 1/4	16	20	12 3/16	16 3/16	9	13	38	42
-5	2 1/2	1 1/2	-	9 13/16	23 7/8	25 7/8	18 1/2	22 1/2	12 3/16	16 3/16	9	13	38	42
-6	3	2	6 1/16	-	23 7/8	25 7/8	18 1/2	22 1/2	12 3/16	16 3/16	9	13	38	42
-7	4	2 1/2	6 1/16	-	23 7/8	27 7/8	18 1/2	22 1/2	12 3/16	16 3/16	9	13	38	42

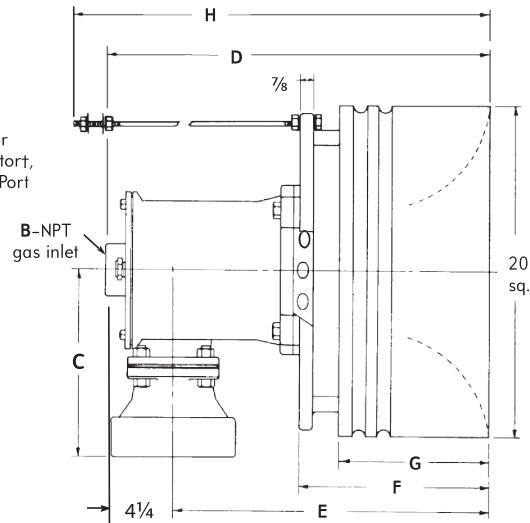
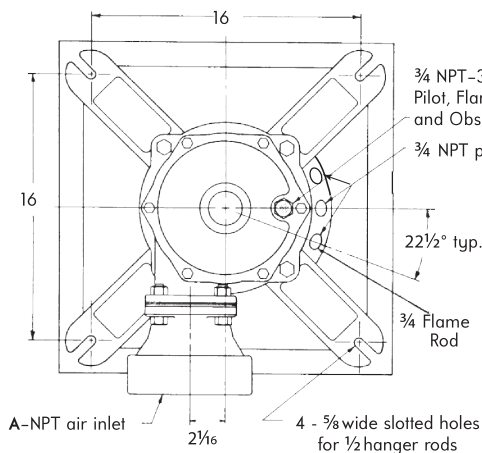
① Tiles available in 9" and 13" depth. "D" designation signifies "Deep" (13") tile.

② 3 holes, 3/4" NPT, for pilot, flame detector and observation port, 22 1/2° on either side of centerline. Detector must be "downstream" of pilot with regard to main air spin (see Bulletin 4832).

-8-A and -8-B ROOF ("R" Series) TILE DESIGNS

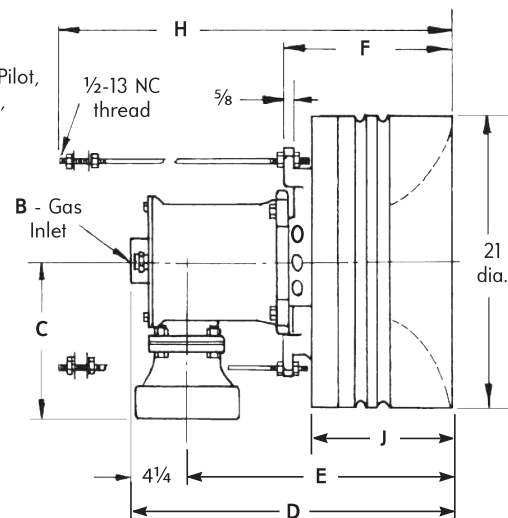
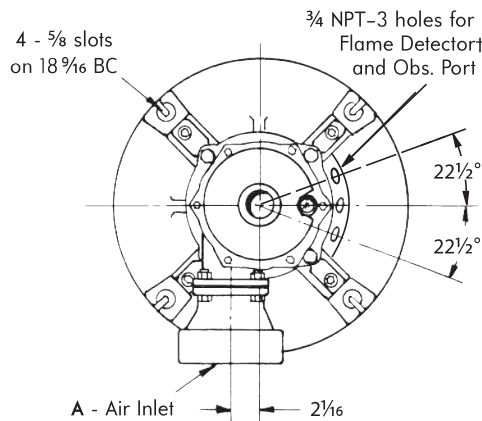
4832-8-A and -8-B/SGR (9" Tile)
4832D-8-A and -8-B/SGR (13" Tile)
(formerly 4836-8-A and -8-B)

DIMENSIONS
inches
SQUARE



4832-8-A and -8-RGR (9" Tile)
4832D-8-A and -8-B/RGR (13" Tile)
(formerly 4836-8-A and -8-B)

