Test Monitoring Center
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Ball Rust Test Information Letter No. 07-1
Sequence No. 3
December 14, 2007

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: Ball Rust Test Mailing List

SUBJECT: Clarification of gassing manifold terminology
Liberalization of flowmeter specification
Modified drying time requirement
Added requirement for system warming
Removal of hardcopy test report requirement for TMC
Various editorial changes

During a teleconference held June 13, 2007 the Ball Rust Test Surveillance Panel approved the above summarized changes to the test method.

The updated sections of ASTM Test Method D 6557 are attached.

Leonard Orzech
Chairman
Ball Rust Test Surveillance Panel

John L. Zalar
Administrator
ASTM Test Monitoring Center

Attachment

c: ftp://ftp.astmtmc.cmu.edu/docs/bench/brt/procedure_and_ils/brt/il07-01.pdf

Distribution: Email

(Revises Test Method D 6557-04)

1.3 The values stated in either SI units or in other units shall be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, use each system independently of the other, without combining values in any way. SI units are provided for all parameters except where there is no direct equivalent such as the units for screw threads, national pipe threads/diameters, and tubing size

6.2 Air Supply System—A compressed air supply is required, with two air filters, two pressure regulators, a gas purifier, a gassing manifold (25 port outlet), TFE-fluorocarbon tubing (25 600 ft (197 m) lengths) or equivalent multiport flow control system, and a calibrated flowmeter (see Annex A1 and Figs. 1 and 2).

6.5.1 A special test tube assembly rack[7,1] (see Figs. 5 and 6) has 24 tube positions and is attached to the shaker platform (18 in. (457 mm) by 18 in. (457 mm)).

6.6 *Air Delivery Manifold*, required.

6.7 *Gas Venting Manifold*—Use a common laboratory apparatus for the required venting system (see Fig. 7).

7.2.1 *TFE-fluorocarbon FEP Tubing* , 1/32-in. I.D. by 1/16-in. outside diameter (O.D.); 17 rolls of 1000 ft (328 m)/roll. (Not required if the optional NRS flow controller[7,2] is used.

7.2.2 *Vinyl Tubing*, 1/8-in. inside diameter (I.D.) by 1/4-in. O.D.; about 15 ft (5 m).

8.1.1 Remove the appropriate number of specimens from vacuum-sealed packages into a 4-oz (100-cc) bottle (clear, medium-round with cap). Add sufficient heptane (see 7.1.3), approximately 2 oz (60 cc), to cover specimens.

8.1.3 Rinse two more times with heptane and follow with an acetone (see 7.1.2) rinse to ensure the specimens are free of contamination. Dry the specimens with nitrogen for 30-60s

8.2.1 Cut 24 separate pieces of TFE-fluorocarbon FEP tubing, each piece to be 9.5-in. (24-cm) long.

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[1]The sole source of supply of the apparatus known to the committee at this time is West End Machine and Weld, Inc., P.O. Box 9444, Richmond, VA 23228.

[2]Brooks Model 8744 NRS Flow Controller has been determined to be acceptable for this application. The sole source of supply of the apparatus known to the committee at this time is McPac Process Automation and Control, 8040 Bavaria Rd., Twinsburg, OH 44087.

8.2.1.1 Use compressed air (for technical use only), 50 psig (347 kPa) minimum, to remove most of the water/oil emulsion that may be trapped inside the short lengths of capillary tubing. Clean the tubing with heptane (see 7.1.3), followed by acetone (see 7.1.2), and dry with compressed air.

8.2.5 Place one precleaned specimen into each test tube, using extra-long forceps (7 in. (175 mm) with serrated tips) to avoid contamination.

8.3.5 Ensure that the syringe barrel flange and the plunger flange are firmly held by the retaining clamps (six 2-in. (51-mm) C-clamps that secure the ends of the hold-down bars of the multiple syringes pump).

8.3.6 Cut 24 pieces of TFE-fluorocarbon tubing; each piece to be 51 ± 1 in. (1295 ± 25 mm) in length.

8.4.1 Clean, dry air, compressed to at least 50 psig (347 kPa), is required.

8.4.4 A Drierite gas purifier, with a maximum working pressure of 100 psig (695 kPa), is next in the line.

8.4.5 Next in the line is the downstream regulator, single stage high-purity stainless steel, which is equipped with a 0 to 60-psi (0-416-kPa) pressure gage.

