



Standard Guide for Collecting Skimmer Performance Data in Controlled Environments¹

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1. Scope

1.1 This standard provides a guide for determining performance parameters of full-scale oil spill removal devices in recovering floating oil when tested in controlled environments.

1.2 This guide involves the use of specific test oils that may be considered hazardous materials after testing is completed. It is the responsibility of the user of this guide to procure and abide by the necessary permits for disposal of the used test oil.

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 97 Test Method for Pour Point of Petroleum Products²
- D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity)³
- D 971 Test Method for Interfacial Tension of Oil Against Water by the Ring Method³
- D 1298 Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method²
- D 2983 Test Method for Low-Temperature Viscosity of Automotive Fluid Lubricants Measured by Brookfield Viscometer⁴
- D 4007 Test Method for Water and Sediment in Crude Oil by the Centrifuge Method (Laboratory Procedure)⁴
- F 625 Practice for Classifying Water Bodies for Spill Control Systems⁵
- F 808 Guide for Collecting Skimmer Performance Data in Uncontrolled Environments⁶

¹ This guide is under the jurisdiction of ASTM Committee F-20 on Hazardous Substances and Oil Spill Response and is the direct responsibility of Subcommittee F20.12 on Removal.

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² Annual Book of ASTM Standards, Vol 05.01.

³ Annual Book of ASTM Standards, Vol 10.03.

⁴ Annual Book of ASTM Standards, Vol 05.02.

⁵ Annual Book of ASTM Standards, Vol 11.04.

⁶ Discontinued; see 1998 Annual Book of ASTM Standards, Vol 11.04.

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *data collection period, n*—the period of time during a test run when the performance data are recorded.

3.1.2 *emulsification factor, n*—the increase in total fluids in storage as a result of emulsification by the skimming mechanism, the skimmer pump, or other component of the skimmer.

$$EF = (WC_F - WC_0)/(100 - WC_F) + 1 \quad (1)$$

where:

WC_F = the final water content %, and

WC_0 = the initial water content %.

3.1.3 *nameplate recovery rate, n*—the maximum skimming capacity of a device as stated by the manufacturer.

3.1.4 *oil encounter rate, n*—the volume of oil per unit time actively directed to the removal mechanism (m³/h).

3.1.5 *oil recovery efficiency, n*—the ratio, expressed as a percentage, of the volume of oil recovered to the volume of total fluids recovered.

3.1.6 *oil recovery rate, n*—the volume of oil recovered by the device per unit of time (m³/h).

3.1.7 *oil slick, n*—the oily fluid encountered by the skimmer.

3.1.7.1 *Discussion*—Most real oil slicks actually are composed of various proportions of pure oil, water-in-oil (W/O) emulsions, and oil-in-water (O/W) emulsions; therefore, efficiencies and other performance criteria must be differentiated between those based on the oil slick itself, and those based on only the water-free oil contained within the oil slick.

3.1.8 *oil slick encounter rate, n*—the volume of oil slick per unit time actively encountered by the skimmer, and therefore, available for recovery (m³/h).

3.1.9 *oil slick recovery efficiency, n*—the ratio, expressed as a percentage, of the volume of oil slick recovered to the volume of total fluids recovered.

3.1.10 *oil slick recovery rate, n*—the volume of oil slick removed from the water surface by the skimmer per unit of time.

3.1.11 *oil slick thickness, n*—the average thickness of the oil slick encountered by the test device (mm).

3.1.12 *test fluid, n*—the oil or oil/water mixture distributed on the water of the test facility and presented to the spill removal device for recovery.