ROUND



4832-8-A, -8-B	dimensions in inches														
	A	B	C	D		E		F		G		H		J	
				9 ^①	13 ^①	9 ^①	13 ^①	9 ^①	13 ^①	9 ^①	13 ^①	9 ^①	13 ^①	9 ^①	13 ^①
square tile	6	2	11 1/4	23 1/16	27 1/16	18 3/4	22 3/4	11 3/8	15 3/8	9	13	38	42	-	-
round tile	6	2	11 1/4	23 1/4	27 1/4	19	23	12 1/4	16 1/4	-	-	38	42	10 3/4	14 3/4

① Tiles available in 9" and 13" depth. "D" designation signifies "Deep" (13") tile.

† Detector must be located "downstream" of pilot in regard to main air spin (see Bulletin 4832).

DIMENSIONS SHOWN ARE SUBJECT TO CHANGE. PLEASE OBTAIN CERTIFIED PRINTS FROM FIVES NORTH AMERICAN COMBUSTION, INC.
IF SPACE LIMITATIONS OR OTHER CONSIDERATIONS MAKE EXACT DIMENSION(S) CRITICAL.

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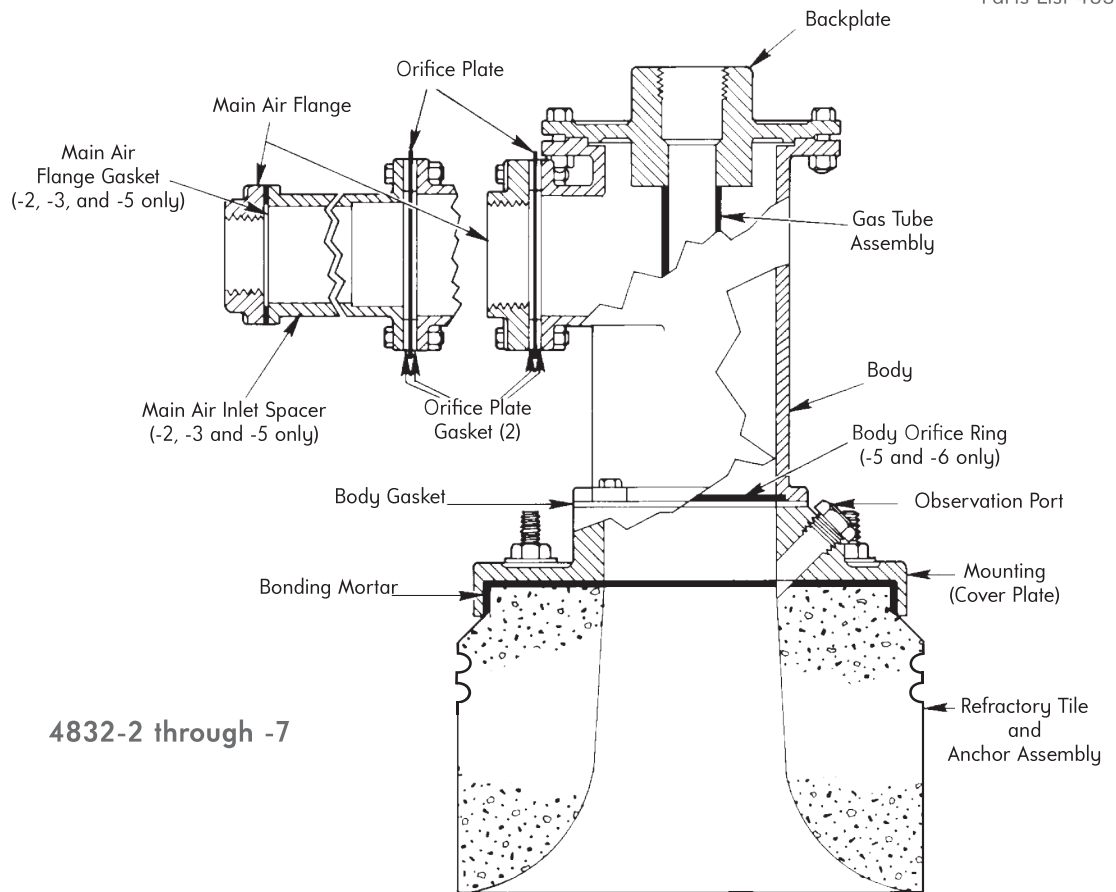


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North American Low NO_x Flat Flame™ Gas Burners