8.4.6 The next installation is a relief valve, in-line adjustable *CA* series, 50 to 150-psi (347 to 1040-kPa) cracking pressure range, set at 80 psi (555 kPa) (optional to control over pressure).

8.4.7 Lastly, install an air delivery manifold with 25 port outlets and 1⁄4-in. tube fittings. (See Figs. 1 and 2 for a photograph and schematic of the air system.).

8.4.8 Cut 25 pieces of the TFE-fluorocarbon tubing, each piece to be approximately 600 ft (197 m) in length.

8.4.8.2 Connect these tubes to the air delivery manifold.
(1) Connect one of these tubes to a calibrated flowmeter, capable of measuring up to 200 mL/min, and with 0.1-mL/min resolution (see Annex A1).
(2) Connect the other 24 tubes to the air inlet ports on the 24 three-way valves.

9.3.1 Monitor the airflow rate with the calibrated flow meter connected to the reference air capillary tubing. Refer to the calibration chart developed in Annex A1 to determine the actual air flow rate setting.

9.4 Turn the three-way valves to the *three-way open* position, and dry the nominal 51-in. (1295-mm) lengths of capillary tubing with air for 30 min.

9.7.3 Then, connect the vent outlets to a gas venting manifold (8 port inlet with 1⁄4-in. hose barb; use vinyl tubing, 1⁄8-in. I.D. by 1⁄4-in. O.D. (see Fig. 7).

9.7.4 Finally, connect the gas venting manifold's outlet to a condensate trap flask, with side arm (1000 mL), placed such that gravity drains the condensate from the test tubes. Make sure that all of the capillary tubes are free to move with the shaker platform.

9.8 Set the shaker temperature to maintain 48 ± 0.1°C, as measured in an actual oil sample, and warm up the entire system to the control temperature in the oil sample for a period of 1h. Refer to the calibration chart developed in Annex A2 to determine the shaker temperature setting.

9.9 Following the 1-h warm-up period, turn on the shaker, set the shaker speed to 300 r/min, and ensure that each ball freely rotates against each syringe wall.

9.11 Turn on the main airflow valve; check and adjust, if necessary, the upstream pressure (that is, upstream from the three-way valves) to ensure that the actual air flow rate is 40 mL/min.

10.2.1 Provide the TMC with the shaker table identification for the test.

10.3 Test the assigned reference oil along with each batch of non-reference oil tests, simultaneously with and in the same shaker table as the non-reference oils.

10.5.5 through 10.5.5.2
Delete these sections.

10.6.2.2 Delete this section.

11.1.1 Remove the specimens from the test tubes, using extra-long forceps (7 in. (178 mm) with serrated tips).

11.1.2 Deleted

11.1.2 Place each specimen into a separate 20-mL scintillation wash vial (make one perforation in the bottom to facilitate cleaning) in a vial holder. (previously numbered as 11.1.3)

11.1. 3 Put the vial holder into a utility tray (stainless steel, 12 1/4 by 7 3⁄4 by 2 1⁄4 in.(311 by 197 by 57 mm)), pour enough heptane into the tray to cover the specimens, and shake the tray gently for 30-60s before decanting the heptane. (previously numbered as 11.1.4)

Renumber existing section 11.1.5 as 11.1.4

11.1.5 Put enough heptane into the tray to cover the specimens, and shake the tray gently for 30-60 s before decanting the heptane. (previously numbered as 11.1.6)

11.1.6 Dry the specimens with nitrogen gas, and then securely cover the vials. (previously numbered as 11.1.7)

Renumber existing section 11.1.8 as 11.1.7

11.6.5 Delete this section.

A.2.1 Insert 10 mL of a representative oil sample into a 20-mL plastic syringe, as part of a test tube assembly, and place the assembly in the test tube rack at rack location No. 10 (second row from the gas venting manifold and fourth slot from the left).

A5 **Ball rust Test Report Forms and Data Dictionary**

A5.1 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.

Report Form Table of Contents

1. Final Report Cover Sheet
2. Summary of Results
3. Comments

Fig. A5.1 through A5.4

Delete these figures (report forms and data dictionary).