A Program of ASTM International

Test Monitoring Center

@ Carnegie Mellon University
6555 Penn Avenue, Pittsburgh, PA 15206, USA

http://astmtmc.cmu.edu
412-365-1000

Engine Oil Water Tolerance Test Information Letter No. 19-1
Sequence No. 2
April 1, 2019

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: Engine Oil Water Tolerance Test Mailing List

SUBJECT: Refinements to the Test Method

On March 15, 2019, the Surveillance Panel approved an assortment of refinements and clarifications to the wording in the Test Method. These changes highlighted in red are not intended to change the operation of the test, but rather to clarify the wording and methods detailed in it. In addition, a new standardized Introduction has been included. These changes are effective with this information letter.

The updated sections of ASTM Test Method D 6794 are attached.

Yong-Li McFarland
Chairperson
EOFT Surveillance Panel

Frank M. Farber
Director
ASTM Test Monitoring Center

Attachment

c: http://www.astmtmc.cmu.edu/ftp/docs/bench/eowt/procedure_and_ils/il19-1.pdf

Distribution: Email

{*The existing INTRODUCTION is replaced with the following text.*}

INTRODUCTION

Portions of this test method are written for use by laboratories that make use of ASTM Test Monitoring Center (TMC)[2] services (see Annex A1).

The TMC provides reference oils, and engineering and statistical services to laboratories that desire to produce test results that are statistically similar to those produced by laboratories previously calibrated by the TMC.

In general, the Test Purchaser decides if a calibrated test stand is to be used. Organizations such as the American Chemistry Council require that a laboratory utilize the TMC services as part of their test registration process. In addition, the American Petroleum Institute and the Gear Lubricant Review Committee of the Lubricant Review Institute (SAE International) require that a laboratory use the TMC services in seeking qualification of oils against their specifications.

The advantage of using the TMC services to calibrate test stands is that the test laboratory (and hence the Test Purchaser) has an assurance that the test stand was operating at the proper level of test severity. It should also be borne in mind that results obtained in a non-calibrated test stand may not be the same as those obtained in a test stand participating in the ASTM TMC services process.

Laboratories that choose not to use the TMC services may simply disregard these portions.

ASTM International policy is to encourage the development of test procedures based on generic equipment. It is recognized that there are occasions where critical/sole-source equipment has been approved by the technical committee (surveillance panel/task force) and is required by the test procedure. The technical committee that oversees the test procedure is encouraged to clearly identify if the part is considered critical in the test procedure. If a part is deemed to be critical, ASTM encourages alternate suppliers to be given the opportunity for consideration of supplying the critical part/component providing they meet the approval process set forth by the technical committee.

An alternate supplier can start the process by initiating contact with the technical committee (current chairs shown on ASTM TMC website). The supplier should advise on the details of the part that is intended to be supplied. The technical committee will review the request and determine feasibility of an alternate supplier for the requested replacement critical part. In the event that a replacement critical part has been identified and proven equivalent the sole-source supplier footnote shall be removed from the test procedure.

2.1 *ASTM Standards:*[4]

D1193 Specification for Reagent Water

D4057 Practice for Manual Sampling of Petroleum and Petroleum Products

D4485 Specification for Performance of Active API Service Category Engine Oils

3.1.3 *candidate oil*, *n*—an oil that is intended to have the performance characteristics necessary to satisfy a specification and is tested against that specification.

3.1.4.1 *Discussion*—It may contain additives to enhance certain properties. Inhibition of engine rusting, deposit formation, valve train wear, oil oxidation, and foaming are examples.

3.1.5 *non-reference oil*, *n*—any oil other than a reference oil–such as a research formulation, commercial oil, or candidate oil.

3.1.6.1 *Discussion*—Reference oils are used to calibrate testing facilities, to compare the performance of other oils, or to evaluate other materials (such as seals) that interact with oils.

