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1M-PC Information Letter No. 05-1
Sequence No. 10
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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: Revised Solvent Specification
Addition of Guidelines for Adjusting Calibration Frequency / Use of Donated Tests
Revised Precision Statement Wording
Correction to Table 1 Exhaust Back Pressure Tolerance (Typographical Error)

During a teleconference held December 3, 2004 the Single Cylinder Diesel Surveillance Panel approved a revised solvent specification.

Additionally, on November 8, 2004, ASTM Subcommittee D02.B approved Test Monitoring Board recommended requirements for adjusting calibration frequency and surveillance panel use of donated reference oil test programs. At the request of ASTM Section D02.B0.09, the definitions of Intermediate Precision and Reproducibility have been revised and the figures in Table 11 updated.

And, finally, Table 1 (Operating Conditions) contained a typographical error on the tolerance for exhaust back pressure that is being corrected.

The updated sections of ASTM Test Method D6618 are attached.

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Attachment

c: ftp://ftp.astmtmc.cmu.edu/docs/diesel/scote/procedure_and_ils/1mpc/il05-01.pdf

Distribution: Email

(Revises Test Method D 6618-04)

7.4.1 *Solvent*—Use only mineral spirits meeting the requirements of Specification D 235, Type II, Class C for Aromatic Content (0-2% vol), Flash Point (142°F/61°C, min) and Color (not darker than +25 on Saybolt Scale or 25 on Pt-Co Scale). Obtain a Certificate of Analysis for each batch of solvent from the supplier. (Warning – Combustible. Health hazard.)

Insert the new 12.7 and 12.8 sections after the current 12.6, renumber current 12.7 to 12.9, and renumber subsequent sections accordingly:

12.7 *Guidelines for Adjustments to Calibration Periods:* Reference oil test frequency may be adjusted for the following reasons:

12.7.1 Procedural Deviations – On occasions when a laboratory becomes aware of a significant deviation from the test method, such as might arise during an in-house review or a TMC inspection, the laboratory and the TMC shall agree on an appropriate course of action to remedy the deviation. This action may include the shortening of existing reference oil calibration periods.

12.7.2 Parts and Fuel Shortages – Under special circumstances, such as industry-wide parts or fuel shortages, the surveillance panel may direct the TMC to extend the time intervals between reference oil tests. These extensions shall not exceed one regular calibration period.

12.7.3 Reference Oil Test Data Flow – To ensure continuous severity and precision monitoring, calibration tests are conducted periodically throughout the year. There may be occasions when laboratories conduct a large portion of calibration tests in a short period of time. This could result in an unacceptably large time frame when very few calibration tests are conducted. The TMC can shorten or extend calibration periods as needed to provide a consistent flow of reference oil test data. Adjustments to calibration periods are made such that laboratories incur no net loss (or gain) in calibration status.

12.7.4 Special Use of the Reference Oil Calibration System – The surveillance panel has the option to use the reference oil system to evaluate changes that have potential impact on test severity and precision. This option is only taken when a program of donated tests is not feasible. The surveillance panel and the TMC shall develop a detailed plan for the test program. This plan requires all reference oil tests in the program to be completed as close to the same time as possible, so that no laboratory/stand calibration is left in an excessively long pending status. In order to maintain the integrity of the reference oil monitoring system, each reference oil test is conducted so as to be interpretable for stand calibration. To facilitate the required test scheduling, the surveillance panel may direct the TMC to lengthen and shorten reference oil calibration periods within laboratories such that the laboratories incur no net loss (or gain) in calibration status.

12.8 *Donated Reference Oil Test Programs* – The Surveillance Panel is charged with maintaining effective reference oil test severity and precision monitoring. During

times of new parts introductions, new or re-blended reference oil additions, and procedural revisions, it may be necessary to evaluate the possible effects on severity and precision levels. The surveillance panel may choose to conduct a program of donated reference oil tests in those laboratories participating in the monitoring system, in order to quantify the effect of a particular change on severity and precision. Typically, the surveillance panel requests its panel members to volunteer enough reference oil test results to create a robust data set. Broad laboratory participation is needed to provide a representative sampling of the industry. To ensure the quality of the data obtained, donated tests are conducted on calibrated test stands. The surveillance panel shall arrange an appropriate number of donated tests and ensure completion of the test program in a timely manner.

