

North American Flat Flame™ Gas Burners



4831 Flat Flame™ Gas Burners

- The small diameter flame is ideal for long narrow furnaces
- Excellent uniformity and fuel economy
- Even radiant heating

Product Overview | Flat Flame™

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 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/h HHV 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/h HHV)

Burner designation	air pressure drop across the burner in osi						min. gas pressure①
	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.

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.

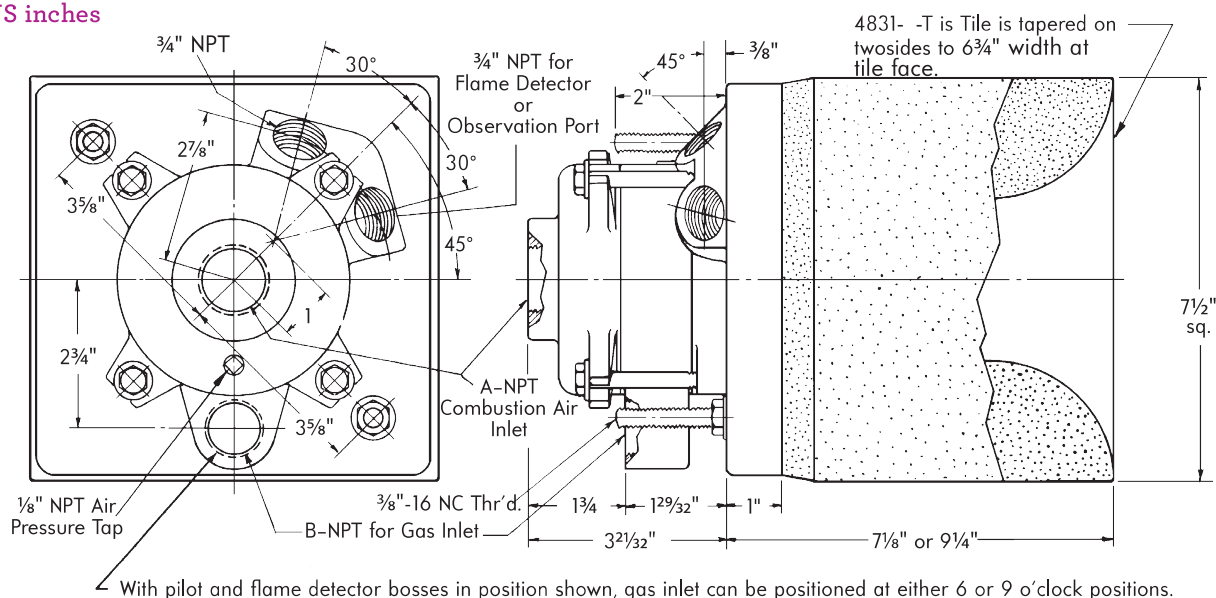
Dimensions | Flat Flame™

Bulletin 4831
Page 3

OPERATING CHARACTERISTICS

Flame description	Burner designation	air pressure drop across the burner in psi					
		1	4	6	8	12	16
Flame diameter, inches ^②	4831-0	③	6	7	7	8	8
	4831-1	③	8	8	9	12	12
Flame length (beyond tile), inches ^②	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 ^④	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

