

**4831 Flat Flame Burners** transfer heat to the surrounding refractory wall or roof by highly turbulent convection; the refractory then radiates heat uniformly to the load. Minimum forward velocity results in uniform radiant heating with no flame impingement.

**Applications.** Successful applications of 4831 Flat Flame Burners include:

*Wire patenting furnaces:* Roof-mounted burners provide more uniform heating than side-fired installations.

*Cover annealers:* The excellent uniformity and fuel economy characteristic of large cover annealing furnaces fired with 4832 Flat Flame Burners have been duplicated with 4831's on smaller units.

*Strip annealers:* The 4831's small diameter flame is ideally suited to long narrow furnaces.

*High temperature single layer kilns.*

*Glass tank forehearth.*

**Performance.** 4831 Flat Flame Burners are sealed-in. All combustion air is provided through the air connection.

They are stable in cold, tight chambers, operating lean, rich, or on correct ratio. This flexibility combines with flat flame characteristics to produce superior uniform heating.

Flames stay flat down to 1 osi air pressure on correct air/gas ratio, but are less flat with rich ratios. Even when visible flames are within the tile throat, flow of combustion products is still flat.

**Construction.** Burners are made of special low growth cast iron.

The standard 60% alumina refractory tile, suitable for furnaces up to 3000 F, is available in 7" and 9" lengths. The refractory cover plate should not be attached to the furnace shell.

Tiles, tapered on two sides, are available (at no extra cost) in the 9" length only. These tile faces measure 6¾" × 7½". Specify "4831- -T".

**Installation.** Burner tile face must be flush with the inside surface of the furnace refractory. For convenience in piping burners in thick walls, air and gas connections enter the back of the burner parallel to its centerline. Two studs projecting from the cover plate permit suspending the burner in a furnace roof. For more comprehensive instructions, refer to Instructions 4832-2.

**Flame Supervision.** Burners are compatible with certain makes and models of flame supervisory equipment. Consult a Fives North American office for a satisfactory arrangement. Viewed from outside the furnace, flame detector must be mounted clockwise from the pilot. Interrupted pilots are required for maximum safety. If no flame detector is specified, an observation port is furnished in the detector opening.

**Lighting.** Series 4831 Burners light smoothly with North American gas pilots. Limit pilot input to 10 000 Btu/hr to avoid overheating the mounting. Manual lighting with a torch also is possible, either at the tile face or through the pilot opening in the burner. Pilot opening must be closed after lighting. The 4055-A Direct Spark Ignition may also be used.

