ASTM Test Monitoring Center

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ASTM consensus has not been obtained on this information letter. An appropriate ASTM ballot will be issued in order to achieve such consensus.

TO: Sequence IVA Mailing List

SUBJECT: Revised Camshaft Bore Measurement Requirements
                  New Solvent Specifications
                  Editorial Corrections
                  Revised Precision Definitions

        This Information Letter addresses specific parts and procedures pertaining to quality, consistency, performance, and accountability of test parts as part of the ongoing effort by the panel to ensure continual process improvement of the Sequence IVA test. This Information Letter references Test Method D 6891-03.

Revised Camshaft Bore Measurement Requirements
        During the May 11, 2004 meeting of the Sequence IVA Surveillance Panel, the panel approved a motion to eliminate the camshaft bore measurement requirements on Sequence IVA cylinder heads prior to each test. The measurements shall still be required when a new cylinder head is installed and these measurements shall be used for the clearance measurements on all tests run on that cylinder head. A revised 9.3.3.1 is attached.
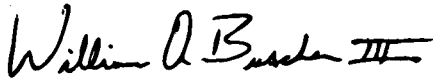
New Solvent Specifications
        On June 2, 2004, the Sequence IVA Surveillance Panel, the panel approved a motion via electronic ballot of solvent meeting Specification D 235 Type II Class C requirements in the Sequence IVA test. A revised 7.4.1 and 7.4.1.1 are attached.
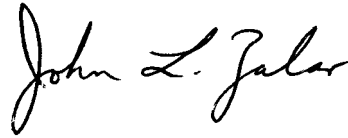
Editorial Corrections
        Test Method D 6891-03 contained several typographical errors. A revised 6.5.1 and 10.1.1 are attached to correct these errors.

Revised Precision Definitions

      At the request of Subcommittee D02.B9 the definitions of Intermediate Precision and Reproducibility have been revised. A revised 14.1.1.1 and 14.1.1.3 are attached.

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Chairman
Sequence IVA Surveillance Panel

John Zalar
Administrator
ASTM Test Monitoring Center

Attachment

c: ftp://ftp.astmtmc.cmu.edu/documents/gas/sequenceiv/procedures_and_ils/ivail04-1-11.pdf

Distribution: Electronic Mail

[1]This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.B0 on Automotive Lubricants. Current edition approved Nov. 1, 2003, published January 2004, and incorporates all Information Letters through Sequence IVA Information Letter No. *(Insert appropriate I.L. number).*

6.5.1 *Camshaft Lobe Measurement Equipment*—Trace the camshaft lobes with a surface texture profilometer system.

6.5.1.1 Use a surface measurement profilometer with real time digital display and graphical output capability. The vertical scale graphical resolution shall be capable of 1 μm per graph division. The profilometer shall be capable of traversing at least 100 mm, with a straightness accuracy equal to or less than 1 mm per 100 mm of traversed length.

6.5.1.2 Use the profilometer pickup without a skid. Use a conical or spherical diamond tip stylus, with a nominal radius of 5 μm.

6.5.1.3 The nominal traversing speed is 0.50 to 0.75 mm/s. A computer interface is recommended. The Precision Devices, Inc. MicroAnalyzer 2000 system,[11,22] see Fig. 9, a computer-driven profilometer, may be used. Equip the profilometer with custom V-blocks (see A2) for holding the work-piece (the camshaft on its journals), and an optical angle encoder for determining the camshaft angular position (see A2).

6.5.1.4 View the data from the trace in the profile mode, allowing an analysis of the texture and waviness of the trace. Configure the instrument software for a two-point line texture leveling at the unworn edges of the cam lobe. Use this reference line for wear measurements. Display the profile waviness, using the Gaussian smoothing filter, set at 0.25 mm cutoff length, and do not remove the filter width at the ends of the texture.

6.5.1.5 Base the lobe wear measurement upon the vertical dimension between the horizontally positioned, two-point leveling line (reference line) and the lowest point in the waviness profile.

7.4.1 *Solvents and Cleansers*—Use only the solvents and cleansers (mineral spirits, ethyl acetate, pentane, cylinder block and RAC cleaning detergent—tri-sodium phosphate detergent, and any commercial coolant cleanser) specified for this test method (see 6.1.3).

7.4.1.1 Use only mineral spirits meeting Specification D 235 Type II Class C requirements.

*{Replace all references to **aliphatic naphtha** in Test Method D 6891 with the correct term, **mineral spirits**.}*

9.3.3.1 *Camshaft Bearing Bore Measurements*— Install cam-bearing caps, without the camshaft, with rocker shafts and tighten the lubricated cap bolts to 39 N·m.
(1) When the cylinder head is new, perform a comprehensive set of measurements of the five cam bearing bores to ensure the bores are sized to specification, and that the bores are round and not tapered. Measure the front and rear of each cam bore in three directions: vertical and two measurements at 45° from vertical. This results in six measurements for each cam bore. The standard inner diameter specification is 33.000 to 33.025 mm. Run-out and taper shall not exceed 0.025 mm.
(2) After the first test on a cylinder head, use only the vertical dimension of the front and rear of each cam bore (from the comprehensive measurements performed on the new cylinder head) to determine the cam journal to bearing bore clearance before subsequent tests.

10.1.1 *Frequency of Logged Steady-State Data*—Log the Stage I steady-state (last 45 min of stage) operational conditions every 2 min or more frequently. Log the Stage II steady-state (last 5 min of stage) operational conditions every 30 s or more frequently.

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

Note 14 - Intermediate precision is the appropriate term for this Test Method, rather than repeatability, which defines more rigorous within-laboratory conditions.

14.1.1.2 *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 value show in Table 9, in only 1 case in 20. 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.

14.1.1.4 *Reproducibility Limit (R)*—The difference obtained under reproducibility conditions that would in the long run, in the normal and correct conduct of the test method, exceed the value shown in Table 9, in only 1 case in 20. 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.