

NFPA 1150

Standard on Foam Chemicals for Fires in Class A Fuels

2004 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
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Standard on
Foam Chemicals for Fires in Class A Fuels
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This edition of NFPA 1150, *Standard on Foam Chemicals for Fires in Class A Fuels*, was prepared by the Technical Committee on Forest and Rural Fire Protection and acted on by NFPA at its May Association Technical Meeting held May 23–26, 2004, in Salt Lake City, UT. It was issued by the Standards Council on July 16, 2004, with an effective date of August 5, 2004, and supersedes all previous editions.

This edition of NFPA 1150 was approved as an American National Standard on August 5, 2004.

Origin and Development of NFPA 1150

The first edition of this document was issued in 1989 as NFPA 298, *Standard on Foam Chemicals for Wildland Fire Control*, in response to a perceived need for a performance standard dealing with the foam chemicals being used in controlling wildland fires. The 1994 edition was a complete revision to make the document consistent with the developing changes in Class A foam technology. The title was changed to *Standard on Fire Fighting Foam Chemicals for Class A Fuels in Rural, Suburban, and Vegetated Areas*.

In 1999, the document was again revised to reflect further advancements in technology and a greater number of Class A concentrates and delivery systems available for use. The document was renumbered as NFPA 1150, which put it within the numerical grouping of documents under the responsibility of the Technical Committee on Forest and Rural Fire Protection.

This edition is a complete revision to bring the document into conformance with the NFPA *Manual of Style*. The title has been changed to *Standard on Foam Chemicals for Fires in Class A Fuels* to recognize that these chemicals are being used not only in rural or wildland areas but in structural fire fighting and urban areas as well. The test procedures for the chemicals as well as the lists of materials tested for compatibility with the chemicals have been updated to ensure the product is consistent with the needs of fire suppression personnel who are using the chemicals to control, suppress, or prevent fires in Class A fuels.

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Rep. National Volunteer Fire Council

Philip A. Cocker, Los Angeles County Fire Department, CA [U]

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Rep. United States Forest Service

Roy A. Johnson, U.S. Department of the Interior, ID [E]

Gregory Kozey, Koche Company, Inc., CT [M]

Dale K. Larson, Fireman's Friend Engineering, Inc., TN [M]

Daniel Madrzykowski, National Institute of Standards and Technology, MD [RT]

Nanette Lockwood McElman, Institute for Business & Home Safety, FL [I]

Rep. Institute for Business & Home Safety

William M. Neville, Jr., Neville Associates, CA [SE]

Martin J. Pabich, Underwriters Laboratories Inc., IL [RT]

Frederick S. Richards, New York Department of State, NY [E]

Rep. International Fire Marshals Association

Herbert A. Spitzer, Jr., Spitzer's Fire & Environmental Consulting, CA [SE]

Alan D. Stovall, State of California, CA [U]

Edward F. Straw, Insurance Services Office, Inc., GA [I]

Howard L. Vandersall, Lawdon Fire Services, Inc., CA [SE]

James T. Wooters, Mizelle, Hodges and Associates Inc., GA [SE]

Alternates

James A. Burns, New York Department of State, NY [E]
(Alt. to F. S. Richards)

Robert L. Crouch, Fire-Trol Holdings LLC, AZ [IM]
(Alt. to L. R. Biddison)

Sam W. Francis, American Forest & Paper Association, PA [M]
(Alt. to J. D. Bowman)

Jack K. Johnson, Alamosa Fire Department, CO [U]
(Alt. to M. P. Carrier)

Peter Matulonis, Tyco Safety Products, IL [M]
(Alt. to M. Hubert)

Emil W. Misichko, Underwriters Laboratories Inc., IL [RT]
(Alt. to M. J. Pabich)

Robert M. Swinford, U.S.D.A. Forest Service, DC [E]
(Alt. to A. R. Forbes)

William D. Walton, National Institute of Standards and Technology, MD [RT]
(Alt. to D. Madrzykowski)

Louis A. Witzeman, Scottsdale Fire Department, AZ [U]
(Alt. to L. G. Jekel)

Carl E. Peterson, NFPA Staff Liaison

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on fire protection for rural, suburban, forest, grass, brush, and tundra areas. This Committee shall also have primary responsibility for documents on Class A foam and its utilization for all wildland and structural fire fighting. This excludes fixed fire protection systems.

