



# Test Monitoring Center

6555 Penn Avenue  
Pittsburgh, PA 15206-4489  
(412) 365-1000

SEQUENCE VIII INFORMATION LETTER NO. 03-1  
Sequence No. 5

November 17, 2003

***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 VIII Mailing List

SUBJECT: Mineral Spirits Specification  
Test Fuel Specification

This information letter implements action items approved by the Sequence VIII Surveillance Panel. 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 VIII test. This information letter references the latest published version of the Sequence VIII procedure, Test Method D6709-03.

### Mineral Spirits Specification

The Sequence VIII Surveillance Panel recently approved a motion, via electronic ballot, to incorporate a standard specification for solvent used in Sequence VIII testing. The required material is mineral spirits meeting Specification D235, Type II, Class C specifications. This material is mandatory in the laboratory no later than January 1, 2004. As an editorial correction, previous references to *Stoddard Solvent* have been changed to the more correct term *mineral spirits*. The revised sections are attached.

### Test Fuel Specification

The Sequence VIII Surveillance Panel recently approved a motion, via electronic ballot, to incorporate the test fuel specification into Test Method D6709 at the request of the Technical Guidance Committee. No changes to the fuel specification were made and the Sequence IVA Surveillance Panel still has exclusive control of the approval of the test fuel. Revised Sections 2.1 and 7.6, along with a new Annex A18 are attached.

Fred Gerhart  
Chairman  
Sequence VIII Surveillance Panel

John L. Zalar  
Administrator  
ASTM Test Monitoring Center

Attachment

c: [ftp://ftp.astmtmc.cmu.edu/docs/gas/sequenceviii/procedure\\_and\\_ils/il03-1.pdf](ftp://ftp.astmtmc.cmu.edu/docs/gas/sequenceviii/procedure_and_ils/il03-1.pdf)

Distribution: Electronic mail

2.1 *ASTM Standards:*

- D 86 Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure<sup>3</sup>
- D 130 Standard Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test<sup>3</sup>
- D 235 Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvents)<sup>4</sup>
- D 240 Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter<sup>3</sup>
- D 323 Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)<sup>3</sup>
- D 381 Standard Test Method for Gum Content in Fuels by Jet Evaporation<sup>3</sup>
- D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity)<sup>3</sup>
- D 525 Standard Test Method for Oxidation Stability of Gasoline (Induction Period Method)<sup>3</sup>
- D 1319 Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption<sup>3</sup>
- D 2422 Classification of Industrial Fluid Lubricants by Viscosity System<sup>3</sup>
- D 2699 Standard Test Method for Research Octane Number of Spark-Ignition Engine Fuel<sup>5</sup>
- D 2700 Standard Test Method for Motor Octane Number of Spark-Ignition Engine Fuel<sup>5</sup>
- D 3231 Standard Test Method for Phosphorus in Gasoline<sup>6</sup>
- D 3237 Standard Test Method for Lead in Gasoline by Atomic Absorption Spectroscopy<sup>6</sup>
- D 3343 Standard Test Method for Estimation of Hydrogen Content of Aviation Fuels<sup>6</sup>
- D 4052 Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter<sup>6</sup>
- D 4294 Standard Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectroscopy<sup>6</sup>
- D 4485 Specification for Performance of Engine Oils<sup>6</sup>
- D 4815 Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C1 to C4 Alcohols in Gasoline by Gas Chromatography<sup>6</sup>
- D 5119 Test Method for Evaluation of Automotive Engine Oils in the CRC L-38 Spark-Ignition Engine<sup>6</sup>
- D 5302 Test Method for Evaluation of Engine Oils for Inhibition of Deposit Formation and Wear in a Spark-Ignition Internal Combustion Engine Fueled with Gasoline and Operated under Low-Temperature, Light-Duty Conditions<sup>6</sup>
- D 5533 Test Method for Evaluation of Automotive Engine Oils in the Sequence III E, Spark-Ignition Engine<sup>7</sup>
- D 5844 Test Method for Evaluation of Engine Oils for Inhibition of Rusting (Sequence IID)<sup>7</sup>
- D 6202 Test Method for Automotive Engine Oils on the Fuel Economy of Passenger Cars and Light-Duty Trucks in the Sequence VIA Spark-Ignition Engine<sup>7</sup>
- E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications<sup>7A</sup>
- E 191 Standard Specification for Apparatus For Microdetermination of Carbon and Hydrogen in Organic and Organo-Metallic Compounds<sup>7B</sup>

<sup>3</sup>Annual Book of ASTM Standards, Vol 05.01.

