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1R Information Letter No. 13-1
Sequence No. 7
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ASTM consensus has not yet been obtained on this information letter. An appropriate ASTM ballot will be issued in order to achieve such consensus.

TO: Single Cylinder Diesel Mailing List

SUBJECT: Corrected References for Rating Manuals and Workshop

As approved by the unanimous email ballot, the references to rating manuals and workshops have been updated to reflect the current nomenclature. Sections 2.2, 7.2, 7.3, 9.10, 11.7.2, 11.7.2.1, A11.1, A11.2, A11.3.1 and A11.4.3.1 have been updated to reference the ASTM Deposit Rating Manual 20 and ASTM Heavy Duty Rating Workshop and are attached.

The attached changes to Test Method D6923 are effective with the issue date of this letter.

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Attachment

c: ftp://ftp.astmtmc.cmu.edu/docs/diesel/scote/procedure_and_ils/1r/il13-01.pdf

Distribution: Email

(Revises Test Method D6923-10a as amended by Information Letter 12-01)

2.2 *OtherASTM Documents:*
ASTM Deposit Rating Manual 20 (Formerly CRC Manual 20)[7]

7.2 *Diesel Piston Rating Booth*, as described by ASTM Deposit Rating Manual 20.

7.3 *Diesel Piston Rating Lamp*, as described by ASTM Deposit Rating Manual 20.

9.10 *Piston and Rings*—Use a new piston (1Y4016 iron crown, 1Y4015 aluminum skirt) and new rings (1Y4014, 1Y4013, 1Y4012) for each test. Clean all three rings with pentane and a lint-free cotton towel. Measure the ring side clearances and ring end gaps for all three rings (see Annex A8). Keystone ring side clearance measurements require the ring to be confined in a dedicated slotted liner (see Appendix X1) or a 137.16 mm ring gauge.[12,19] Measure the side clearances using four feeler gauges of equal width and 0.01 mm graduations at 90° intervals around the piston. Measure the rectangular ring side clearance this way as well. Measure the minimum side clearance as specified in ASTM Deposit Rating Manual 20. Record the measurements for these parts before and after each test. Compare the measurements before the test and after the test to determine the amount of wear. Assemble the piston with the part number toward the camshaft.

11.7.2 *Piston Ratings*—Immerse the piston assembly in solvent and air-dry it prior to any rating. Process and measure the piston deposits according to the Modified Diesel Piston Rating Method described in ASTM Deposit Rating Manual 20 and modified by the directions listed in Annex A11. Rate only two levels of carbon (heavy and light) on the second groove and all lands, and only one level of carbon (light) for the under-crown and cooling groove. Use a combined varnish rating method for the third groove, third land, fourth land, under-crown and cooling groove (see Annex A11). An example rating worksheet is shown in Appendix X1. Another heavy-duty engine deposit rater shall verify all piston deposit ratings done by the testing laboratory. In special cases where another rater is not available, the rating may be verified by other qualified laboratory personnel. Record the initials of both the rater and the verifying rater.

11.7.2.1 *Referee Ratings*—The referee laboratory rates the entire piston. Wrap all pistons to be referee-rated in paper with desiccant chips. Then place them in plastic and seal before shipping to the referee laboratory. Report referee ratings to the TMC within 10 days of EOT for calibration tests. Referee-rate piston deposits for all non-reference tests reviewed by Caterpillar.

A11.1 The 1R piston deposits are accessed using the Modified ASTM Diesel Piston Rating Method described in ASTM Deposit Rating Manual 20. Three levels of carbon (heavy, medium and light) are rated for grooves one and three. Only two levels of carbon (heavy and light) are rated for the second groove and all lands, and only one level of carbon (light) is rated for the cooling gallery and under-crown. The carbon deposit factors are 1.00 for heavy, 0.5 for medium and 0.25 for light carbon. The varnish merit values range from 1.0 to 10 using the ASTM Rust/Varnish Rating Scale where 10 is clean and 1.0 is maximum intensity. The merit varnish values are converted to demerit values resulting in deposit factors that range from 0 for clean to 9.0 for maximum intensity. The merit varnish values are converted to demerit values using the following equation:

$$\text{Demerit Varnish Zonal Rating} = \text{Area percent} \times (10 - \text{Merit Rating}) \quad \text{(A11.1)}$$

[7]For STOCK# TMCMNL20, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org

Example: 15 % × (10.0 – 8.5) = 0.15 × 1.5 = 0.22 Demerits using rounding guidelines presented in Practice E29.

A11.2 The rating location factors were chosen to yield separation between low and high calibration oils. All required rating equipment, such as the rating booth and particular lamp used, are described in ASTM Deposit Rating Manual 20.

A11.3.1 Rate the piston as is normally done according to the Modified ASTM Diesel Piston Rating Method described in ASTM Deposit Rating Manual 20.

A11.4.3.1 *Rating Environment*—Rate liners in the rating booth with the same light as specified to rate pistons or a two-bulb fluorescent desk lamp.