



Standard Guide for Collecting Containment Boom Performance Data in Controlled Environments¹

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1. Scope

1.1 This standard provides a guide for evaluating the effectiveness of full-scale oil spill containment booms in a controlled test facility.

1.2 This guide involves the use of specific test oils that may be considered hazardous materials. 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 requirements prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 97 Test Method for Pour Point of Petroleum Oils²
- D 445 Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity)²
- D 971 Test Method for Interfacial Tension of Oil Against Water by the Ring Method³
- D 1298 Practice for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method²
- D 1796 Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure)²
- 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 Centrifuge Method (Laboratory Procedures)⁴
- D 4092 Test Method for Density and Relative Density of liquids by Digital Density Meter⁵
- F 631 Guide for Collecting Skimmer Performance Data in

Controlled Environments⁶

F 818 Terminology Relating to Spill Response Barriers⁶

3. Terminology

3.1 *Boom Performance Data Terminology*—Terms associated with boom performance tests conducted in controlled environments:

3.1.1 *boom submergence (aka submarining)*—containment failure due to loss of freeboard.

3.1.2 *first-loss tow/current velocity*—minimum tow/current velocity normal to the membrane at which oil continually escapes past a boom. This applies to the boom in the catenary position.

3.1.3 *gross loss tow/current velocity*—the minimum speed at which massive continual oil loss is observed escaping past the boom.

3.1.4 *harbor chop*—a condition of the water surface produced by an irregular pattern of waves.

3.1.5 *preload*—during testing, the quantity of test fluid distributed in front of and contained by the boom prior to the onset of a test.

3.1.6 *tow speed*—the relative speed difference between a boom and the water in which the boom is floating. In this standard guide relative current speed is equivalent.

3.1.7 *wave height*—(significant wave height) the average height, measured crest to trough, of the one-third highest waves, considering only short-period waves (i.e., period less than 10 s).

3.1.8 *wave period*—(significant wave period) the average period of the one-third highest waves, measured as the elapsed time between crests of succeeding waves.

4. Significance and Use

4.1 This guide defines a series of test methods to determine the oil containment effectiveness of containment booms when they are subjected to a variety of towing and wave conditions. The test methods measure the tow speed at which the boom first loses oil (both in calm water and in various wave conditions), the tow speed at which the boom reaches a gross oil loss condition (both in calm water and in various wave conditions), boom conformance to the surface wave conditions

¹ This guide is under the jurisdiction of ASTM Committee F20 on Hazardous Substances and Oil Spill Response and is the direct responsibility of Subcommittee F20.11 on Control.

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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 08.02.

⁶ *Annual Book of ASTM Standards*, Vol 11.04.