Parts List 4832-1

Parts for 4832 and 4832D Flat Flame Burners
Wall Mounted Design^①



4832-2 through -7

Part Name	Burner designation					
	4832-2	4832-3	4832-4	4832-5	4832-6	4832-7
Backplate	OB4-0432-1	OB4-0432-1	OB4-0432-2	OB4-0313-1	OB4-0313-2	OB4-0313-3
Body	OC4-0261-1	OC4-0261-1	OC4-0261-1	OC4-0291-1	OC4-0291-1	OC4-0291-1
Body Gasket	OA4-0262-1	OA4-0262-1	OA4-0262-1	OA4-0333-1	OA4-0333-1	OA4-0333-1
Body Orifice Ring	—	—	—	OA4-0334-1	OA4-0334-1	—
Gas Tube Assembly	OA4-0473-1	OA4-0473-1	OA4-0473-1	OB4-0335-1	OB4-0354-1	OA4-0374-1
Main Air Flange	OA4-0433-1	4-1695-1	4-1695-2	4-1695-3	4-1695-4	4-1695-5
Main Air Flange Gasket	4-5371-1	4-5371-1	—	4-5371-2	—	—
Main Air Inlet Spacer	OB4-0353-1	OB4-0353-1	—	OB4-0292-1	—	—
Orifice Plate	OA4-0508-1	OA4-0509-1	OA4-0510-1	OA4-0511-1	OA4-0512-1	OA4-0513-1
Orifice Plate Gskt (2 req'd)	4-5371-2	4-5371-2	4-5371-2	OA4-0315-2	OA4-0315-2	OA4-0315-2
Observation Port	8790-0	8790-0	8790-0	8790-0	8790-0	8790-0
Hardwall Mounting (square)	OC4-0260-3	OC4-0260-3	OC4-0260-3	OC4-0260-4	OC4-0260-4	OC4-0260-4
(round)	OC4-1151-1	OC4-1151-1	OC4-1151-1	OC4-1151-2	OC4-1151-2	OC4-1151-2
Fiber Wall Mounting	②	②	②	②	②	②
Fiber Wall Mounting Adapter	4-28356-1	4-28356-1	4-28356-1	4-28356-2	4-28356-2	4-28356-2
Mounting Adapter Gasket	4-28576-1	4-28576-1	4-28576-1	4-28576-1	4-28576-1	4-28576-1

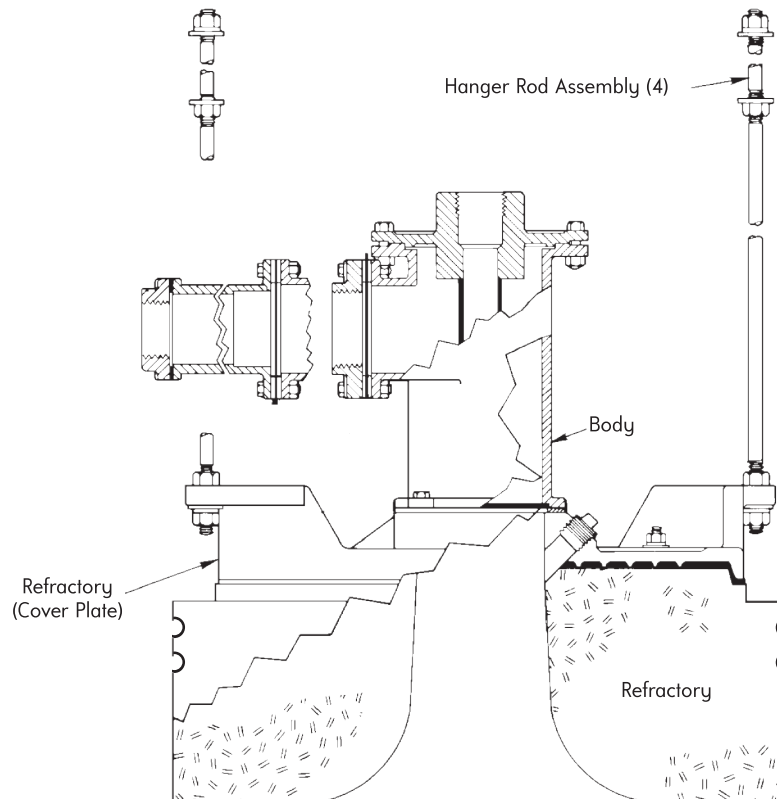
① See pages 2 and 3 for roof mountings.

② See page 4 for fiber wall mounting part numbers. For tile and mounting assembly part numbers, see Sheet 4832-5.

③ Mounting adapters and gaskets listed are new, three-hole design. Old-style, two-hole replacement parts are available. Order kit 4-31154-1 (burner sizes -2, -3, -4 or kit 4-31154-2 (burner sizes -5, -6, -7). Kit includes mounting adapter, gasket and special hardware.

