FOREWORD

This manual contains instructions on the overhaul, maintenance, and operation of the basic General Motors 3, 4 and 6 cylinder Series 71, 71E and 71T Diesel Engines.

Full benefit of the long life and dependability built into these engines can be realized through proper operation and maintenance. Of equal importance is the use of proper procedures during engine overhaul.

Personnel responsible for engine operation and maintenance should study the sections of the manual pertaining to their particular duties. Similarly, before beginning a repair or overhaul job the mechanic should read the manual carefully to familiarize himself with the parts or sub-assemblies of the engine with which he will be concerned.
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Fig. 3 - Liquid Cooling Around Valves and Injector in Cylinder Head

However, current four valve heads do incorporate the injector tubes and seal rings as used in the two valve head. Use of the injector tube in current four valve heads has necessitated relocation of the injector locating dowel hole in both the cylinder head and injector body.

The exhaust passages from the exhaust valves of each cylinder lead through a single port to the exhaust manifold. The exhaust passages and injector tubes (where used) are completely surrounded by water (Fig. 3).

In addition to being surrounded by water, cooling of these areas is further assured by the use of nozzles pressed into the water inlet ports of the head (Figs. 4 and 5). Nozzle holes are so positioned in the cylinder head that the comparatively cool water which enters the head is directed at high velocity against the sections of the head which are subjected to the greatest heat.

Two double-jet spray nozzles are located between each pair of cylinders and two single-jet spray nozzles are installed at each end of the cylinder head.

The fuel inlet and outlet manifolds are cast as an integral part of the current cast iron cylinder heads. The integral fuel manifolds permit a greater degree of flexibility in the installation of fuel lines since an inlet and outlet passage is provided in the side of the cylinder head opposite each cylinder position. On aluminum and former cast iron cylinder heads, separate fuel manifolds are attached to the side of the head and locked in position by the fuel pipe connectors which set in the tapered seats of the manifold "T" connectors.

To seal compression between the cylinder head and the cylinder block, separate laminated metal gaskets are provided at each cylinder (Fig. 6). Water passages between the block and head are sealed with seal rings which fit into counterbored holes in the block. Similar individual seal rings are used to seal the oil passages between the head and block.

A long, endless synthetic rubber seal fits in a rectangular milled groove near the outer perimeter of the block. When the cylinder head is pulled down, a positive leak-proof metal-to-metal contact is assured between the head and block.

Certain service operations on the engine require the removal of the cylinder head. These operations are:

1. Removing and installing the pistons.
2. Removing and installing the cylinder liners.
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c. Insert nozzle ring in housing. Ring will slide into housing with very little force.
d. Allow nozzle ring to come up to room temperature before tightening nuts securely.

25. Stand turbocharger in upright position and remove pilot J 6756 from turbine wheel shaft.

26. Coat outer periphery of blower end oil seal (173) with a non-hardening, heat resisting sealing compound. Assemble thrust collar (187) to blower end oil seal (173), see Fig. 21, and start collar and seal over shaft and into position in intermediate housing. Make sure scribe and punch marks, previously made on seal and housing, see step 5, are aligned to ensure correct sealing. Tap seal uniformly into place with soft hammer.

27. Rotate turbine wheel until keyway in shaft is in up position; then attach tool J 6750-2 again to nozzle ring to prevent turbine wheel from turning.

28. Place key (190) in keyway of shaft, marked side up, and slide impeller (188) onto shaft with keyway in line with key.

29. Install nose piece (189) against impeller, aligning punch and scribe mark of nose piece with that on impeller.

30. Secure impeller with elastic stop nut (191). Draw nut tight until punch and scribe marks on nut register with those on impeller and nose piece. These parts are dynamically balanced and marked at time of initial assembly.

31. Remove tool J 6750-2, and turn turbine wheel by hand to be assured it rotates freely.

32. Install remaining bolts (165); tighten securely and install lock wire.

33. Install remaining nozzle ring lock washers and nuts (156), and tighten.

34. Insert feeler ribbon between nozzle ring (154) and radial vanes of wheel to check clearance. See Fig. 14.

Clearance should be from .025” to .045”. When checking for minimum clearance, force wheel in direction of exhaust housing by pushing against impeller. Force wheel in opposite direction when checking for maximum clearance. If clearance is less than minimum allowable, it will be necessary to add required shims (153) under nozzle ring.
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