CONTACT

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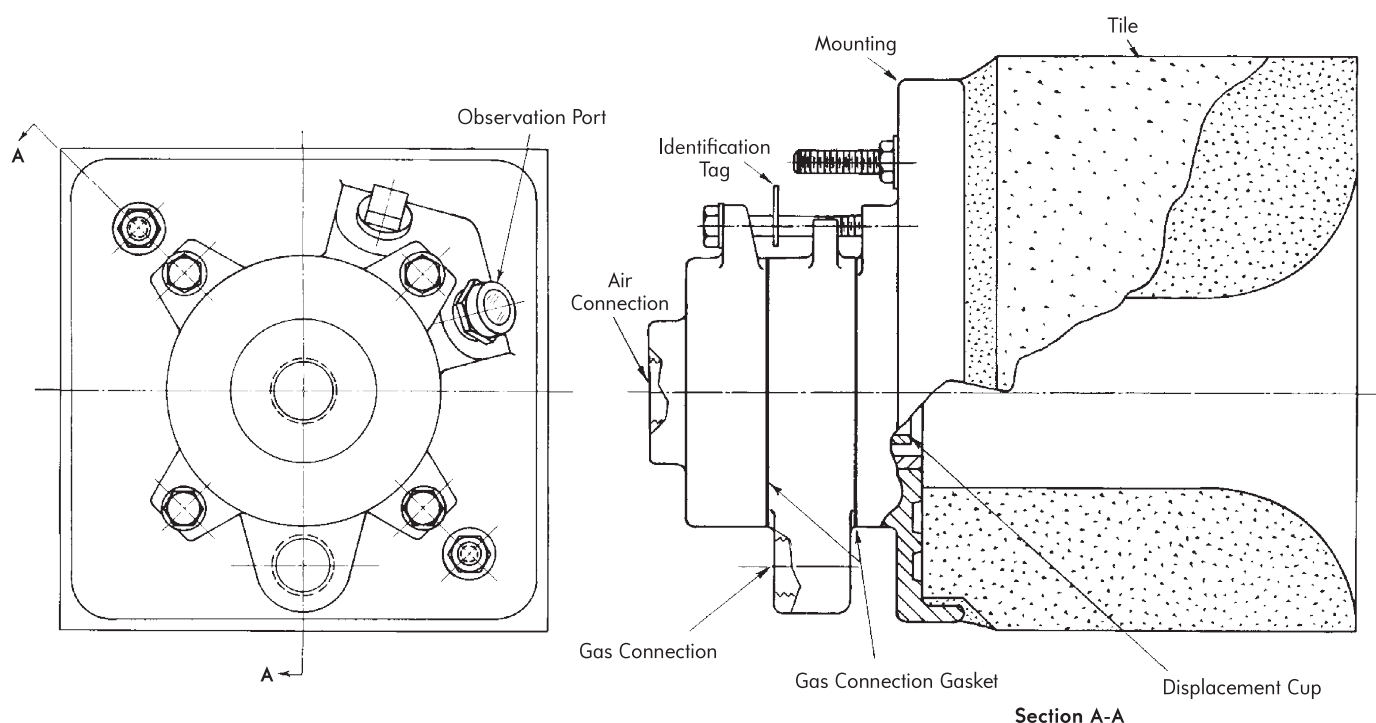
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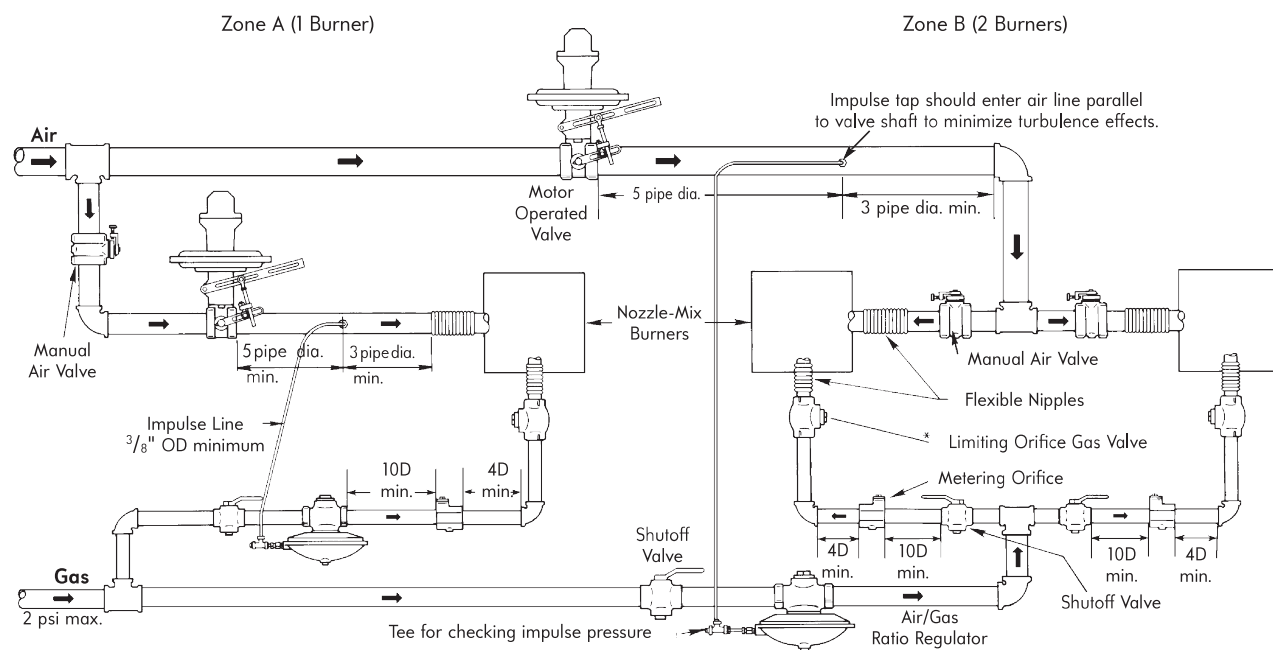
North American Small Flat Flame Burners

