



- 4 to 40 million Btu/hr
- For applications up to 2600 F
- Combustion air temperature up to 1200 F
- Fuel gases (500 Btu/ft³ or higher)
- Fuel oils #2 through #6
- Sharp, well-defined flames
- Excellent performance with cold or hot air



6821 Hot Air Magna-Flame™ Burners operate with hot air from recuperators or other heat recovery devices to save energy on furnaces, such as steel reheat, aluminum melting, process heaters, and other high temperature applications. Typical operation is with 1000 F air at a pressure of 10"wc.

CONSTRUCTION. Bodies are fabricated heavy-gauge carbon steel and lined with ceramic fiber and castable refractory. Internal parts are heat-resistant alloy and the stabilizing disc is faced with high alumina refractory.

OPERATION. Gas flames are stable in cold, tight combustion chambers even when starting with ambient temperature combustion air. Under these conditions, natural gas flames are semi-luminous. For stoichiometric firing, required natural gas pressure is a minimum 60 percent of the air pressure. Use approximately 4 osi atomizing air for cooling purposes when burning gas.

6821 Burners use 5654 low pressure (cold) air atomizers that require 28 osi air pressure at the atomizer connection. Fuel oil grades #4 and #6 must be heated to reduce viscosity to 100 SSU. Stoichiometric operation requires less than 4 psig oil pressure at the nozzle.

For applications using gas or #2 oil that benefit from high velocity, such as aluminum melters and holders, steel reheat furnaces or others, the 6821 is available in an "R-version". The refractory tile port of the R version is reduced (converging) to produce high hot-gas exit velocities, resulting in increased convective heat transfer and at the

same time entrainment of surrounding furnace gases resulting in low NOx emissions. The R-version is not recommended for heavy oil (grades #4 and #6).

CONTROL. The burner operates with main air pressures from 0.2 to 10"wc. If combustion air temperature varies during normal operation, metered flow control with air temperature compensation is recommended—use North American's 8196 or 8199 Combustion Controllers.

IGNITION and FLAME SUPERVISION. Magna-Flame burners should be pilot ignited ①. Pilot ignition must occur at 1" wc main air pressure or less. Appropriate 4014 gas-boosted pilots are to be used with this burner (sold separately), and are shown on the dimension table. Pilot operation must be interrupted to prevent overheating of the mounting. Self-checking UV scanners (sold separately) are recommended for flame supervision. See Bulletin 8832 for selection of UV adapters. It is possible for a UV scanner mounted on this burner to sight flame(s) of other burners in the same firing chamber. Consult Fives North American for configuration guidance on multiple burner applications.

INSTALLATION. The burner does not include a refractory tile. The shape shown on the dimension drawing (page 2) must be built into the combustion chamber wall. See Supplement DF-M1 for installation recommendations.

COMBUSTION AIR CAPACITY, scfh (for Btu/hr capacity, multiply scfh by 100)

