



Standard Guide for Determining Emulsion Properties, Wetting Behavior, and Corrosion-Inhibitory Properties of Crude Oils¹

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1. Scope

1.1 This guide presents some generally accepted laboratory methodologies that are used for determining emulsion forming tendency, wetting behavior, and corrosion-inhibitory properties of crude oil.

1.2 This guide does not cover detailed calculations and methods, but rather covers a range of approaches that have found application in evaluating emulsions, wettability, and the corrosion rate of steel in crude oil/water mixtures.

1.3 Only those methodologies that have found wide acceptance in the industry are considered in this guide.

1.4 This guide is intended to assist in the selection of methodologies that can be used for determining the corrosivity of crude oil under conditions in which water is present in the liquid state (typically up to 100°C). These conditions normally occur during oil and gas production, storage, and transportation in the pipelines.

1.5 This guide is not applicable at higher temperatures (typically above 300°C) that occur during refining crude oil in refineries.

1.6 This guide involves the use of electrical currents in the presence of flammable liquids. Awareness of fire safety is critical for the safe use of this guide.

1.7 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.8 *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:²

- D96 Test Method for Water and Sediment in Crude Oil by Centrifuge Method (Field Procedure) (Withdrawn 2000)³
- D473 Test Method for Sediment in Crude Oils and Fuel Oils by the Extraction Method
- D665 Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water
- D724 Test Method for Surface Wettability of Paper (Angle-of-Contact Method) (Withdrawn 2009)³
- D1125 Test Methods for Electrical Conductivity and Resistivity of Water
- D1129 Terminology Relating to Water
- D1141 Practice for the Preparation of Substitute Ocean Water
- D1193 Specification for Reagent Water
- D4006 Test Method for Water in Crude Oil by Distillation
- D4057 Practice for Manual Sampling of Petroleum and Petroleum Products
- D4377 Test Method for Water in Crude Oils by Potentiometric Karl Fischer Titration
- G1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens
- G31 Guide for Laboratory Immersion Corrosion Testing of Metals
- G111 Guide for Corrosion Tests in High Temperature or High Pressure Environment, or Both
- G170 Guide for Evaluating and Qualifying Oilfield and Refinery Corrosion Inhibitors in the Laboratory
- G184 Practice for Evaluating and Qualifying Oil Field and Refinery Corrosion Inhibitors Using Rotating Cage
- G185 Practice for Evaluating and Qualifying Oil Field and Refinery Corrosion Inhibitors Using the Rotating Cylinder Electrode
- G193 Terminology and Acronyms Relating to Corrosion

¹ This guide is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.05 on Laboratory Corrosion Tests.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.