Replace the entirety of section 13 with:

13. **Precision and Bias**

13.1 Test precision is established on the basis of reference oil test results (for operationally valid tests) monitored by the ASTM Test Monitoring Center. The data are reviewed semi-annually by the Single-Cylinder Diesel Surveillance Panel. Contact the ASTM TMC for current industry data.

13.1.1 Table 11 summarizes reference oil intermediate precision and reproducibility of the test. The tabulated values are current as of February 1, 2005. The Surveillance Panel updates these values as necessary.

13.1.2 *Intermediate Precision Conditions*—Conditions where test results are obtained with the same test method using the same test oil, with changing conditions such as operators, measuring equipment, test stands, test engines, and time.

NOTE 2 Intermediate precision is the appropriate term for this test method rather than repeatability which defines more rigorous within-laboratory conditions.

13.1.2.1 *Intermediate Precision Limit (i.p.)*—The difference between two results obtained under intermediate precision conditions that would, in the long run, in the normal and correct conduct of the test method, exceed the values shown in Table 11 in only one case in twenty. When only a single test result is available, the Intermediate Precision Limit can be used to calculate a range (test result ± Intermediate Precision Limit) outside of which a second test result would be expected to fall about one time in twenty.

13.1.3 *Reproducibility Conditions*—Conditions where test results are obtained with the same test method using the same test oil in different laboratories with different operators using different equipment.

13.1.3.1 *Reproducibility Limit (R)*—The difference between two results obtained under reproducibility conditions that would, in the long run, in the normal and correct conduct of the test method, exceed the values shown in Table 11 in only one case in twenty. When only a single test result is available, the Reproducibility Limit can be used to calculate a range (test result ± Reproducibility Limit) outside of which a second test result would be expected to fall about one time in twenty.

13.1.4 *Bias*—Bias is determined by applying an acceptable statistical technique to reference oil test results and when a significant bias is determined, a severity adjustment is permitted for non-reference oil test results (see TMC Memo 94-200, Lubricant Test Monitoring System document for details).

TABLE 11 1M-PC Reference Oil Precision Data

NOTE—These statistics are based on results obtained on Test Monitoring Center reference oils between April 8, 1995 and January 24, 2005.

Test Parameter	$S_{i.p.}$	*i.p.*	S_R	*R*
TGF – top groove fill, %	17.3	48.4	17.8	49.8
WTD – weighted total piston deposits, demerits	45.7	128.0	47.0	131.6

Legend:

$S_{i.p.}$	=	intermediate precision standard deviation.
i.p.	=	intermediate precision.
S_R	=	reproducibility standard deviation.
R	=	reproducibility.

TABLE 1 1M-PC Operating Conditions [A, B]

Speed, r/min	1800 ± 10
Fuel flow, kg/h (lb/h)	8.13 ± 0.07 (17.92 ± 0.15)
Temperature, water from cylinder head,° C (°F)	87.8 ± 2.8 (190 ± 5)
Flow rate, engine coolant, L/min (gal/min)	57.9 ± 3.8 (15.3 ± 1.0)
Temperature, oil to bearings, °C (°F)	96.1 ± 2.8 (205± 5)
Temperature, inlet air to engine, °C (°F)	123.9 ± 2.8 (255± 5)
Temperature, exhaust, °C (°F)	573 ± 28 (1063 ± 50)
Pressure, fuel to injection pump, kPa (psi)	137.9 ± 13.8 (20 ± 2)
Pressure, exhaust, kPa (in. Hg Abs.)	106.7 ± 1.7 (31.5 ± 0.5)
Pressure, oil at jet cooling nozzle, kPa (psi)	165.5 ± 13.8 (24± 2)
Pressure, oil to bearings maximum, kPa (psi)	220.6 (32)
Pressure, air to engine, kPa (in. Hg Abs.)	179.0 ± 1.0 (53 ± 0.3)
Vacuum, crankcase, kPa (in. H_2O)	0.25 ± 0.12 (1.0± 0.5)
Humidity, air to engine, g/kg of dry air (grains/lb)	17.8 ± 1.7 (125 ± 12)
Flow rate, engine air, approximate m^3/min (ft^3/min) at 15.6°C (60°F), 101.3 kPa Abs. (14.7 psi Abs.)	0.2 (94)

[A] Count test time from the moment the conditions in this table are obtained (30 min maximum are allowed for stabilization).
[B] Only speed and fuel flow are controlled. Load is used as a verification of engine build and operation.