



Standard Test Method for Thermal Stability of Way Lubricants¹

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1. Scope

1.1 This test method is designed primarily to evaluate the thermal stability of hydrocarbon based way lubricants, although oxidation may occur during the test.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 *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.*

2. Referenced Documents

2.1 ASTM Standards:

D 2070 Test Method for Thermal Stability of Hydraulic Oils²

D 4057 Practice for Manual Sampling of Petroleum and Petroleum Products³

2.2 Other Standards:

UNS C11000 Electrolytic Tough Pitch Copper⁴

AISI W1 1% Carbon Tool Steel⁵

3. Summary of Test Method

3.1 A beaker containing test oil and copper and steel rods is placed in a gravity convection electric oven for 24 h at a test temperature of 100°C. At the completion of the test, the copper and steel rods are visually rated for discoloration and the beaker is visually evaluated for deposits.

4. Significance and Use

4.1 Thermal stability characterizes physical and chemical property changes which may adversely affect an oil's lubricating performance. This test method evaluates the thermal stability of a way lubricant in the presence of copper and steel

rods at 100°C. Deposits and rod colors are the evaluation criteria. No correlation of the test to field service has been made.

4.2 This test method is intended for use in qualifying a way lubricant, rather than for quality control or condition monitoring purposes.

5. Apparatus

5.1 *Gravity Convection Electric Oven*, capable of maintaining the samples at a test temperature of $100 \pm 2^\circ\text{C}$.

5.2 *Calibrated Temperature Indicator*, suitable for measuring and controlling the oven temperature.

5.3 *Griffin Beakers*, borosilicate glass, 100 mL.

5.4 *Copper Test Specimens*, in accordance with UNS C11000, 99.9 % pure electrolytic tough pitch copper, 6.4 mm in diameter by 7.6 cm in length (0.25 by 3.0 in.).

5.5 *Steel Test Specimens*, in accordance with AISI W1 1 % carbon steel, 6.4 mm in diameter by 7.6 cm in length (0.25 by 3.0 in.).

5.6 *Silicon Carbide Abrasive*, 320 grit with cloth backing.

5.7 *Crocus Cloth*.

5.8 *Cincinnati Milacron Color Chart*.⁶

5.9 *Facial Tissue*.

6. Reagents

6.1 *Reagent Grade Acetone*. (**Warning**—Flammable, health hazard.)

6.2 *Reagent Grade Heptane*. (**Warning**—Flammable, health hazard.)

7. Preparation of Metal Rods

7.1 Handle the rods at all times using forceps, facial tissue, or suitable gloves.

7.2 Clean the iron and copper catalyst rods, whether new or previously used, prior to use. Clean the rods with the 320 grit silicon carbide abrasive cloth while rotating the rods in a drill chuck at 1700 to 1800 rev/min. Clean the surface until it has a bright copper or steel appearance. Discard rods when diameter is less than 6 mm.

7.3 Prepare surfaces finally with a crocus cloth. Remove all grind marks. Finish the rods to a lightly polished surface finish.

¹ This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.L on Industrial Lubricants.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vol 05.02.

⁴ Available from Copper Development Assoc., 2 Greenwich Office Park, Box 1840, Greenwich, CT 06836.

⁵ Available from American Iron and Steel Institute, 1133 15th St., NW, Washington, DC 20005.

⁶ Available from Cincinnati Milacron, 470 Marburg Ave., Dept 97B Lubricants and Tribology, Cincinnati, OH 45209.