4.1 The test oil is treated with 0.6 %, 1.0 %, 2.0 %, and 3.0 % deionized water. The sample is heated to 70 °C for 6 h, followed by storage at room temperature. The sample is filtered and the flow rate is calculated determining the engine oil filterability characteristics.

6.1 The apparatus consists of a 25 mL burette, a filter holder with 25 µm automotive oil filter paper, and a source of 69 kPa ± 2 kPa air pressure. Discs of filter paper are cut to fit the holder and installed (see Fig. 1).

{Renumber existing section 6.2.1 as new section 6.3, renumber existing sections 6.3 through 6.7 as sections 6.4 through 6.8, and then incorporate changes shown below in red}

6.3 *Timer,* capable of timing 30 s ±1 s.

6.4 *Container*, 250 mL, with blade compatible with the blender.
6.6 Glass Jars, 60 mL, wide-mouth with inert lined lids.

Note: paperbacked lids may detach from lid and are not suggested for use.

6.7 *Mechanical Convection Oven,* capable of maintaining 70 °C ±1 °C.

{Insert new section 6.9 and subsections }

6.9 *Tubing,* Inert tubing used to connect to burette.

6.9.1 *Air Regulator Tubing,* Flexible tubing to prevent air from leaking from the air supply to the burette.

6.9.2 *Filter Holder Tubing,* Flexible tubing used to connect burette tip to filter holder.

9.1 Add 49.7 g ± 0.1 g of test oil, 0.3 g ± 0.05 g of deionized water using the 1000 µL syringe to the blender, and mix for 30 s ± 1 s at 18 000 rpm ± 10 %.

9.2 Repeat 9.1 with 49.5 g ± 0.1 g of test oil and 0.5 g ± 0.05g water for 1 % water, 49.0 g ± 0.1 g of test oil and 1.0 g ± 0.05 g water for 2 % water, and 48.5 g ± 0.1 g of test oil and 1.5 g ± 0.05 g water for 3 % water.

9.3 Transfer the sample to a 60 mL wide-mouth glass jar and place the loosely capped (1⁄4 turn) jar in an oven at 70.0 °C ± 1.0 °C for 6 h ± 10 min. Remove from the oven, tighten cap and allow to cool to room temperature 20 °C to 24 °C.

9.4 Store the sample in the dark at room temperature 20 °C to 24 °C.

9.5 Within 48 h ± 2 h of removing the sample from the oven, determine the filterability (see 10.2) of the sample.

10.2 Determine the new oil flow rate by placing a sample of the new oil in the burette. Pressurize the system and force at least 10 mL of oil through the filter to saturate the filter with oil and remove any air bubbles. Disconnect the air line and fill the burette with new oil to a level 1 cm to 2 cm above the *0* mark. Pressurize the system to 69 kPa ± 2 kPa, open the stopcock, and measure the flow time for each successive 5 mL of oil between the 0 mL and 25 mL graduations.

10.3 To determine the test oil flow rate, the flow times of the new oil are first determined. Using the same filter disc, filter holder, and burette, reduce the new oil level in the burette to the lowest level that allows no air bubbles below the stopcock. Disconnect the air line and fill the burette with a well-mixed sample of test oil to a level 1 cm to 2 cm above the *0* mark. Pressurize the system to 69 kPa ± 2 kPa,, open the stopcock, and measure the flow time for each successive 5 mL of oil between the 0 mL and 25 mL graduations.

{*Replace Eq 1 in 11.1 with the following:*}

$$FR = A/B \qquad (1)$$

where:
FR = the flow rate of oil, mL/s,
A = volume of oil, mL, and
B = flow time, s.

{*Replace Eq (2) in 11.2 with the following:*}

$$\Delta FR = 100(E - D)/D \qquad (2)$$

where:
ΔFR = change in flow rate, %,
E = final test oil flow rate, mL/s, and
D = final new oil flow rate, mL/s.