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## Standard Guide for Containment of Hazardous Material Spills by Emergency Response Personnel<sup>1</sup>

This standard is issued under the fixed designation F1127; 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 describes methods to contain the spread of hazardous materials that have been discharged into the environment. It is directed toward those emergency response personnel who have had adequate hazardous material response training.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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

*1.4 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>

[F716 Test Methods for Sorbent Performance of Absorbents for Use on Chemical and Light Hydrocarbon Spills](#)

[F726 Test Method for Sorbent Performance of Adsorbents for use on Crude Oil and Related Spills](#)

[F1129 Guide for Using Aqueous Foams to Control the Vapor Hazard from Immiscible Volatile Liquids](#)

[F1525 Guide for Use of Membrane Technology in Mitigating Hazardous Chemical Spills](#)

#### 2.2 Federal Schedules/Regulations:<sup>3</sup>

[29 CFR 1910.120 – Hazardous waste operations and emergency response](#)

[2001.340 CFR 112 Protection of Environment, Part 112 Oil Pollution Prevention](#)

[2001.440 CFR 300 Protection of Environment, Part 300 National Oil and Hazardous Substances Pollution Contingency Plan 2008.1](#)

### 3. Terminology

#### 3.1 Definitions of Terms Specific to This Standard:

<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 F20.22 on Mitigation Actions.

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<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.

<sup>3</sup> Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>. Electronic Code of Federal Regulations e-CFR, <https://www.ecfr.gov>

3.1.1 *absorbent*—a material that picks up and retains a liquid distributed throughout its molecular structure causing the solid to swell (50 % or more). The absorbent is at least 70 % insoluble in excess ~~fluid~~ liquid.

3.1.2 *adsorbent*—an insoluble material that is coated by a liquid on its surface including pores and ~~capillaries~~ capillaries without the solid swelling more than 50 % in excess liquid.

3.1.3 *gellant*—a material such as a colloidal network or other aggregate network ~~which~~ that pervades and holds a liquid in a highly viscous fragile structure. Many gels may rapidly liquefy with added heat or ionic/polar addition. These materials are soluble/flowable in excess liquid.

3.1.4 *sorbent*—an insoluble material or mixture of materials used to recover liquids through the mechanisms of absorption or adsorption, or both.

3.1.5 *thickener*—a material (usually of higher molecular weight) that is soluble in excess liquid. These materials go from dry to gummy (viscoelastic) to flowable and then soluble. The final viscosity depends only on the liquid to solid ~~ratio~~ ratio

3.1.6 *universal sorbent*—an insoluble material or mixture of materials that will sorb both hydrophobic and hydrophilic liquid spills.

#### 4. Significance and Use

4.1 This guide contains information regarding the containment of a hazardous material that has escaped from its container. If a material can be contained, the impact on the environment and the threat it poses to responders and the general public is usually reduced. The techniques described in this guide are among those that may be used by emergency responders to lessen the impact of a discharge. Initial hazard assessment should be performed before applying mitigation techniques.

4.2 Emergency responders might include police, fire service personnel, government spill response personnel, industrial response personnel, or spill response contractors. In order to apply any of the techniques described in this guide, appropriate training is recommended. See OSHA Hazardous Waste and Emergency Response Standard (HAZWOPER) requirements.

#### 5. Containment Methodology

5.1 Containment equipment, procedures, and techniques can be categorized into three general functional classes: ~~(a(a))~~ patch/plug, ~~(b(b))~~ enclosure, and ~~(c(c))~~ immobilization. The important advantage of containment is that it restricts the spreading of a spill and makes cleanup easier. Careful selection of techniques and materials is required. Errors in judgment can lead to worsening of the situation, deflagration or detonation, and increased hazard to personnel involved in the cleanup.

#### 6. Patches and Plugs (General)

6.1 Diminishing or stopping the flow of a leaking hazardous material is desirable in order to limit the size of the spill. The following techniques may be helpful in controlling leaks, provided response personnel can use them safely under existing conditions. Whichever method is used, it should be noted that the higher the pressure inside the container, the more difficult it is to plug the leak.

6.1.1 *Wood Plug*—Wooden cones and wedges may be hammered into leaking containers (drums, tanks, pipes, and so forth). Softwoods in particular are easily sawed or lathe-turned and conform well to irregular shapes. Additionally, softwood may absorb liquid and swell, enhancing its capacity to seal a leak. Wedges or cedar shingles are especially applicable to splits, gouges, rips, and tears. Rigid plywood sheets or compatible closed cell flexible plastic foam ~~125 mm to 2-in. (2550 mm (1 in. to 50-mm) 2 in.)~~ thick can be fastened over a damaged area with “T” bolts, ~~tie-down~~ tie-down toggle, molly, butterfly bolts, straps, or by mechanical bracing and wedging. To minimize leakage between the plywood and the container, a gasket of rubber or flexible closed cell plastic foam, putty, butyl rubber caulk, lead wool, or oakum may be used.

6.1.2 *Metal Sheet*—Various sizes of steel or aluminum sheets can be fastened over damaged areas by mechanical methods (“T” bolts, toggle bolts, bracing, strapping, and so forth). Gasketing material between the metal and the container generally provides more positive sealing.