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StandardGuide for Oil Spill Dispersant Application Equipment: Boom and Nozzle Systems[1]

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1. Scope

1.1 This guide covers design criteria, requirements, material characteristics, and essential features for oil spill dispersant application systems. This guide is not intended to be restrictive to a specific configuration.

1.2 This guide covers spray systems employing booms and nozzles and is not fully applicable to other systems such as fire monitors, sonic distributors, or fan-spray guns.

1.3 This guide covers systems for use on ships or boats and helicopters or airplanes.

1.4 This guide is one of four related to dispersant application systems using booms and nozzles. One is on design, one on calibration, one on deposition measurements, and one on the use of the systems. Familiarity with all four guides is recommended.

1.5 *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]

F1460 Practice for Calibrating Oil Spill Dispersant Application Equipment Boom and Nozzle Systems

F1738 Test Method for Determination of Deposition of Aerially Applied Oil Spill Dispersants

3. Significance and Use

3.1 This guide will enable design of oil spill dispersant application equipment using boom and nozzle systems and ensure a desired dosage and uniformity across the swath width.

3.2 This guide provides information for designing and specifying dispersant spray application equipment to obtain optimal application rates. These include specifications for minimum equipment performance, equations for estimating operational parameters, material considerations, and a list of information to be provided to the equipment purchaser.

4. Equipment Description

4.1 *General*—Oil spill dispersant spray systems include one or more booms with nozzles to form droplets, a pumping or pressure system to deliver dispersants to the boom, and associated piping and valving. All systems shall include a dispersant flow meter and a pressure gauge. All systems shall be equipped with provision for cleaning and drainage.

4.2 *Ship/Boat*—Each boom holding nozzles shall be designed to be mounted near the bow of the vessel so that the spray is uniformly deposited on the slick surface. Spray units can be portable or fixed. Flow correction or straightener devices, to ensure laminar flow, shall precede the nozzles. System components should be designed to give a uniform droplet spray as described in this guide. The spray pattern should be flat and strike the water in a line perpendicular to the vessel's line of travel. The nozzle spray angle should be such that spray from adjacent nozzles overlap just above the water.

4.3 *Airplanes*—Mounting of spray booms on aircraft is subject to federal regulation. Each installation or modification requires approval.

4.3.1 Nozzles may not be necessary on aircraft flying at speeds greater than 220 km/h (120 knots or 135 mph) because the wind shear alone can produce the required droplet sizes. Pressure-activated check valves must be used to eliminate drainage during nonspraying transits. In order to minimize the effects of wind shear, nozzles should be oriented aft (180° from the direction of flight).

4.4 *Helicopters*—Systems may consist of spray booms with nozzles and pump/tank assemblies directly attached to the helicopter or a bucket system slung below the helicopter.

4.4.1 The bucket system consists of a tank and pump assembly to which spray booms with nozzles are attached. The assembly is supported from the helicopter by a cable system and is remotely-controlled from the helicopter cabin. An

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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.