



Designation: **F2152–07 (Reapproved 2013) F2152 – 07 (Reapproved 2018)**

## Standard Guide for In-Situ Burning of Spilled Oil: Fire-Resistant Boom<sup>1</sup>

This standard is issued under the fixed designation F2152; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This guide covers a set of criteria to evaluate the performance, material characteristics, and essential features of fire-resistant oil spill containment boom.

1.2 This guide covers two types of fire-resistant oil containment boom: those that are intrinsically fire-resistant through the use of fire-resistant materials, and those that provide fire-resistance through the use of coolants. This guide may not be fully applicable to other types of fire-resistant boom.

1.3 This guide is one of four related to in-situ burning of oil spills. Guide **F1788** addresses environmental and operational considerations, Guide **F1990** addresses ignition devices, and Guide **F2230** addresses burning in ice conditions.

1.4 *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, health, and environmental practices and determine the applicability of regulatory requirements/limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

**F625** Practice for Classifying Water Bodies for Spill Control Systems

**F715** Test Methods for Coated Fabrics Used for Oil Spill Control and Storage

**F818** Terminology Relating to Spill Response Booms and Barriers

**F962** Specification for Oil Spill Response Boom Connection: Z-Connector

**F1093** Test Methods for Tensile Strength Characteristics of Oil Spill Response Boom

**F1523** Guide for Selection of Booms in Accordance With Water Body Classifications

**F1788** Guide for In-Situ Burning of Oil Spills on Water: Environmental and Operational Considerations

**F1990** Guide for In-Situ Burning of Spilled Oil: Ignition Devices

**F2084** Guide for Collecting Containment Boom Performance Data in Controlled Environments

**F2230** Guide for In-situ Burning of Oil Spills on Water: Ice Conditions

### 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *actively-cooled fire-resistant boom*—type of fire-resistant boom that uses ancillary equipment to supply coolant to the boom to increase its fire resistance.

3.1.2 *ancillary equipment*—mechanical devices essential to the operation of a given boom system; for example, water pumps, power supplies, control manifolds, and so forth.

3.1.3 *fire resistance*—the ability of a barrier to maintain structural integrity and oil containment ability while being subjected to the thermal stress of a petroleum fire.

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee **F20** on Hazardous Substances and Oil Spill Response and is the direct responsibility of Subcommittee **F20.15** on In-Situ Burning.

Current edition approved April 1, 2013/Oct. 1, 2018. Published July 2013/March 2019. Originally approved in 2001. Last previous edition approved in 2007/2013 as **F2152–07**; **F2152 – 07(2013)**. DOI: 10.1520/F2152-07R13; 10.1520/F2152-07R18.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.



- 3.1.4 *fire-resistant boom*—barrier intended for containment of burning oil floating on water.
- 3.1.5 *freeboard*—minimum vertical height of the boom above the water line.
- 3.1.6 *heat flux*—the thermal intensity indicated by the amount of energy per unit area. (kW/m<sup>2</sup>).
- 3.1.7 *in-situ burning*—burning of oil directly on the water surface.
- 3.1.8 *residue*—the material, excluding airborne emissions, remaining after the oil stops burning.

3.1.8.1 *Discussion*—

Residue includes only material derived from the oil that is burned, and it shall not include material related to the boom or its components.

3.1.9 *salvageable components*—components of the boom that may be reused in a repair or reconstruction of the boom to its original state.

3.2 For other definitions relating to boom properties and dimensions, refer to Terminology F818.

#### 4. Equipment Description

4.1 To be effective, the fire-resistant boom shall contain oil floating on water before, during, and after exposure to in-situ burning of oil.

4.2 Some fire-resistant booms use coolant to increase their fire resistance. With some booms, this is actively supplied by ancillary equipment; others rely on wicking of the water in which the boom is floating. Additional requirements and testing stipulations for such booms are noted in 5.5 and 6.5.

4.3 If a boom is defined as reusable, a procedure for cleaning, decontaminating, salvage, and restoration shall be provided to the user by the manufacturer.

4.4 Fire-resistant booms may be used in conjunction with conventional booms or “transition” booms. If a boom is to be used in this fashion, a suitable means of connection between the fire boom and transition boom must be made, such as a connector in accordance with Specification F962.

#### 5. Minimum Equipment Performance Characteristics

##### 5.1 *Overview:*

5.1.1 Minimum performance characteristics are grouped under three headings: Operability, Oil Containment; and Fire-Resistance. All minimum performance characteristics listed here shall be achieved before a boom is considered to meet the requirements of this guide.

5.1.2 The fire-resistant boom shall withstand oil fires and contain oil in various conditions that include both calm water and waves with a significant wave height of up to 1 m and a period of 3 to 4 s.

5.1.3 For booms intended for use in salt water or brackish water, the boom shall be tested in water that has a salinity of 15 o/oo (parts per thousand) or greater. For booms that rely on wicking, the salinity shall be 33 o/oo or greater. For actively-cooled booms, the water in which the boom is tested may be 15 o/oo if the water supplied to the boom (from a separate supply) has a salinity of 33 o/oo or greater.

##### 5.2 *Operability Characteristics:*

5.2.1 The fire-resistant boom shall meet the minimum physical dimensions and strength parameters as for conventional oil containment booms, except for the buoyancy-to-weight ratio. These parameters are listed in Guide F1523 and summarized in Table 1.

5.2.2 *Total Tensile Strength*—Prior to exposure to an in-situ burn, the fire-resistant boom shall meet the minimum total strength for the various water body classifications listed in Table 1.

5.2.3 Total tensile strength for fire-resistant booms may decrease after each burn exposure. In any case, the boom shall retain sufficient strength following a burn to retain burn residue and any unburned oil and to allow the salvage or disposal of the boom.

5.2.4 *Corrosion Resistance*—Fire-resistant oil spill containment booms (and ancillary systems, if applicable) shall be manufactured of components that do not degrade significantly and that maintain fire resistance characteristics while exposed to typical marine environmental conditions.

5.2.5 *Extreme Temperature Properties*—The fire-resistant boom and any ancillary equipment shall not be adversely affected by use or storage at temperatures within the range of -40 to 40°C:40 °C.

5.2.6 *Fabric Tests*—Fabrics and components shall meet the applicable test methods for fabrics used in spill control barriers and temporary storage devices in accordance with Test Methods F715.