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A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for mandatory extracts are given in Chapter 2 and those for nonmandatory extracts are given in Annex B. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1* Scope. This standard specifies requirements for foam and the chemicals used to produce foam that is used to control, suppress, or prevent fires in Class A fuels.

1.2* Purpose.

1.2.1 The purpose of this standard is to define the acceptance requirements and test methods for fire-fighting foam chemicals that are used to control, suppress, or prevent fires in Class A fuels.

1.2.2 Acceptance requirements shall not be deemed as establishing performance levels in actual fire-fighting situations.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. (Reserved)**2.3 Other Publications.**

2.3.1 ASTM Publications. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester*, 2002.

ASTM D 97, *Standard Test Method for Pour Point of Petroleum Products*, 2002.

ASTM D 1331, *Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface-Active Agents*, 2001.

ASTM D 2281, *Standard Test Method for Evaluation of Wetting Agents by the Skein Test*, 1997.

ASTM D 4976, *Standard Specification for Polyethylene Plastics Molding and Extrusion Materials*, 2002.

ASTM E 3, *Standard Practice for Preparation of Metallographic Specimens*, 2001.

ASTM E 407, *Standard Practice of Microetching Metals and Alloys*, 1999.

ASTM E 729, *Standard Guide for Conducting Acute Toxicity Tests on Test Materials with Fishes, Macroinvertebrates, and Amphibians*, 1996.

2.3.2 ISO Publication. International Standards Organization, 1 rue de Varembe, Case Postale 56, CH-1211, Genève 20, Switzerland.

ISO 304, *Surface Active Agents—Determination of Surface Tension by Drawing Up Liquid Films*, 2nd edition, 1985.

2.3.3 NACE Publication. NACE International, 1440 South Creek Drive, Houston, TX 77084-4906.

NACE TM0169, *Standard Test Method — Laboratory Corrosion Testing of Metals*, 2000.

2.3.4 OECD Publication. Organization for Economic Cooperation and Development, 2, rue André-Pascal, 75775 Paris Cedex 16, France.

OECD Principles of Good Laboratory Practice, Annex 2, C(89) 87(Final).

2.3.5 SAE Publications. Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

AMS-3208, *Chloroprene (Cr) Rubber, Weather Resistant*, 45-55, November 1998.

AMS-C-9084, *Cloth, Glass, Finished for Resin Laminates*, June 1999.

AMS-DTL-23053/5, *Insulation Sleeving, Electrical, Heat Shrinkable, Polyolefin, Flexible Crosslinked*, July 1999.

AMSS-8802, *Sealing Compound, Temperature Resistant, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion*, January 2003.

2.3.6 U.S. EPA Publications. Environmental Protection Agency, National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242. Also available at <http://www.epa.gov/ncepihom/nepishom/>.

OPPTS 835.3110, *Ready Biodegradability*, Section M, CO₂ Evolution (Modified Sturm), Test, Fate, Transport and Transformation Test Guidelines, January 1998.

OPPTS 850.1075, *Fish Acute Toxicity Test, Freshwater and Marine*, Ecological Effects Test Guidelines, April 1996.

OPPTS 870.1100, *Acute Oral Toxicity*, Health Effects Test Guidelines, August 1998.

OPPTS 870.1200, *Acute Dermal Toxicity*, Health Effects Test Guidelines, August 1998.

OPPTS 870.1300, *Acute Inhalation Toxicity*, Health Effects Test Guidelines, August 1998.

OPPTS 870.2400, *Acute Eye Irritation*, Health Effects Test Guidelines, August 1998.

OPPTS 870.2500, *Acute Dermal Irritation*, Health Effects Test Guidelines, August 1998.

2.3.7 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

Title 40, Code of Federal Regulations, Part 160, "Good Laboratory Practice Standards."

Title 40, Code of Federal Regulations, Part 792, "Good Laboratory Practice Standards."