**COMBUSTION AIR CAPACITIES, scfh**  
(multiply by 100 to get Btu/hr)

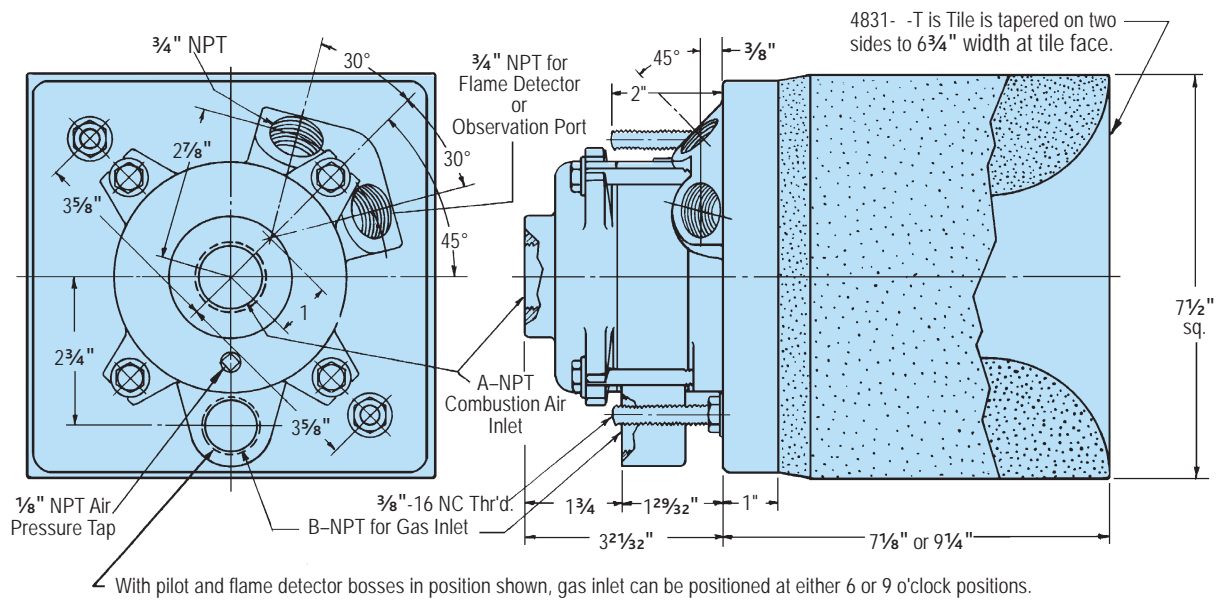
| Burner designation | air pressure drop across the burner in osi |     |     |     |      |      | min. gas pressure <sup>①</sup> |
|--------------------|--|-----|-----|-----|------|------|--------------------------------|
|                    | 1  | 5   | 6   | 8   | 12   | 16   |                                |
| 4831-0             | 170  | 380 | 420 | 490 | 600  | 690  | 3.0 osi                        |
| 4831-1             | 305  | 680 | 755 | 870 | 1070 | 1230 | 3.0 osi                        |

① With 10:1 air/gas ratio and 16 osi air. Lower gas pressure required at lower firing rates. Do not use these figures to set air/gas ratio--use an 8697 Metering Orifice.

## OPERATING CHARACTERISTICS

| Flame description   | Burner designation | air pressure drop across the burner in osi |     |     |     |    |    |
|---|--------------------|--|-----|-----|-----|----|----|
|   |                    | 1  | 4   | 6   | 8   | 12 | 16 |
| Flame diameter, inches <sup>②</sup>                         | 4831-0             | ③  | 6   | 7   | 7   | 8  | 8  |
|   | 4831-1             | ③  | 8   | 8   | 9   | 12 | 12 |
| Flame length (beyond tile), inches <sup>②</sup>             | 4831-0             | ③  | 2½  | 2   | 1½  | 1  | 1  |
|   | 4831-1             | ③  | 2   | 2   | 2   | 1  | 1  |
| Maximum % XSAir, with constant pilot air                    | 4831-0             |  | 190 | 120 | 105 | 85 | 85 |
|   | 4831-1             |  | 130 | 100 | 90  | 80 | 75 |
| Maximum % XSAir, without constant pilot air or direct spark | 4831-0             |  | 110 | 90  | 85  | 60 | 40 |
|   | 4831-1             |  | 75  | 70  | 65  | 50 | 45 |

## DIMENSIONS inches



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.

| Burner designation | dimensions in inches |   | Recommended pilot tip | Mixture pressure | Flame rod length <sup>④</sup> | Wt, lb |
|--------------------|----------------------|---|-----------------------|------------------|-------------------------------|--------|
|                    | A                    | B |                       |                  |                               |        |
| 4831-0             | ¾                    | ½ | 4021-12               | 0.8"wc           | 3½"                           | 44     |
| 4831-1             | 1                    | ¾ | 4021-12               | 0.8"wc           | 3½"                           | 44     |

- ② With natural gas at 10:1 air/gas ratio.
- ③ Flame is entirely within tile.
- ④ From the outer boss of the flame rod connection.

To order, specify: 4831-(code for pipe size)-tile length or style (7 for 7", 9 for 9", T for 9" Tapered) Burner Complete.  
 Examples: 4831-0-9 ¾" Burner Complete with 9" Tile  
 4831-0-T ¾" Burner Complete with Tapered 9" Tile  
 4831-0-BO ¾" Burner Only

**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.