For Refractory Tile part numbers, see Sheet 4832-4

PARTS LIST for 4832 and 4832D Flat Flame™ Roof Section Burners

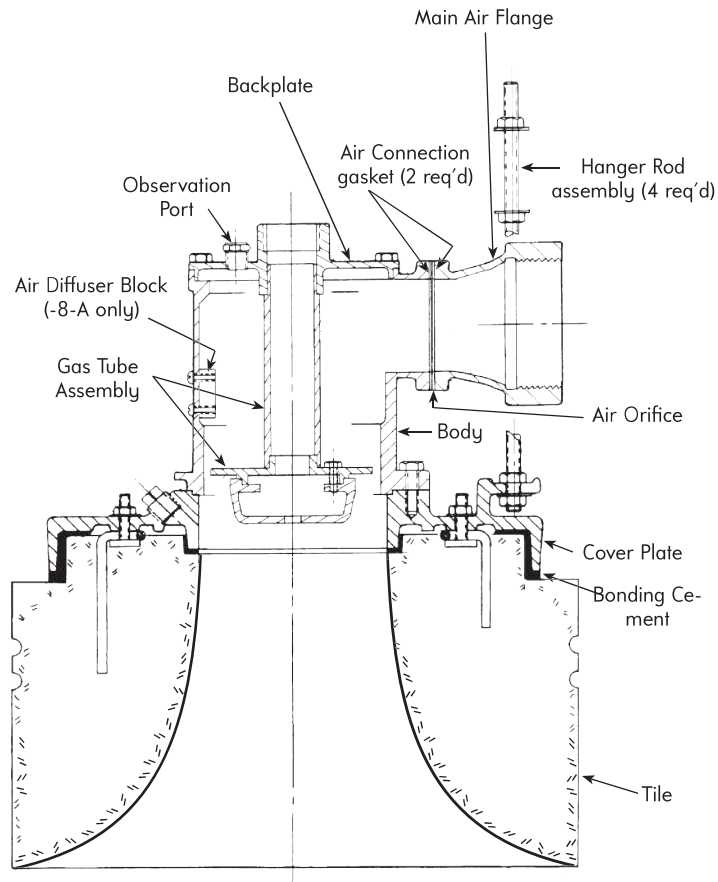


4832-2 through -7 (formerly 4836-2 through -7)
(24" Square Tile)

Part Name	Burner designation					
	4832-2	4832-3	4832-4	4832-5	4832-6	4832-7
Burner Body Assembly	← See parts on reverse side →					
Hanger Rod Assembly	← OA4-0399-1 →					
Refractory Cover Plate Square (cast)	← OC4-0521-3 →			← OC4-0521-4 →		

For Refractory Tile part numbers, see Sheet 4832-4.

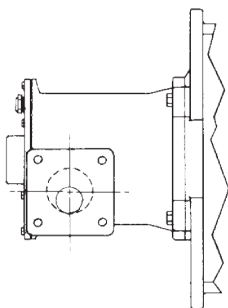
PARTS LIST for 4832 and 4832D Flat Flame™ Roof Section Burners



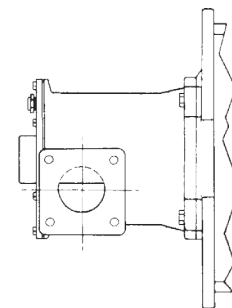
**4832-8-A/B (Round or Square)
(formerly 4836-8-A and -8-B)**

Part Name	4832-8-A	4832-8-B
Air Orifice	OA4-0995-1	OA4-0996-1
Air Connection Gasket (2 req'd.)	OA4-1059-1	OA4-1059-1
Air Diffuser Block	OA4-1057-2	-
Backplate	OB4-0851-1	OB4-0851-1
Body	OC4-0853-1	OC4-0853-2
Cover Plate (round)	OD4-2392-1	OD4-2392-1
Cover Plate (square)	OD4-0976-1	OD4-0976-1
Gas Tube Assembly	OA4-2474-1	OA4-2474-2
Hanger Rod Assembly (4 req'd)	OA4-0399-1	OA4-0399-1
Main Air Flange	8765-8 × 7-D	8765-8 × 7-D
Observation Port	8790-0	8790-0

For Refractory Tile part numbers, see Sheet 4832-4.



4832-8-A orifice plate is positioned as shown at left.
Position for 4832-8-B orifice plate is shown at right. Plates should not be repositioned.



