



Test Monitoring Center

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1P Information Letter No. 03-1

Sequence No. 3

November 21, 2003

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: Report Package Revision and Removal of Report Package from Test Method
Nickel-plated Oil Coolers Permitted for use
Editorial Changes

The Single Cylinder Surveillance Panel has approved several changes to Test Method D 6681 (1P). The changes below are effective immediately.

The report forms and data dictionary (Annexes A15 and A16) are being removed from the test method. Instead, the test method will refer the reader to the TMC website for the most recent report package.

Nickel-plated oil coolers are approved for testing. Use of a nickel-plated oil cooler will allow the oil cooler to be replaced without performing the pacification procedure required in Section 9.3. Nickel-plating will remain optional and does not eliminate the need for pacification whenever other copper components are replaced.

Several editorial changes are also being made. The updated sections of the test method are attached.

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Attachment

c: ftp://ftp.astmtmc.cmu.edu/docs/diesel/scote/procedure_and_ils/1p/il03-01.pdf

Distribution: email

(Revises Test Method D 6681-01)

- Section 1.2 All measurements made in accordance with this standard shall use the SI system of units.
- Section 7.2 *Diesel Piston Rating Booth*, as described by CRC Manual 20.²⁷
- Section 7.3 *Diesel Piston Rating Lamp*, as described by CRC Manual 20.²⁷
- Section 7.8 *Mobil EF-411*, available from ExxonMobil for engine assembly and calibration of the oil scale pump flow rates.²⁹
- Section 7.14 *Mineral Spirits*, meeting the requirements of Specification D 235, Type II, Class C.
- Section 7.15 *Test Fuel*—The specified test fuel is Haltermann Products LSRD-4 diesel test fuel. The specifications are shown in Annex A14.
- Section 9.3 *Copper Components*—Anytime a copper part is replaced, run an engine test using REO 217 until two consecutive 12-h periods show a stable copper level. To eliminate the need to perform this pacification process when replacing the engine oil cooler, use of a nickel-plated oil cooler is permitted.
- Section 9.10 *Piston and Rings*—Use a new piston (1Y3400 iron crown, 1Y3659 aluminum skirt) and new rings (1Y3802, 1Y3803, 1Y3804) for each test. Clean all three rings with pentane and a lint-free 100% cotton towel. Measure the ring side clearances and ring end gaps for all three rings (see Fig. A10.2 and Table A10.1). 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 gage.²² Measure the side clearances using four feeler gages of equal width and 0.01 mm thickness at 90° intervals around the piston. Measure the rectangular ring side clearance this way as well. Measure the minimum side clearance as specified in CRC 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.
- Section 9.11 *Cylinder Liner*—Use a new 1Y3805 cylinder liner for each test. After removing the protective oil/grease with mineral spirits (see 7.14), clean the liner bore with a hot tap water and heavy-duty clothes washing detergent solution, then rinse with hot tap water. Measure and record the liner surface finish. Oil the liner bore with Mobil EF-411. Assemble the cylinder liner, block and head with the torque specification shown in the 1Y3700 Service Manual or Fig. A10.1. Measure the liner with a dial bore gage to ensure that the out-of-round and taper conditions are within specified tolerances measured at seven intervals as shown in Fig. A10.3. Measure the cylinder liner projection using the modified indicator shown in Fig. A10.4. Torque the cylinder liner support ring using the procedure shown in Fig. A10.5.

- Section 11.7.2 *Piston Ratings*—Immerse the piston assembly in mineral spirits (see 7.14) and air-dry it prior to any rating. Process and measure the piston deposits according to the Modified CRC Diesel Piston Rating Method described in CRC Manual No. 20 modified by the directions listed in Annex A13. 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 A13). 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.
- Section 12.1 *Test Validity*—If a test was run for 360 h according to this test method, declare the test valid. If a test was not run as specified by this test method, then the test is operationally invalid. Some examples of an invalid test are: use of nonspecified hardware, non-specified assembly methods, a test run whose downtime is greater than 125 h, a test that has a Quality Index value for a controlled parameter below the threshold of zero (see DACA II Report),³² and so forth. If a test has greater than 4-h without data acquisition on any controlled parameter the test shall be considered operationally invalid. If a test completes 360 h and the piston, rings, or liner exhibit distress, then consider the test to be non-interpretable. Likewise, if the test is terminated *prior* to completing 360 h for reasons including purchaser request, excessive oil consumption, or piston, ring, or liner distress, then consider the test non-interpretable.
- Section 13.1 *Forms and Data Dictionary*— For reference oil tests, the standardized report forms and data dictionary for reporting test results and for summarizing the operational data are required. All report forms making up the 1P final report are available at the TMC website (<http://www.astmtmc.cmu.edu>). Report values for all the field names listed in the report forms. Some fields may be blank for short-term tests. Report all deposits, wear, and engine operational data as shown in the test report. The data dictionary defines the field lengths, decimal size, data type, units and format for the field names listed in the test report forms.
- Section 13.2 *Test Validity*—Mark whether the test is Valid, Invalid, or Non-interpretable where indicated in the test report. For a *valid stand calibration run*, report the test data to TMC who will include the test data in the operationally valid database and determine statistical validity using the LTMS method.³³ For an *invalid or non-interpretable stand calibration run*, report the test data to TMC with comments describing why the test is considered invalid or non-interpretable. TMC will not include the test data in the operationally valid database. All operationally invalid and non-interpretable calibration tests are reported by the TMC to the ASTM Single Cylinder Diesel Surveillance Panel in periodic testing summaries.

Note 1 – For a *valid ACC Registered Oil Test*, report the data to the registration organization.³⁴ For an *invalid or non-interpretable ACC Registered Oil Test*, report the test data to the registration organization with supporting comments describing why the test is considered invalid or non-interpretable. When tests are presented to Caterpillar for review, include the data from all tests that were registered with the registration organization as part of the program.

- Footnote 34 Registration Systems, Inc., ACC Monitoring Agency, 4139 Gardendale, Suite 205, San Antonio, TX 78229.
- Section 13.3.2 Report any causes for any missing or bad test data in the comment section of the Downtime Summary form. If any alternative data acquisition method is used, document it as well.
- Section 13.3.3 If a calibration period is extended beyond the normal nine-month period, make a note in the comment section of the Downtime Summary form and attach a written confirmation from the TMC to the test report. List the outcomes of previous calibration runs in the comment section of the Downtime Summary form.
- Section 13.3.4 Attach to the test report the fuel analysis provided by the fuel supplier. For calibration tests, attach a copy of the TMC control chart analysis.

Note 2 – It is recommended that test purchasers include the form shown in Fig. X1.8 when presenting the test results against specification limits, such as those in Specification D 4485 or military specifications.

- Annex A15 Download report forms and data dictionary from the ASTM Test Monitoring Center (TMC) Web Page at: <http://www.astmtmc.cmu.edu/>. TMC can also provide hardcopies on request.

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20. TMC Control Chart Analysis	Form 17

Note 3 – If the test will be submitted to the registration organization as a candidate oil, then use the same forms used for reporting reference test results and add the ACC Conformance Statement, Form 18.