<sup>4</sup>Annual Book of ASTM Standards, Vol 06.04.

<sup>5</sup>Annual Book of ASTM Standards, Vol 05.05.

<sup>6</sup>Annual Book of ASTM Standards, Vol 05.02.

<sup>7</sup>Annual Book of ASTM Standards, Vol 05.03.

<sup>7A</sup>Annual Book of ASTM Standards, Vol 14.02.

<sup>7B</sup>Annual Book of ASTM Standards, Vol 14.04.

7.2.6 *Mineral spirits*<sup>30</sup>, Specification D 235, Type II, Class C.

<sup>30</sup>Mineral spirits meeting Specification D 235, Type II, Class C specifications are available from petroleum solvent suppliers.

7.6 *Test Fuel*—Use Haltermann Products KA24E Test Fuel.<sup>34</sup> See A.18 for the specification for KA24E Test Fuel.

9.4.3.1 *Oil Pump, Oil Pressure Regulator, Distributor, and Crankcase Breather*—Remove the distributor and crankcase breather. Remove the oil pump and oil pressure regulator with the oil gallery side cover plate. Clean this cover plate thoroughly using Penmul<sup>29</sup> (**Warning**—Combustible. Health hazard.) and a fiber brush or swab, then rinse the cover plate with tap water heated to 65 to 82°C (150 to 180°F), and rinse it again with mineral spirits<sup>30</sup> (**Warning**—Combustible. Health hazard.). Carefully spray the oil pump, oil pressure regulator, and distributor with mineral spirits<sup>30</sup> to remove deposits. Disassemble, inspect, and clean the crankcase breather with mineral spirits<sup>30</sup>.

9.4.3.2 *Power Section*—Dismantle the power section completely before each test and thoroughly clean the parts by soaking them in Penmul for a minimum of 4 h. Remove remaining deposits on the crankshaft using fine or very fine 3M Scotch Brite pads. After the minimal 4-h soak and cleaning period, rinse the parts in hot tap water (65 to 82°C) to remove all traces of Penmul, and then rinse them with mineral spirits<sup>30</sup>. (**Warning**—Insufficient rinsing may allow Penmul carryover to the test oil causing increased severity in H-24 alloy bearing weight loss.)

9.4.3.5 *Oil Heater Cleaning*—Prior to each reference oil test, clean the oil heater case and inner cartridge with Penmul to remove all residues, deposits, and foreign material. Use a wire brush or emery cloth as needed to completely remove residues and deposits, then rinse with hot tap water and spray the case and cartridge with mineral spirits<sup>30</sup> and air dry. Prior to every test between references, the oil heater may be cleaned by circulating mineral spirits<sup>30</sup> through it for 15 min and then air drying.

9.4.3.6 *H-24 Alloy Test Bearing*—Mark the bearing before using it in a test with the letters T (top) and B (bottom) on the backs of the bearing tangs, using a vibrating engraver. Make no other marks on the bearing until after the final weighing. Prior to initial weighing and prior to weighing at the end of a test, clean the bearing halves according to the procedure given in Annex A9. (Fresh, clean mineral spirits<sup>30</sup> and pentane shall be used for cleaning.) (**Warning**—Flammable. Health hazard.)

9.4.4.1 *Cleaning Procedure and Rust Prevention*—After the desired finish is achieved, spray the liner with mineral spirits<sup>30</sup>, and air dry it. Apply build-up oil to the liner surface. Wipe the liner interior with a cloth or paper towel wetted with build-up oil until the wiping material appears clean after wiping. Coat the liner with build-up oil.