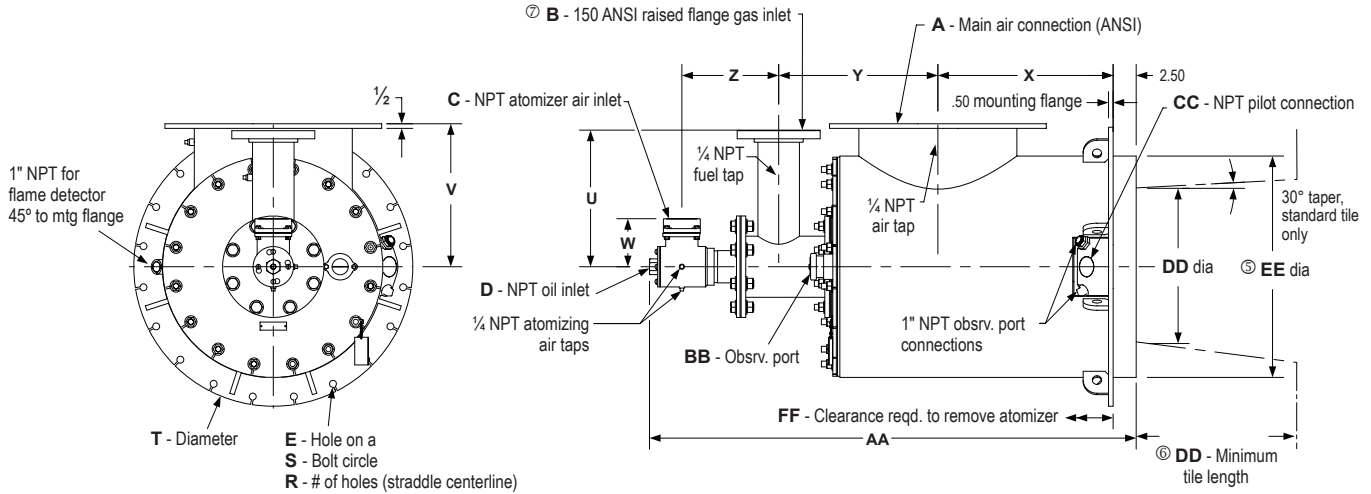
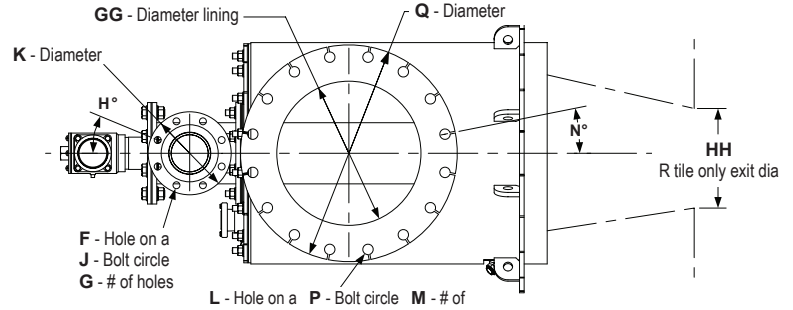
| Standard Tile | Burner Designation Reduced Port Tile | 1000 F Air at 10"wc ΔP | 60 F Air ④ at 10"wc ΔP | Atomizer Designation | Max. Oil Capacity ⑤ (gph) | Atomizing Air, scfh not burning with 28 osi air | Flame Dimensions at 1000 F air ② | |
|---------------|---|---------------------------|---------------------------|-------------------------|---------------------------------|---|-------------------------------------|----------|
| | | | | | | | Length | Diameter |
| 6821-10-A54 | 6821-10-A54R | 40 000 | 67 000 | 5654-4 | 35 | 6 000 | 5' | 2' |
| 6821-10-B54 | 6821-10-B54R | 53 000 | 89 000 | 5654-4 | 35 | 6 000 | 7' | 2' |
| 6821-12-54 | 6821-12-54R | 78 000 | 130 000 | 5654-5 | 60 | 10 700 | 9' | 3' |
| 6821-14-54 | 6821-14-54R | 106 000 | 177 500 | 5654-6 | 100 | 19 700 | 10' | 4' |
| 6821-16-54 | 6821-16-54R | 134 000 | 225 000 | 5654-6 | 100 | 19 700 | 13' | 4' |
| 6821-18-54 | 6821-18-54R | 172 000 | 288 000 | 5654-7 | 200 | 29 000 | 16' | 5' |
| 6821-20-54 | 6821-20-54R | 215 000 | 360 000 | 5654-7 | 200 | 29 000 | 17' | 5' |
| 6821-22-54 | 6821-22-54R | 260 000 | 435 500 | 5654-7 | 200 | 29 000 | 20' | 5' |

① Because of positive pressure in the burners, it is difficult to light with a torch unless the air is turned very low and a strong pressure torch is used.
 ② Add 10% to flame dimensions shown for operation with #6 oil.
 ③ Subtract 10% from flame dimensions shown for reduced port tile "R" version.
 ④ Fuel gas can be increased to match the cold air capacity with no change to burner components however, fuel oil flow is limited as shown in the table above. Consult Fives North American for special atomizer options.

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.

