M.I. 1759 *Rev. D

Maintenance Instruction

Service Department

ELECTRO-MOTIVE

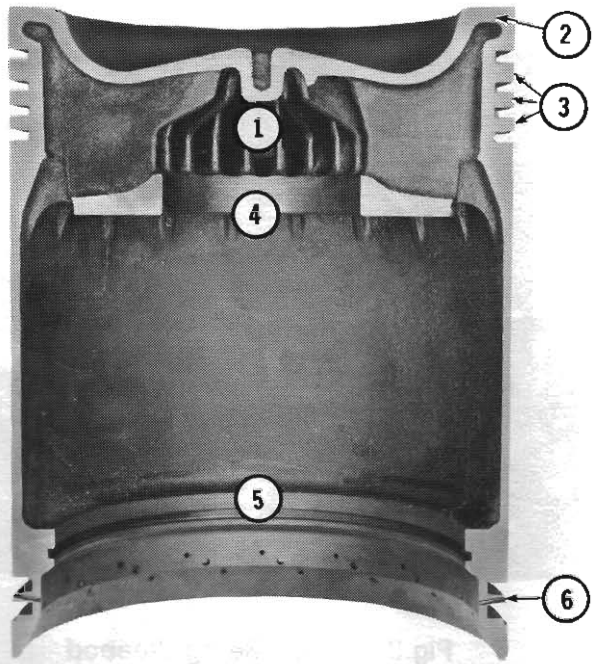
REMOVAL OF UNDERCROWN DEPOSITS FROM ENGINE PISTONS

DESCRIPTION

The full floating pistons used in EMD diesel engines are efficiently cooled during operation by means of lubricating oil. This oil comes from the piston cooling oil pipe which directs the oil through a hole in the piston carrier to the underside of the piston crown. After providing the necessary piston cooling, as well as thrust washer and piston pin lubrication, this oil then drains to the engine oil pan. The flow or circulation of oil through the piston is continuous.

During normal operation, there is often a tendency for carbon deposits to form inside the piston, Fig. 1, in the cooling fin and crown rim areas. If allowed to accumulate, such deposits reduce piston cooling efficiency by preventing the necessary heat transfer to the cooling oil. The resulting temperatures at the crown rim and number one compression ring areas might then be such as to cause cracking in top ring groove. It is therefore recommended that any time pistons are removed from an engine, they be thoroughly cleaned to remove any undercrown deposits that may have formed.

Two steps are recommended for the complete cleaning of pistons. The first step is to follow the conventional method using solutions. However, this treatment will not remove all deposits from the underside of the crown in the center and crown rim areas. A second step is therefore recommended which involves the use of a sand or grit blasting method to remove the hardened undercrown deposits. A suitable fixture for such cleaning is shown in Figs. 2 and 3 and may be constructed from information available in Maintenance Facility Drawing File No. 417. This print may be obtained by request to your Electro-Motive District Representative or regional office. Overseas customers should direct their request to the Service Dept., Electro-Motive Division, General Motors Corporation, La Grange, Illinois 60525.



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1. Puller Hole Boss
2. Crown Rim
3. Compression Ring Lands
4. Upper Pilot
5. Lower Pilot
6. Oil Ring Land

Fig.1 – Piston Cross-Section

*This bulletin is revised and supersedes previous issues of this number.
Areas of change are indicated by vertical bars.

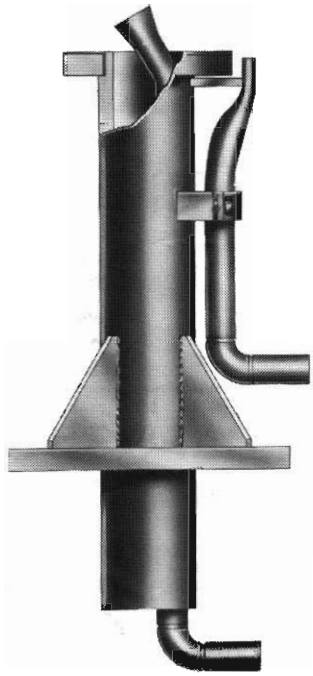

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Fig.2 – Sand Blasting Fixture

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Fig.3 – Piston Being Cleaned

Correct use of this fixture will ensure satisfactory removal of the undercrown deposits without damage to the pistons.

The amount of sand or grit blasting material required depends to a great extent on the grade and type used as well as the thickness of deposit to be removed. When first starting the cleaning program, it is recommended that a few scrap pistons be cleaned, then cut in half in order that the effectiveness of the cleaning operation may be observed. The blasting interval can then be adjusted to the minimum time required to completely remove the deposits.

CLEANING PROCEDURE

For best results, it is recommended that the cleaning procedure outlined below is followed.

1. Clean pistons in a suitable solution.

CAUTION

Do not use a caustic cleaner if tin is not intended to be removed.

2. Remove from cleaning solution and allow to dry for 2 to 4 hours.

3. Apply rubber gasket on top of fixture to protect the piston platform from damage.

4. Place piston on fixture and apply turning handle to threaded piston pulling hole.

5. Securely clamp air supply hoses to fixture since any leakage at this point may damage the finish on the piston skirt.

6. Using fine sharp sand or light grit, commence the blasting operation. Rotate piston at a rate of one turn every 10 seconds.

7. After about 30 seconds of blasting (or to the extent indicated by experience) stop blasting and remove the piston from fixture.

8. Place piston in liquid cleaning solution as outlined in Step 1. Remove piston from solution and spray rinse with clean hot water.

9. Blow piston dry with compressed air and carefully inspect to make sure all traces of the cleaning material have been removed.

10. Replate with tin or reapply phosphate treatment (following procedure outlined in Maintenance Instruction 1758) as needed. Make sure piston is protected from rusting if it is to be stored for any length of time.