



Standard Test Method for Shear Stability of Polymer Containing Fluids Using a European Diesel Injector Apparatus¹

This standard is issued under the fixed designation D6278; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—Editorial changes made to 3.2.1 and Section 10 in April 2013.

1. Scope*

1.1 This test method covers the evaluation of the shear stability of polymer-containing fluids. The test method measures the percent viscosity loss at 100°C of polymer-containing fluids when evaluated by a diesel injector apparatus procedure that uses European diesel injector test equipment. The viscosity loss reflects polymer degradation due to shear at the nozzle.

NOTE 1—Test Method D2603 has been used for similar evaluation of shear stability; limitations are as indicated in the significance statement. No detailed attempt has been undertaken to correlate the results of this test method with those of the sonic shear test method.

NOTE 2—This test method uses test apparatus as defined in CEC L-14-A-93. This test method differs from CEC-L-14-A-93 in the period of time required for calibration.

NOTE 3—Test Method D5275 also shears oils in a diesel injector apparatus but may give different results.

NOTE 4—This test method has different calibration and operational requirements than withdrawn Test Method D3945.

NOTE 5—Test Method D7109 is a similar procedure that measures shear stability at both 30 and 90 injection cycles. This test method uses 30 injection cycles only.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in Section 8.

2. Referenced Documents

2.1 ASTM Standards:²

D445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.07 on Flow Properties.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D2603 Test Method for Sonic Shear Stability of Polymer-Containing Oils

D5275 Test Method for Fuel Injector Shear Stability Test (FISST) for Polymer Containing Fluids

D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

D7109 Test Method for Shear Stability of Polymer Containing Fluids Using a European Diesel Injector Apparatus at 30 and 90 Cycles

2.2 *Coordination European Council (CEC) Standard:*³

CEC L-14-A-93 Evaluation of the Mechanical Shear Stability of Lubricating Oils Containing Polymers

3. Terminology

3.1 Definitions:

3.1.1 *kinematic viscosity, n*—a measure of the resistance to flow of a fluid under gravity.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *calibration pressure, n*—the recorded gauge pressure when calibration fluid RL233 undergoes a viscosity loss of 2.7 to 2.9 mm²/s when the recorded gauge pressure is within the range of 13.0 to 18.0 MPa.

3.2.2 *percent viscosity loss, n*—viscosity loss, as defined in 3.2.3, divided by the pre-sheared viscosity, and reported as a percent.

3.2.3 *viscosity loss, n*—the loss in viscosity determined from the difference in kinematic viscosity at 100°C of pre-sheared and post-sheared fluid.

4. Summary of Test Method

4.1 A polymer-containing fluid is passed through a diesel injector nozzle at a shear rate that causes polymer molecules to degrade. The resultant degradation reduces the kinematic viscosity of the fluid under test. The percent viscosity loss is a measure of the mechanical shear stability of the polymer-containing fluid.

³ Available from CEC Secretariat, Interlynk Administrative Services, Ltd., Lynk House, 17 Peckleton Lane, Desford, Leicestershire, LE9 9JU, United Kingdom.

*A Summary of Changes section appears at the end of this standard