



RAF RETAIN-A-FLAME GAS BURNER NOZZLES



 **WARNING**

These instructions are intended for use only by experienced, qualified combustion start-up personnel.

Adjustment of this equipment and its components, by unqualified personnel, can result in fire, explosion, severe personal injury, or even death.

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These instructions are intended to serve as guidelines covering the installation, operation, and maintenance of Hauck equipment. While every attempt has been made to ensure completeness, unforeseen or unspecified applications, details, and variations may preclude covering every possible contingency. **WARNING: TO PREVENT THE POSSIBILITY OF SERIOUS BODILY INJURY, DO NOT USE OR OPERATE ANY EQUIPMENT OR COMPONENT WITH ANY PARTS REMOVED OR ANY PARTS NOT APPROVED BY THE MANUFACTURER.** Should further information be required or desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, contact Hauck Mfg. Co.



WARNING

This equipment is potentially dangerous with the possibility of serious personal injury and property damage. Hauck Manufacturing Company recommends the use of flame supervisory equipment and fuel safety shutoff valves. Furthermore, Hauck urges rigid adherence to National Fire Protection Association (NFPA) standards and insurance underwriter's requirements. Operation and regular preventative maintenance of this equipment should be performed only by properly trained and qualified personnel. Annual review and upgrading of safety equipment is recommended.

A. GENERAL INFORMATION

Hauck Retain-A-Flame Burner Nozzles are recommended for blast firing of gas-air mixtures where a small amount of excess air induced around the nozzle is allowable. These nozzles will retain the flame at their tips under usual operating conditions. The nozzle design permits a wider range of mixture pressures without blowing the flame off the burner tip or backfiring; little turbulence is caused in the main stream of gas mixture, with a resulting long, cylinder flame of good stability. Combustion is quieter than with usual nozzles of this class.

B. RECEIVING AND INSPECTION

Upon receipt, check each item on the bill of lading and/or invoice to determine that all equipment has been received. A careful examination of all parts should be made to ascertain if there has been any damage in shipment.

IMPORTANT

If the installation is delayed and the equipment is stored outside, provide adequate protection as dictated by climate and period of exposure. Special care should be given to all motors and bearings, if applicable, to protect them from rain or excessive moisture.

C. CAPACITIES

Nozzle Size	Pipe Size NPT (See Note 3)	Discharge Area (In²)	Capacity @ 6"wc Mixture Press. (1000 Btu/hr)
05	1/2	.11	40
07	3/4	.18	65
10	1	.27	100
12	1 1/4	.7	250
15	1 1/2	1.1	390
20	2	1.8	670
30	3	2.8	1000
40	4	5.2	2000

NOTES:

1. Capacities based on 80% combustion air in the mixture, natural gas with HHV of 1000 Btu/ft³, 0.60 S.G. and stoichiometric air/gas ratio of 10:1 with nozzle firing under no backpressure.
2. Nozzle will ignite with as little as 50% combustion air in the mixture, however, the remaining air must be induced.
3. Nozzle sizes 20, 30, and 40 are also available with a square flanged connection; flanged to NPT adapters are also available.

Table 1. Capacities

D. DIMENSIONS

Nozzle No.	Dimensions (Inches)				
	Pipe Size NPT	B	C	D	E
RFS 1105A	1/2	1 3/4	5/16	1 1/2	1 1/2*
RFS 1107A	3/4	1 3/4	7/16	1 1/2	1 1/2*
RFS 1110A	1	2 1/8	9/16	1 7/8	1 5/8
RFS 1112A	1 1/4	2 3/8	7/8	2 1/2	2 3/16
RFS 1115A	1 1/2	2 7/8	1 1/8	3 1/8	2 11/16
RFS 1120A	2	3 7/8	1 1/2	3 7/8	3 3/8
RFS 1130A	3	4 5/8	1 7/8	4 5/8	4 1/4
RFS 1140A	4	5 1/2	2 9/16	5 1/2	5 1/8

Note: *Nozzles for 1105A and 1107A are round.