9.4.7.3 Polish the connecting rod bearing journal according to the following guidelines. Mount the crankshaft on centers or position the main bearing journals in V-blocks. Prepare strips of polishing medium (only a wet/dry, silicon carbide, 400, 600 and 800 grit abrasive paper, standard crocus cloth, or Mylar 3m tape is approved for use) 13 mm wide by 0.9 to 1.2 m long. It is necessary to wet the strip of crocus cloth or abrasive paper with build-up oil or the Mylar tape with mineral spirits<sup>30</sup>. Wrap the strip 1-1/2 times around the journal to provide a minimum of 360° contact between the cloth and journal. The Mylar tape will not slide over itself so only wrap it 180°. Stroke the journal with the cloth or abrasive paper by alternately pulling on the two ends of the strip while maintaining a light tension on the strip, and while traversing across the journal. Do not dwell in the center of the journal. Rotate the crankshaft 90° between each traverse. Repeat four times. If abrasive paper is used, complete the fourth and final polishing process using crocus cloth or Mylar tape.

9.4.7.10 After preparing the crankshaft according to 9.4.7.1–9.4.7.9, clean it thoroughly. Either pressure spray it with mineral spirits<sup>30</sup> or brush it with mineral spirits<sup>30</sup>, and air dry.

A1.3 Thoroughly clean the connecting rod bore with mineral spirits<sup>30</sup> and air dry. Use caution not to affect the original surface. Clean the connecting rod bearings according to A9.1. Install the rod bearing halves that are to be used in the test into the proper location (top and bottom as marked). Place the connecting rod into a holding device clamping as close as possible to the large end of the connecting rod to prevent the rod from being twisted during the torquing procedure. Install lower bearing cap and apply 61 N·m torque to the bearing cap bolts.

A9.1 Soak bearings halves in a container of mineral spirits<sup>30</sup> for a minimum of 5 min to remove all traces of oil from both the front and back of the bearing. During the soak period move the bearing halves back and forth in solvent using protective tongs. Exercise care when handling the bearings to prevent nicking or scratching the bearing surface. (Always use latex gloves and protective tongs when handling bearings.)

A18. Test Fuel Specification.

A18.1 The Test Fuel Specification is shown in Fig. A18.1.

ASTM D6709 Sequence VIII Test Fuel Specification					
Halterman Products KA24E Test Fuel					
Product Code: HF008					
TEST	METHOD	UNITS	SPECIFICATIONS		
			MIN	TARGET	MAX
Distillation - IBP	ASTM D86	°F	75		95
5%		°F			
10%		°F	120		135
20%		°F			
30%		°F			
40%		°F			
50%		°F	200		230
60%		°F			
70%		°F			
80%		°F			
90%		°F	300		325
95%		°F			
Distillation - EP		°F	385		415
Recovery		vol %		Report	
Residue		vol %		Report	
Loss		vol %		Report	
Gravity	ASTM D4052	°API	58.7		61.2
Density	ASTM D4052	kg/l	0.734		0.744
Reid Vapor Pressure	ASTM D323	psi	8.8		9.2
Carbon	ASTM E191	wt fraction	0.8580		0.8667
Carbon	ASTM D3343	wt fraction		Report	
Sulfur	ASTM D4294	wt %	0.01		0.04
Lead	ASTM D3237	g/gal			0.05
Phosphorous	ASTM D3231	g/gal			0.005
Oxygen	ASTM D4815	wt %			0.05
Composition, aromatics	ASTM D1319	vol %			35.0
Composition, olefins	ASTM D1319	vol %	5.0		10.0
Composition, saturates	ASTM D1319	vol %		Report	
Oxidation Stability	ASTM D525	minutes	1440		
Copper Corrosion	ASTM D130				1
Gum content, washed	ASTM D381	mg/100ml			5
Research Octane Number	ASTM D2699		96.0		97.5
Motor Octane Number	ASTM D2700			Report	
R+M/2	D2699/2700			Report	
Sensitivity	D2699/2700		7.5		
Net Heat of Combustion	ASTM D240	btu/lb		Report	
Color	Visual			Green	

Fig. A18.1 KA24E Test Fuel Specification