DIMENSIONS in inches

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



DIMENSIONS IN INCHES AND DEGREES

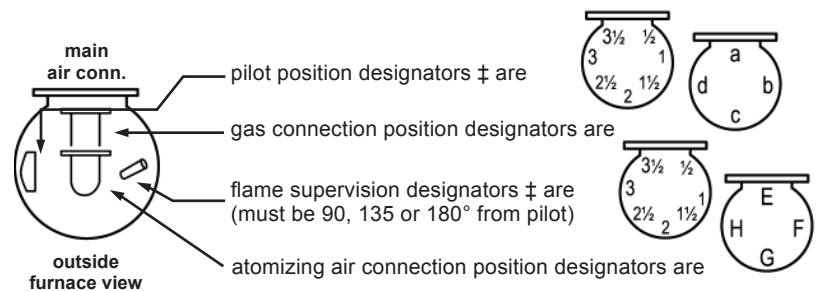
| Burner Designation | A | B ^⑦ | C | D | E | F | G | H° | J | K | L | M | N° | P | Q | R | S | T | U | V |
|--------------------|----|----------------|-----|-----|------|------|---|------|-----|-----|------|----|-------|-------|------|----|------|-------|-------|------|
| 6821-10-A | 10 | 2.5 | 2 | 3/8 | 0.75 | 0.75 | 4 | 45 | 5.5 | 7 | 1 | 12 | 15 | 14.25 | 16 | 16 | 20.5 | 22.25 | 11.75 | 11 |
| 6821-10-B | 10 | 2.5 | 2 | 3/8 | 0.75 | 0.75 | 4 | 45 | 5.5 | 7 | 1 | 12 | 15 | 14.25 | 16 | 16 | 22.5 | 24.25 | 13.75 | 12.5 |
| 6821-12 | 12 | 3 | 2.5 | 3/8 | 0.75 | 0.75 | 4 | 45 | 6 | 7.5 | 1 | 12 | 15 | 17 | 19 | 16 | 24.5 | 26.25 | 14.75 | 13.5 |
| 6821-14 | 14 | 4 | 3 | 3/8 | 0.75 | 0.75 | 8 | 22.5 | 7.5 | 9 | 1.13 | 12 | 15 | 18.75 | 21 | 20 | 26.5 | 28.25 | 14.81 | 14.5 |
| 6821-16 | 16 | 4 | 3 | 3/8 | 0.75 | 0.75 | 8 | 22.5 | 7.5 | 9 | 1.13 | 16 | 11.25 | 21.25 | 23.5 | 20 | 28.5 | 30.25 | 14.81 | 15.5 |
| 6821-18 | 18 | 4 | 4 | 1/2 | 0.88 | 0.75 | 8 | 22.5 | 7.5 | 9 | 1.25 | 16 | 11.25 | 22.75 | 25 | 20 | 30.5 | 32.25 | 14.81 | 16.5 |
| 6821-20 | 20 | 6 | 4 | 1/2 | 0.88 | 0.88 | 8 | 22.5 | 9.5 | 11 | 1.25 | 20 | 9 | 25 | 27.5 | 24 | 32.5 | 34.25 | 15.5 | 17.5 |
| 6821-22 | 22 | 6 | 4 | 1/2 | 0.88 | 0.88 | 8 | 22.5 | 9.5 | 11 | 1.25 | 20 | 9 | 26 | 29.5 | 24 | 34.5 | 36.25 | 15.5 | 18.5 |

DIMENSIONS IN INCHES

| Burner Designation | W | X | Y | Z | AA | BB | CC | DD ^⑥ | EE ^⑤ | FF | GG | HH | Estimated weight, lb | Recommended pilot assy. |
|--------------------|------|-------|-------|------|-------|-----|-----|-----------------|-----------------|-----|-------|-------|----------------------|-------------------------|
| 6821-10-A | 1.75 | 12.25 | 13.06 | 9.5 | 40.19 | 3/4 | 1.5 | 10 | 16 | 72 | 9 | 6.25 | 351 | 4014-2-T |
| 6821-10-B | 1.75 | 15 | 13.94 | 9.5 | 43.81 | 3/4 | 1.5 | 11 | 18 | 79 | 9 | 7 | 451 | 4014-2-T |
| 6821-12 | 2.38 | 17.5 | 15.44 | 10.5 | 49.19 | 3/4 | 2 | 12.5 | 20 | 88 | 11 | 8.5 | 588 | 4014-3-AT |
| 6821-14 | 5.19 | 18.5 | 16.88 | 10.5 | 51.88 | 3/4 | 2 | 14.75 | 22 | 95 | 13.63 | 10 | 727 | 4014-3-AT |
| 6821-16 | 5.19 | 19 | 17.25 | 10.5 | 52.75 | 2 | 2 | 17 | 24 | 99 | 15.63 | 11.25 | 807 | 4014-3-AT |
| 6821-18 | 7.88 | 19.5 | 18.88 | 15.5 | 60.56 | 2 | 2 | 19.25 | 26 | 112 | 17.63 | 12.75 | 950 | 4014-3-BT |
| 6821-20 | 7.88 | 20.5 | 21.25 | 15.5 | 61.44 | 2 | 2 | 21.5 | 28 | 116 | 19.63 | 14.25 | 1045 | 4014-3-BT |
| 6821-22 | 7.88 | 21.5 | 23.13 | 15.5 | 66.81 | 2 | 2 | 24 | 30 | 120 | 21.63 | 15.75 | 1183 | 4014-3-BT |

- ⑤ Furnace opening should be 1/2" larger than dimension EE for 10A thru 14 and 3/4" larger than dimension EE for 16 thru 22.
- ⑥ Whenever the tile length is greater than DD x 1.2, the tile beyond DD should flare out at a 30° angle (60° included angle).
- ⑦ Flat face companion flange available upon request.

Arrangement Designators are specified relative to the main air connection at 12 o'clock and should be listed for **pilot, gas, flame supervision and atomizing air in that order.**



‡ Good practice dictates that neither the pilot nor the flame detector be below the centerline of a horizontally-mounted burner.

ORDER MUST SPECIFY: (1) Burner designation (such as 6821-16-54); (2) Arrangement designation for pilot, gas connection, flame safety and atomizing air connection positions in that order such as 6821-16-54, arrangement 3a1E (for the arrangement shown above).