FIBER WALL MOUNTINGS (Fabricated)
(Round)

Figure 1

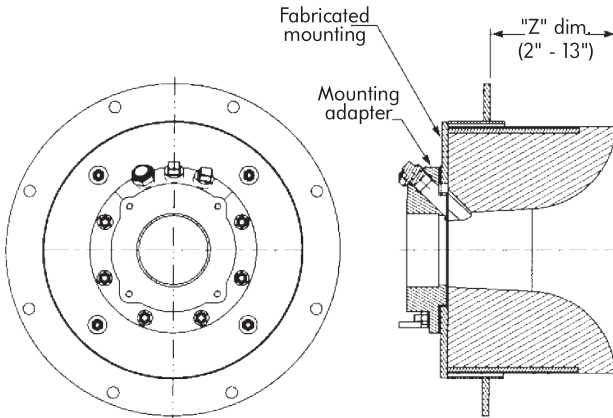
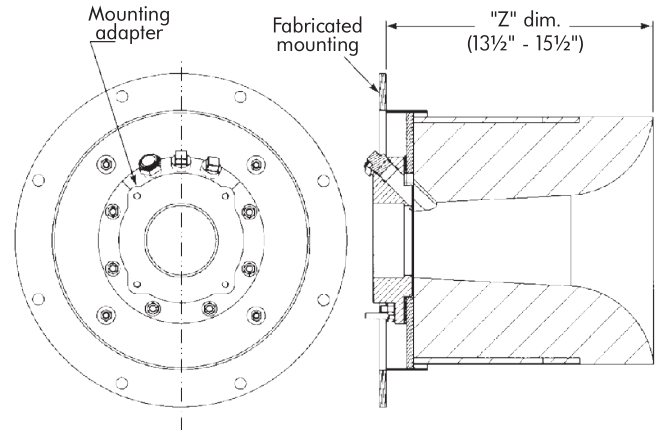


Figure 2



Burner Size	9" Deep (Fig. 1) Z = 2 to 9"	13" Deep (Fig. 1) Z = 9 1/2" to 13"	13" Deep (Fig. 2) Z = 13 1/2" to 15 1/2"
4832-2 thru -7 4832D-2 thru -7	4-28574-1/X.X -	- 4-28574-2/X.X	- 4-29467-1/X.X

FIBER WALL MOUNTINGS (Fabricated)
(Square)

Figure 1

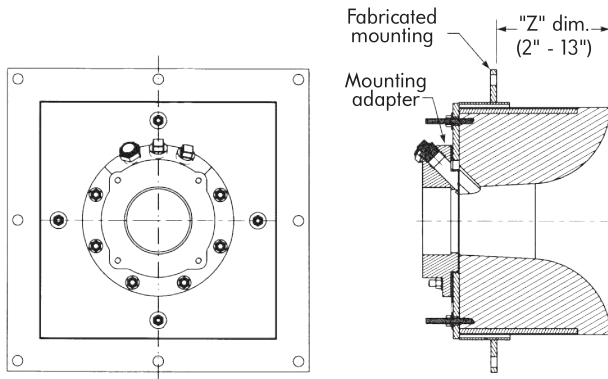
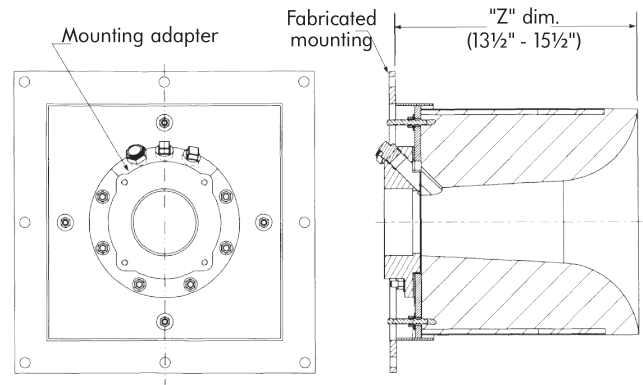


Figure 2



Burner Size	9" Deep (Fig. 1) Z = 2 to 9"	13" Deep (Fig. 1) Z = 9 1/2" to 13"	13" Deep (Fig. 2) Z = 13 1/2" to 15 1/2"
4832-2 thru -7 4832D-2 thru -7	4-28575-1/X.X -	- 4-28575-2/X.X	- 4-29468-1/X.X

For Refractory Tile and Liner Assembly part numbers, see Sheet 4832-4.

NOTE: Fabricated mounting assembly part numbers have been revised to include the required "Z" dimension. When selecting mounting assembly, include the "X.X" suffix to represent the required "Z" dimension in 0.5" increments, 2.0" min to 15.5" max.

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