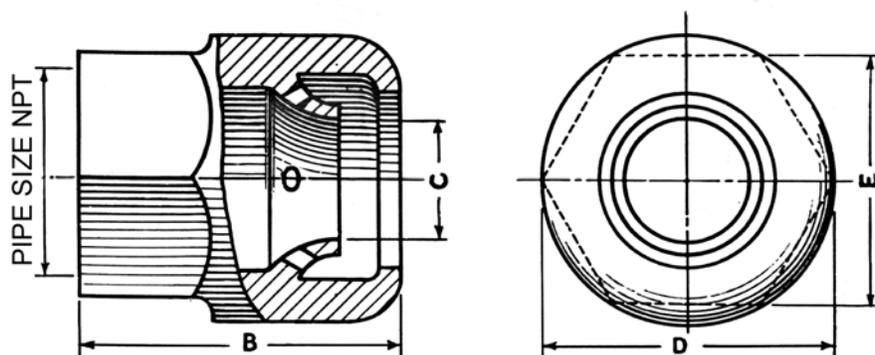
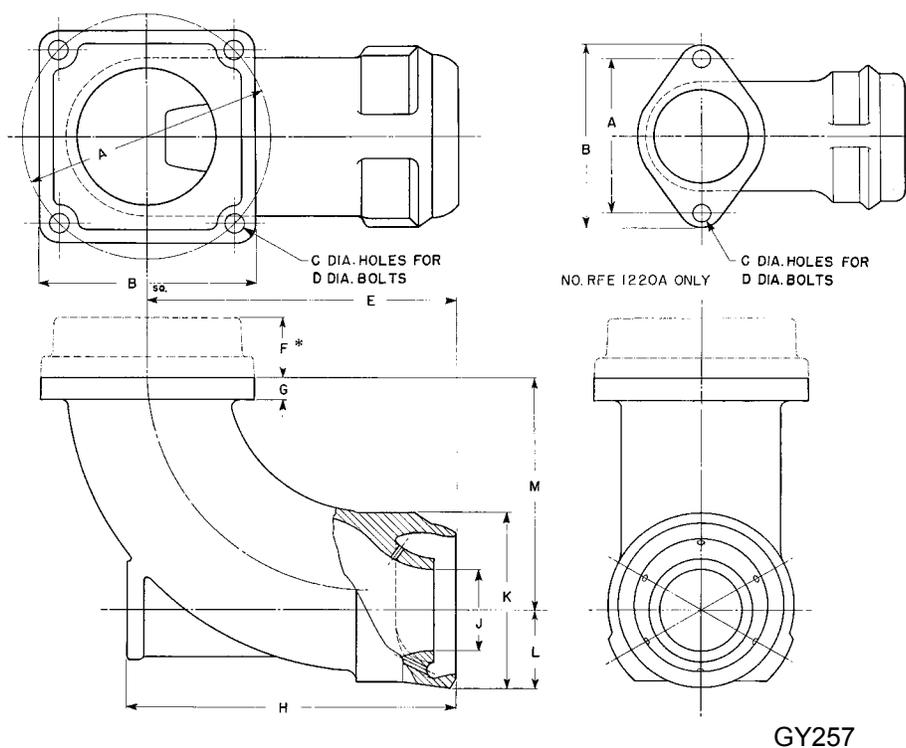


Figure 1. Dimensions - Series 1100 Retain-A-Flame Straight Nozzles

D. DIMENSIONS (Continued)

Nozzle No.	Dimensions (Inches)											
	A	B	C	D	E	F*	G	H	J	K	L	M
RFE 1220A	3 ⁹ / ₁₆	4 ³ / ₁₆	1 ¹ / ₃₂	5/16	4 ⁵ / ₈	1 ³ / ₁₆	7/16	5 ⁵ / ₁₆	1 1/2	3 ³ / ₁₆	1 1/2	3 ³ / ₈
RFE 1230A	5 ⁵ / ₈	4 ⁷ / ₈	7/16	3/8	7	1 ⁵ / ₁₆	7/16	7 1/2	1 ⁷ / ₈	4	1 ²⁵ / ₃₂	5 ¹ / ₄
RFE 1240A	6 ³ / ₈	5 1/2	7/16	3/8	8	1 1/2	1/2	8 ⁷ / ₁₆	2 ⁹ / ₁₆	5 ⁹ / ₁₆	2 ⁵ / ₈	6

Note: * Flange to threaded adapters available.



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Figure 2. Dimensions - Series 1200 Retain-A-Flame Flanged Elbow Nozzles

E. INSTALLATION

1. Secure the nozzle to the inspirator, booster, mixer, or mixture piping as required. The threaded nozzles are designed with female connections and may require a threaded connector. The flanged nozzles are designed to be held firmly in place by 4 bolts, one in each corner of the flange.