Parts List & Instructions 4831



Part Name	Burner designation	
	4831-0	4831-1
Air Connection	OB4-1317-4	OB4-1317-5
Gas Connection	OC4-1316-3	OC4-1316-4
Gas Connection Gasket	OA4-1318-1	OA4-1318-1
Identification Tag	3-1972-1	3-1972-1
Mounting	OD4-1082-1	OD4-1082-1
Observation Port	8790-0	8790-0
Displacement Cup	OA4-1563-1	OA4-1563-1
Tile 7" Long	OB4-1381-1	OB4-1381-1
9" Long	OB4-1381-2	OB4-1381-2
9" Long Tapered	OB4-1574-1	OB4-1574-1

suggested piping



* Limiting orifice gas valves must be mounted as close to the burner as possible.

INSTALLATION

To minimize leaks around tile and to prevent cracking of tile by thermal expansion in the wall, see Supplements DF-M1 (for hard refractory lined furnaces) and DF-M2 (for fiber lined furnaces) for installation recommendations.

LIGHTING AND ADJUSTMENT



Warning: Startup and adjustment of combustion equipment should only be done by trained personnel familiar with combustion technology, combustion equipment, and with the particular burner system, equipment, and controls.

1. Basic:
 - a) All manual and automatic fuel valves (gas and oil) must be closed.
 - b) Open all furnace doors and flue dampers. Lock all burner air valves in full open position.
 - c) Start combustion air blower and check rotation.
 - d) Adjust control motor/air valve linkage(s) for low and high fire.
 - e) Set control motor(s) at high fire allowing furnace to purge for several minutes prior to lighting. Check motor amps with all burners at high fire. If in overload, adjust linkage to reduce the high fire air flow.
 - f) Return the control motor to low fire. Linkage must not bind.
2. Pilots:

Light the pilots in accordance with the pilot instruction sheet.
3. Main Burner:
 - a) Open limiting orifice valve five turns (CCW) from full closed position.
- b) Open gas shutoff valve(s). If burner does not light within a few seconds, close gas shutoff valve and open limiting orifice valve one more turn; then open gas shutoff valve. Repeat purge/ignition attempts as necessary until burner lights.
- c) Slowly open main air valve to high fire position, adjusting limiting orifice valve as necessary.
- d) Return control valve to low fire position. Adjust air/gas ratio regulator for desired flame.
- e) Repeat Steps (c) and (d) if necessary. Replace cover on limiting orifice valve.
- f) For multiple burner zones, approximate limiting orifice valve settings can be made by counting the number of turns open on the first valve.

4. Trouble-shooting:

- a) Gas supply pressure too high or too low (see appropriate regulator literature.)
- b) Impulse pressure too low to ratio regulator--check for dirt in line or connections; check method of connecting impulse line to air pipe (see regulator literature).
- c) Regulator not controlling--check method of connecting impulse line to air pipe; check regulator diaphragms (see regulator literature); if bleeder is used, check orifices for dirt.

Note: Prior to the first, and each subsequent lighting attempt, the main air valve must be fully opened for a period of time sufficient to provide for a minimum of (4) changes of atmosphere in the combustion chamber and flue. Failure to do so can result in the ignition of residual gas from previous lighting attempts, resulting in an uncontrolled fire or explosion and causing property damage and/or personal injury.

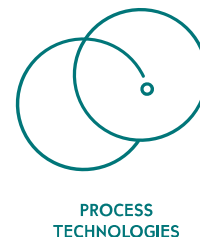
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Industry can do it



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