



Designation: F 1129 – 88 (Reapproved 1995)^{€1}

Standard Guide for Using Aqueous Foams to Control the Vapor Hazard from Immiscible Volatile Liquids¹

This standard is issued under the fixed designation F 1129; 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 (€) indicates an editorial change since the last revision or reapproval.

€¹ NOTE—Section 11 was added editorially in September 1995.

INTRODUCTION

The vapor released by spills of volatile hazardous substances (either flammable or toxic) can present a significant hazard to life and property in the spill area and for some measurable distance downwind. Such spills may also cause natural resource damage by penetration into the ground or by movement into groundwater.

Aqueous foam blankets have been shown to be an effective mechanism to mitigate the hazard arising from vapor release of volatile chemicals and to block accidental ignition of flammable liquids. Because they are a common tool of the fire services, they are available early in the spill response. Foams can be used to control spill vapors to extend evacuation time and may offer a long-term control for the life of the incident.

Effective actions have been demonstrated for a wide variety of chemical classes—volatile organics, water reactive inorganics and certain classes of liquefied gases.

The water reactive compounds and liquefied gases require special considerations peculiar to each chemical grouping. Although foam solutions are not considered to be dispersants, foam treatment may enhance the penetration of water soluble materials into the ground, or transport into the groundwater, or both. Adequate information is not available to generalize on such questions.

1. Scope

1.1 This guide restricts itself to addressing the application of foam to water immiscible liquid compounds with boiling points above 15°C for vapor control of landspill or contained spills on water.

1.2 *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.* For hazard statements, see Section 10.

2. Referenced Documents

2.1 NFPA Standards:²

- 11 Low Expansion Foam and Combined Agent Systems
- 11A Foam Systems Medium and High Expansion

3. Terminology

3.1 *aqueous foam*—a mixture of water and a foaming agent.

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 F20.22 on Mitigation Actions.

Current edition approved Feb. 26, 1988. Published April 1988.

² Available from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

3.2 *foam*—a mass of bubbles formed by the mechanical agitation of foam solution with air.

3.3 *foam expansion*—the ratio of air to water in the foam. A measure of the volume of foam produced for each volume of foam solution used.

3.4 *high expansion*—a ratio of greater than 100:1. (See Foam Equipment for practical ranges of expansion.)

3.5 *foaming agent*—an organic compound or mixture of compounds which lowers the surface tension of water and imparts a foaming capability to it. Five major types of foam liquid concentrates are in general use by the fire service.

3.6 *protein*—a mixture of hydrolyzed animal protein with various stabilizing materials. Protein foam may be used only at low expansion. The surface tension of protein foam solutions in water is 40 to 50 dyne/cm. Protein foams are subject to bacterial and fungal attack and may have shelf life limitations.

3.7 *surfactant*—also known as syndet or detergent foam. These foams are based on high-foaming synthetic surface active agents. While these foams are normally used at high expansion, they may also be applied through low expansion foam-making devices. Surface tensions are in the range 23 to 30 dyne/cm.

3.8 *aqueous film forming foam*—also known as AFFF (A triple F). AFFF is a mixture of fluorocarbon and hydrocarbon surfactants. It is usually used at low expansion. The very low