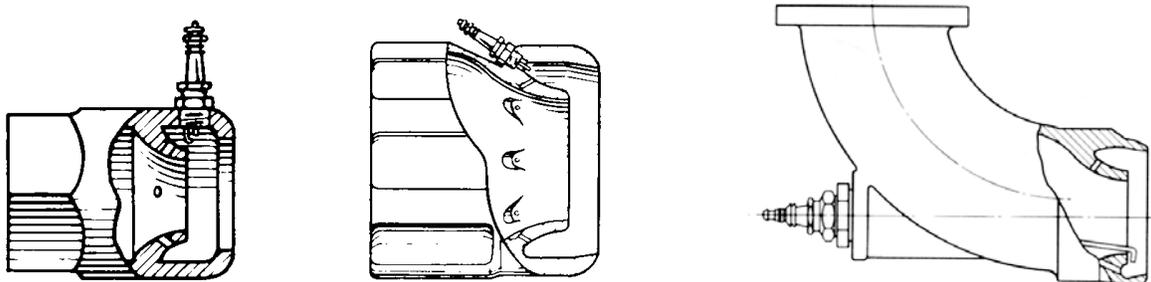


Figure 3. Spark Plug Ignition of Straight And Elbow Nozzles

2. All straight, and elbow nozzles can be ordered with a spark plug ignition system. When so equipped, the following applies:
 - A. Ensure that the spark plug is properly seated in the nozzle.
 - B. Connect the spark plug to a spark transformer with a high voltage lead wire.
 - C. Equip the transformer with a momentary pushbutton.

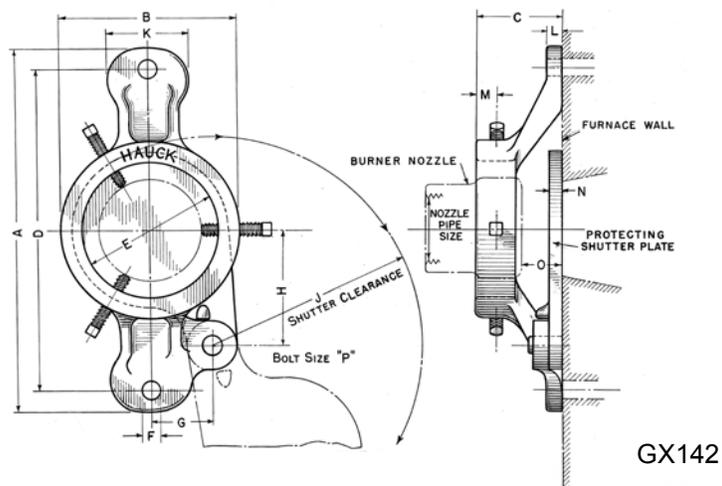


Figure 4. Mounting Bracket BMB 2253A – BMB 2255A

3. Furnace wall mounting brackets are available to mount; all manually ignited straight and elbow nozzles, all spark ignited elbow nozzles, and spark ignited straight nozzles in the 2" to 4" range.
 - A. Securely fasten the mounting bracket to the furnace wall. Be sure to maintain a proper Alignment between the openings in the bracket, the wall, and the refractory burner block (if used).

- B. Supply the proper external support for all piping and equipment preceding the nozzle. The bracket is designed to properly position and support the nozzle only.
- C. Center the nozzle orifice in the bracket opening and tighten the 3 retaining screws.
- D. **Prior to ignition, open the protective shutter plate** (present on mounting brackets).



WARNING

Adjustment of this equipment, by unqualified personnel, can result in fire, explosion, severe personal injury, or even death.

E. OPERATION

All Retain-A-Flame nozzles may be ignited manually and, if properly equipped by a spark plug ignition system. **Prior to ignition, ensure that the protecting shutter plate (if present) is in the full open position.**

When the nozzle is not in use, maintain the protecting shutter plate (if present) in the fully closed position. This will provide maximum heat protection for the nozzle assembly.

CAUTION

A flash-back can cause not only serious damage to equipment but also severe personal injury, or even death.

"Flash-back" occurs when a flame front moves back through the burner nozzle, and possibly back to the mixing point. It occurs when the flame velocity exceeds the mixture velocity through the burner nozzle. As a rule of thumb, to prevent an occurrence of flash-back the mixture pressure must exceed the following:

- A. .20 "wc for propane
- B. .25 "wc for natural gas
- C. .40 "wc for manufactured gas

However, an uneven distribution of the gas/air mixture through the nozzle, and oversized nozzle, or an obstruction can cause a flash-back to occur when the pressure is greater than that stated above.

If a flash-back occurs, immediately stop the flow of gas through the mixer/burner system. If necessary, allow the mixer, mixture piping and/or the nozzle to completely cool before attempting to reignite the burner. If the flash-back occurred with mixture pressures greater than those indicated above, inspect the nozzle and remove any obstructions or residue build-up. If the conditions persist, it may be due to the piping configuration or the nozzle being used- Consult Hauck for recommendations.

F. MAINTENANCE

These nozzles are constructed of heat resisting cast iron, properly proportioned to withstand severe operating conditions. In addition, they are accurately machined to secure the proper flame and ignition characteristics. Under normal conditions and temperatures no service should be necessary.