TO: Service Locations
FROM: Technical Support Development
SUBJECT: MBE 4000 Coolant Leaks

ISSUE
MBE 4000 engines may exhibit a high mileage concern of coolant leakage around the cylinder liner.

CAUSE
The current stainless steel shim installed between the cylinder liner and cylinder block counterbore area cannot adequately seal out coolant in this area. The coolant acts as a lubricant, causing movement between the cylinder liner and cylinder block and subsequent wear in the counterbore area. Coolant will then leak past the counterbore area. See below for pictures showing the affected areas.

Figure 1 – Leakage in the Counterbore Area
Figure 2 – Leakage on the Shim

Figure 3 – Leakage on the Liner Flange
REQUIRED ACTION

To seal the counterbore area from coolant and prevent liner movement, Detroit Diesel has released a new cylinder liner design which uses an additional rubber D-ring just below the liner flange to seal against the coolant. See Figure 4.

Figure 4 – New Design Cylinder Liner and D-ring Seal

New cylinder block service procedures have been prepared to repair existing blocks. The procedure involves the following:

- Cutting the failed cylinder block counterbores to leave a full contact area for the shim and liner flange.
- Installation of a new design cylinder liner with an additional D-ring seal in all cylinder positions.

REQUIRED MATERIAL

Table 1 provides a list of the new service kit and individual part numbers. The liner kits contain the new liner, new 0.15 mm standard shim, new sealing D-ring, the two existing liner bottom o-rings, and the scraper ring (EPA04 only). The new 0.15 mm standard shim and sealing D-ring are also listed separately, as are thicker shims if the depth of the freshly cut counterbores require them to reach the correct cylinder liner protrusion specifications. Since the liners are being replaced, the piston rings must also be replaced, and the applicable ring kits are listed for your convenience.
<table>
<thead>
<tr>
<th>New Part Number</th>
<th>Former Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4600102050</td>
<td>A4600110610</td>
<td>EPA04 and EPA07 EGR Cylinder Liner Kit</td>
</tr>
<tr>
<td>A4600101950</td>
<td>A4600110210</td>
<td>EPA98 Non-EGR Cylinder Liner Kit</td>
</tr>
<tr>
<td>A4609970045</td>
<td>NA</td>
<td>Cylinder Liner D-Ring – Contained In New Liner Kits</td>
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<td>A4600110159</td>
<td>A4570110259</td>
<td>Cylinder Liner Shim (0.15 mm) – Contained In New Liner Kits</td>
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<td>A4600110359</td>
<td>A4570110459</td>
<td>Cylinder Liner Shim (0.3 mm) – As Needed</td>
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<tr>
<td>A4600110459</td>
<td>A4570110559</td>
<td>Cylinder Liner Shim (0.5 mm) – As Needed</td>
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<td>NA, use former</td>
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<td>EPA07 EGR Piston Ring Kit</td>
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<tr>
<td>NA, use former</td>
<td>A4600300324</td>
<td>EPA04 EGR Piston Ring Kit</td>
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<tr>
<td>NA, use former</td>
<td>A4600300124</td>
<td>EPA98 non-EGR Piston Ring Kit</td>
</tr>
</tbody>
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Table 1 – MBE 4000 Cylinder Block Counterbore Repair Parts

**REPAIR PROCEDURE**

- Reference SIB 08 MBE 4000-1Rev (EPA07) and SIB 08 MBE 4000-1Rev (EPA04) for information on cutting the cylinder block counterbores using the existing Kent-Moore PT-2250-B Porta-Tool.

- Only the **FAILED** cylinders should have their counterbores cut. This decision is based on the condition of the cylinder block counterbore sealing area. See Figures 1-3 on pages 1 and 2 for examples of failed counterbores.

- The machining of the counterbores **MUST** be done correctly to accept the cylinder liner shim and arrive at the correct liner protrusion specifications as listed in the **EPA07 MBE 4000 Workshop Manual**, DDC-SVC-MAN-0026 (6SE420) and **MBE 4000 Workshop Manual**, DDC-SVC-MAN-0023 (6SE412).

- **ALL** liners must be replaced with the new version and D-ring, even if that particular cylinder is not having its counterbore cut. Installation of the new liner and D-ring seal should prevent future failures.

- Ensure that the new liner diameter tolerance code corresponds to the one marked on the piston. The new liners should have a tolerance code B which requires a piston of either code BA or BC. Reference to sections 1.4.3 and 1.19.1.1 in the **EPA07 MBE 4000 Workshop Manual**, DDC-SVC-MAN-0026 (6SE420) and sections 1.3.2 and 1.18.1.1 in the **MBE 4000 Workshop Manual**, DDC-SVC-MAN-0023 (6SE412).

- Start the repair by measuring the liner protrusion. Install the new liner with the new standard 0.15mm shim and measure the liner protrusion as noted by SIB 08 MBE 4000-1Rev (EPA07) and SIB 08 MBE 4000-1Rev (EPA04). Do **NOT** install the D-ring & O-ring at this point. Mark the liners for cylinder position.

- If the liner protrusion values are not within specifications, then you will need to cut the counterbore. Reference section 1.4.1.3 in the **EPA07 MBE 4000 Workshop Manual**, DDC-SVC-MAN-0026 (6SE420) and section 1.3.1.2 in the **MBE 4000 Workshop Manual**, DDC-SVC-MAN-0023 (6SE412) for cylinder liner protrusion specifications.
• Install the new D-ring to the cylinder liner. Make sure the D-ring is installed dry with the flat surface against the vertical face of the liner. See Figure 4 above, and SIB 08 MBE 4000-1Rev (EPA07) and SIB 08 MBE 4000-1Rev (EPA04). Be careful not to over-stretch the D-ring when it is installed over the liner flange.

• The shim **MUST** be installed into the cylinder block, not on the liner.

• Before installing the cylinder liner with D-ring into the cylinder block, apply a light coating of clean engine oil to the D-ring.

• Ensure the D-ring doesn’t roll or twist when installing the liner into the block.

• Measure liner protrusion again. Follow the directions in 08 MBE 4000-1Rev (EPA07) and SIB 08 MBE 4000-1Rev (EPA04). The values should be the same as measured above. If not, remove the liner and check the installation.

• If re-using the pistons, be sure to install new piston rings.

• If installing new pistons, be sure to select the correct piston and piston cooling nozzle. Reference Technical Service letter 05 TS-55Rev2. Please note that the current piston kits (which contain the piston and liner) do **NOT** contain the new liner. Order only the individual piston and cooling nozzle.

• Before installing the cylinder heads, ensure they are not worn or defective which may contribute to coolant leaks. For example, look for cracks around the cup plug on the rear face of the heads.

**CONTACT INFORMATION**

Please contact the Detroit Diesel Customer Support Center at 313-592-5800 or email csc@detroitdiesel.com if you have any questions.