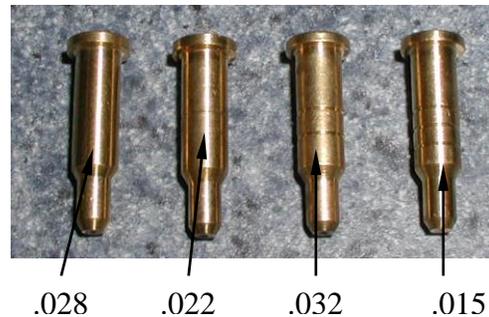




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FUEL INJECTION NOZZLES

- 1-9. Fuel injection nozzles for each cylinder are of the air bled type. This type of nozzle uses the pressure differential between ambient and manifold pressure to draw air into the nozzle mixing chamber and spray an atomized fuel-air charge at the intake valve. Each nozzle incorporates a calibrated fuel restrictor (jet), the size of which is determined by; 1) the fuel pressure available at maximum horse power, 2) the total fuel flow required at maximum horsepower, and 3) the number of injector nozzles used on the engine. The fuel restrictors are calibrated to flow alike within plus or minus 1%. The nozzles are interchangeable between engine and cylinders, assuming the restrictors are the same size. There are four standard sizes of restrictors. .015 designated by three bands machined on the restrictor, .022; designated by one machined band on the restrictor, .028, designated by no (smooth) band on the restrictor and .032, designated by two bands machined on the restrictor. Special restrictors are made to tune individual cylinder EGT. These are designated by the size of the restrictor or a + % or - % showing the amount the restrictor is rich or lean from the standard calibration.



Restrictor marked with size

NATURALLY ASPIRATED INJECTOR NOZZLE

3-33. Naturally aspirated injector nozzles are identified by the gold anodized shield around the nozzle body. Each nozzle has a calibrated fuel restrictor that slips into the body of the nozzle. These are identified by machined bands on the body of the restrictor.

| <u>BAND</u> | <u>SIZE</u> |
|-------------|-------------|
| None | .028 |
| 1 | .022 |
| 2 | .032 |
| 3 | .015 |



Do not mix restrictor sizes on the same engine. To install the nozzle body; remove the restrictor and apply a **small** amount of anti-seize compound to the pipe threads on the body. Install the nozzle with a clean 1/2" deep socket (a 1/4" drive, 6 point deep socket works well) to tighten the nozzle.



Make sure the hex is broached far enough into the socket so it will not damage the nozzle shield. Torque the nozzle body to 40 to 60 inch pounds. If the nozzle will be installed in any position other than vertical (discharge end down), tighten the nozzle to 40 inch pounds first then check for the position of the "A" stamped on one of the hex flats on the body of the nozzle. Continue to tighten the nozzle until the "A" points downward within a tolerance of one flat of the hex of the nozzle body. Do not exceed the maximum nozzle torque value when positioning the "A". This will position the air bleed hole in the body of the nozzle to face upward, and tend to keep fuel from dripping out the air bleed hole after engine shut down. Reinstall the fuel restrictor into the nozzle body before attaching the nozzle line.

TURBO INJECTOR NOZZLES

3-34 These nozzles are on engines using turbo or superchargers. They are also used on naturally aspirated engines where the position of the installed nozzle will be up side down (the discharge end of the nozzle is higher than the air bleed hole on the nozzle body). This is typical for Lycoming engines where the nozzles are installed in the primer ports. You may also choose to use these nozzles if the environment where the engine will be running is extremely dirty.

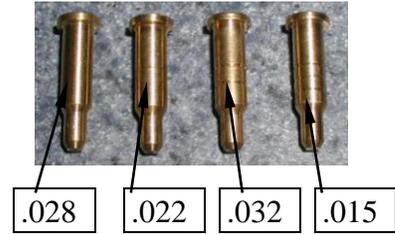


These nozzles have a shroud, which uses two O-Rings to seal the air bleed section of the nozzle. There is a 3/16" diameter stainless steel tube brazed to the shroud for attachment of a 3/16" hose.

NOTE:
Band Markings Designate API Stock Restrictor Size Only. Does not apply to other manufacture's parts.

Each nozzle has a calibrated fuel restrictor that slips into the body of the nozzle. These are identified by machined bands on the body of the restrictor.

| <u>BAND</u> | <u>SIZE</u> |
|-------------|-------------|
| None | .028 |
| 1 | .022 |
| 2 | .032 |
| 3 | .015 |



Do not mix restrictor sizes on the same engine. To install the nozzle body; remove the restrictor and apply a small amount of anti-seize compound to the pipe threads on the body. Install the nozzle body into the injector nozzle port on the engine. Use a clean 1/2" deep socket (a 1/4" drive, 6 point deep socket works well) to tighten the nozzle. Torque the nozzle body to 40 to 60 inch pounds. The B-nut of the nozzle line will hold the spring and retainers in place. Be sure the nozzle restrictor is in place before connecting the nozzle line.



Refer to Appendix 'F' for nozzle Bleed Air Rail installation.

- 3-35. The shrouds of all the nozzles must be connected to in a way to vent the nozzle. A bleed air rail can be constructed to connect the nozzles on one side of the engine. This is typically built using 3/8" diameter stainless tubing for the rail between the nozzles, and 3/16" stainless tubing stubs silver soldered to the rail. Connect the stubs to the shroud tubes with short pieces of 3/16" hose. Clamp securely. If the installation uses a turbo or supercharger, the bleed air rails will be connected to the bleed air shuttle valve, or the turbo discharge. If the engine is naturally aspirated, connect hoses to the bleed air rail to vent them overboard or to the air box. Air will be drawn through the air bleed system when the engine is running so protect the system from picking up dirt. Naturally aspirated engines can also vent turbo nozzles by running individual 3/16" hoses from each nozzle. Run these hoses overboard or connect all the 3/16" hoses to one 3/8" hose and run it overboard. Do not connect more than six nozzles to one 3/8" hose. After engine shut down, some fuel may drip from the bleed air hoses.

NOZZLE CLEANING INSTRUCTIONS

- 6-8. The following procedure is approved for cleaning Airflow Performance injector nozzles.
1. Remove the nozzle from the engine using a clean 1/2" six point 1/4" drive deep socket.
 2. Remove the fuel restrictor from the injector nozzle body.
 3. Submerge all the nozzle parts in non etching parts cleaner, Acetone, MEK, or Hoppes Number 9 gun cleaning fluid. Use the submersion time prescribed by the cleaner manufacture for cleaning the parts.

SOME CLEANERS WILL ETCH THE NOZZLE MATERIAL. PROLONGED SUBMERSION IN THESE TYPES OF CLEANERS WILL RUIN THE NOZZLE BODY AND FUEL RESTRICTOR.

4. Sonic cleaning is also an acceptable method of cleaning injector nozzles. Use approved solvent in the sonic cleaner. Follow the manufactures recommendations for cleaning time.

WARNING

DO NOT INSERT WIRE OR ANY SHARP OBJECTS INTO THE NOZZLE ORIFICES.

5. Remove from the solvent, rinse and blow dry.
6. Reinstall the injection nozzle in the engine as described.

INSTALLING THE NOZZLE LINE

Torque the nozzle line B-nut to 20-25 inch pounds or seat the B-nut finger tight then tighten the B-nut an additional one-half flat.

WARNING

Over torquing the B-nut will fail the fuel restrictor.