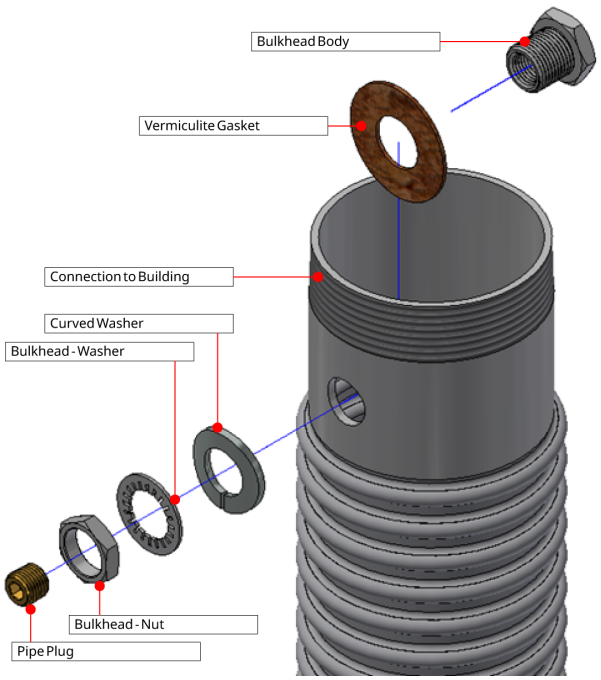
Procedure to Measure Back Pressure on Engine Turbo

Per NFPA 25, paragraph 8.1.1.2.14: Back pressure on the engine turbos shall be measured annually.

To accurately measure engine exhaust back pressure in a diesel fire pump driver with or without a turbocharger, modify the engine's flexible exhaust pipe by adding a test port such that a handheld test pressure gauge can be installed and measurements observed. The modification to the flexible exhaust pipe involves purchasing **Clarke exhaust back pressure port kit part number 0C062252** and following these steps:

1. Identify and mark the side of the flexible exhaust pipe where connection will be made to test gauge. It is suggested that this be the side of the engine that faces the instrument control panel, or the front of engine opposite the fire pump. Ideally the connection should not be above the driveline or the battery side of the engine.
2. Remove the flexible exhaust pipe from the engine and building's exhaust plumbing. Ensure no foreign debris falls into the engine exhaust, by temporarily covering with masking tape, shop rag, etc.
3. Take the flexible exhaust pipe to a suitable work area where it can be modified.
4. Drill a hole thru the wall of the flexible exhaust pipe, just prior to the building connection end (usually a flange mount or NPT pipe thread). The diameter of the hole should be just large enough to clearance the ¾" outer diameter bulkhead fitting 0C12B255. Do not enlarge the hole any greater than that.
5. De-burr the sharp edge and any metal shavings from inside and outside of the drilled hole.
6. Install vermiculite gasket part number 0C12E744 onto threaded brass bulkhead.
7. Install threaded brass bulkhead fitting part number 0C12B255 from the inside of the flexible exhaust pipe thru the drilled hole, with the threads on the exterior. The vermiculite gasket will be on the interior of the flexible exhaust pipe.
8. Install curved lock washer part number 0C12E743 facing gasket and contouring the flexible exhaust pipe.
9. Install internal toothed lock washer and hex nut onto bulkhead fitting and tighten, sealing the gasket to the outside of the flexible exhaust pipe.
10. Install ¼ NPT pipe plug part number 00C12496 into bulkhead fitting when test port is not being used.
11. Remove engine's temporary exhaust masking and re-install flexible exhaust pipe onto engine and building's exhaust plumbing, ensuring no foreign debris falls into the engine exhaust.

Use **Clarke exhaust back pressure gauge kit part number 0C062254** for obtaining pressure measurements. If this pressure gauge kit is not sourced from Clarke, the pressure gauge used for this measurement can be analog or digital and should have a readout for units of "inches of water column" or "kilopascals (kPa)". It should be sized for a maximum pressure range of approximately 50 to 60 inches of water column (12.5 to 15 kPa) and have a display accuracy of +/-2.5% or better. The pressure gauge should be connected to the exhaust piping via a high temperature hose of several feet in length to protect it from being damaged by the hot exhaust gas, as well as keeping the operator a safe distance away from the hot piping.



Remove the ¼ NPT pipe plug from the exhaust test port and install the pressure gauge and flexible hose. The pressure measurement should be taken when operating the engine at pump nameplate horsepower and at normal operating temperature. Ensure that the gauge's pressure reading is under the limit of the exhaust back pressure criteria found on page 2 of the engine's Installation & Operation (I&O) Data Sheet. If back pressure measurement exceeds the published limits, check for any restrictions within the exhaust piping. If no restrictions are found and the back pressure is still excessive, then the diameter of the exhaust piping may have to increase or number of elbows be reduced in effort to reduce back pressure. Upon completion of pressure measurement, remove gauge and hose from flexible exhaust pipe test port and re-install ¼ NPT pipe plug.

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