Title 49, Code of Federal Regulations, Part 178, Subpart L — "Non-bulk Performance-Oriented Packaging Standards" and Subpart M — "Testing of Non-bulk Packagings and Packages."

Federal Test Standard No. 601, Methods 3021 and 3025 (April 12, 1985).

2.3.8 U.S. Military Specifications. Standardization Documents Order Desk, Building 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094. Also available at <http://stinet.dtic.mil/>.

MIL-A-A-55859A, *Tube, Nonmetallic; Polyvinyl Chloride (PVC) Flexible (General Use)*, October 31, 2002.

MIL-PRF-81733D, *Sealing and Coating Compound, Corrosion Inhibitive*, May 15, 1998.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not included, common usage of the terms shall apply.

3.2 NFPA Official Definitions.

3.2.1* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.2 Shall. Indicates a mandatory requirement.

3.2.3 Should. Indicates a recommendation or that which is advised but not required.

3.2.4 Standard. A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

3.3 General Definitions.

3.3.1 Artificial Sea Water. A solution that consists of 1.10 percent magnesium chloride hexahydrate, 0.16 percent calcium chloride dihydrate, 0.40 percent anhydrous sodium sulfate, 2.50 percent sodium chloride, and 95.84 percent deionized or distilled water.

3.3.2 Biodegradability. A measure of the decomposition of organic matter through the action of microorganisms.

3.3.3 Class A Foam. Foam for use on fires in Class A fuels.

3.3.4 Class A Fuel. Materials such as vegetation, wood, cloth, paper, rubber, and some plastics in which combustion can occur at or below the surface of the material.

3.3.5 Drain Time. The time that it takes for a specified percent (customarily 25 percent) of the total solution that is contained in the foam to revert to liquid and drain out of the bubble structure.

3.3.6 Expansion Ratio. The ratio of the volume of the foam in its aerated state to the original volume of the non-aerated foam solution.

3.3.7 Fixed Tank. A tank that is internal to or attached directly to a helicopter.

3.3.8 Flash Point. The minimum temperature of a liquid at which it gives off vapor sufficient to form an ignitable mixture with air near the surface of the liquid under specified environmental conditions.

3.3.9 Foam. An aggregation of bubbles lighter than water created by forcing or entraining air into a foam solution by means of suitably designed equipment or by cascading it through the air.

3.3.10 Foam Chemicals. A generic name for the liquid foam concentrate, foam solution, and foam in whatever form it is being used.

3.3.11* Foam Concentrate. The foaming agent as received from the supplier that, when mixed with water, becomes foam solution.

3.3.12 Foam Solution. A homogeneous mixture of foam concentrate and water in the mix ratio required to meet the needs of the user.

3.3.13 Fresh Water. Deionized or distilled water to which 140 ppm of calcium chloride has been added.

3.3.14 Intergranular Corrosion. A corrosive attack on metal at the grain boundary.

3.3.15 LC₅₀ (Lethal Concentration₅₀). The concentration of agent in water, usually expressed as milligrams of agent in a liter or solution, that results in the death of 50 percent of the aquatic test specimens within a specified time frame.

3.3.16 LD₅₀ (Lethal Dosage₅₀). The dosage of a chemical, usually expressed as milligrams of the chemical per kilogram of body weight of the test animal, at which 50 percent of the test animals die within a specified time frame.

3.3.17* Material Safety Data Sheet (MSDS). A form, provided by manufacturers and compounders (blenders) of chemicals, containing information about chemical composition, physical and chemical properties, health and safety hazards, emergency response, and waste disposal of the material. [472:3.3]

3.3.18 Miscibility. The property of being capable of mixing in any ratio without separation into phases.

3.3.19 Mix Ratio. The proportion of foam concentrate in the foam solution, expressed as a volume percentage.

3.3.20 Surface Tension. The elastic-like force at the surface of a liquid, which tends to minimize the surface area, causing drops to form.

3.3.21 Uniform Corrosion. Removal of metal by chemical means over the entire surface.

3.3.22 Viscosity. A measure of the resistance of a liquid to flow.

3.3.23 Wetting Ability. The ability of foam solution to penetrate and soak into a solid.