

KES

**Standard Test Method for
Maximum Fluidity Temperature
of Residual Fuel Oil**

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1. Scope of Application

This standard shall specify evaluation of low temperature fluidity of gasoline.

2. Summary of Method

- (1) Heat the test sample of the fuel to 220 °F (104 °C). Divide the test sample into 6 and cool until the samples solidify. Heat refining water to 100, 120, 140, 160, 180 and 200 °F (38, 49, 60, 71, 82 and 93). Pour the 6 samples in U shaped test tube. Test sample is cooled slowly by immersion in constant temperature chamber.
- (2) 6 test samples in u shaped test tube are heated at different temperature settings. The test is process in constant temperature chamber, sample is heated in 5 °F (3 °C) difference. Report the fluidity determined.

3. Definition of Terms

- (1) Fluidity Temperature: Maximum pressure to measure the heat or the minimum temperature (5 °F (3 °C)) at which fluid speed is 2 mm/min when height of the mercurial column is 15.2 cm, in 12.5 mm U shaped test tube.
- (2) Maximum Fluidity Temperature: Single fluidity temperature found after heating samples at 100, 120, 140, 160, 180 and 200 °F (38, 49, 60, 71, 82 and 93 °C)

4. Apparatus

- (1) Glass U Shaped Test Tube

The height is 150 mm, inner diameter is 12.5 ± 1 mm, and diameter of outer curvature of the test tube is 35 mm.

- (2) Thermometer

It meets the standard of ASTM has scales at every 5 °F (5 °C). The range suitable for this thermometer is -26 to 120 °F (-38 to 50 °C). Thermometer is inserted in U shaped

test tube, used to measure temperature of constant temperature chamber. Other thermometer has range of 0 to 320 °F (-20 to 150 °C), and scale marks at every 1 °F (1 °C), is used to measure the temperature during test sample preparation.

(3) Low temperature constant temperature chamber is filled with kerosene or other low temperature solution and dry ice. The chamber is kept at 0 ± 2 °F (-18 ± 1 °C).

(4) Cooling Bath

2 cooling baths are filled with water and ice. One is kept at 50 ± 2 °F (10 ± 1 °C) and the other at 32 ± 2 °F. It is used to cool the U shaped test tube. Size and shape is not specified. Supporting pole to fix the U shaped test tube is needed.

(5) Low temperature fluidity test constant temperature chamber is made of tank, mixer, motor and pump that sends coolant that circulates the coil in the bottom of the chamber and passes through cooling bath. The flow of the coolant is controlled by thermostat and solenoid valve (Figure 1).

(6) Mercury manometer has a marking at 15.2 cm and has scale marks at every 1 cm up to 20 cm.

(7) Automatic vacuum controller increases the vacuum at the rate of 1 cm/ 4 s and attached at one end of U shaped test tube. (Refer to Figure 1 and Figure 3)

5. Preparation of Apparatus

Operation of the automatic vacuum controller is as the following. Connect automatic vacuum controller to the Low temperature test constant temperature chamber and close stopcock. Pinchcock of the rubber test tube is used along with stopcock. Adjust the manometer so that the end of the steel rod is above 0.5 inch (1.5 cm) from the mercury graduation of 0. Tie a line around the pulley of the motor to attach a steel rod. Turn on the power switch. Untie the line and lower the steel rod. When the rod touches the mercury, open the solenoid valve from the vacuum line and air will be pump in by need valve at