

NFPA®

412

**Standard for
Evaluating Aircraft Rescue
and Fire-Fighting Foam
Equipment**

2020



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NFPA® 412

Standard for

Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment

2020 Edition

This edition of NFPA 412, *Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment*, was prepared by the Technical Committee on Aircraft Rescue and Fire Fighting. It was issued by the Standards Council on April 28, 2019, with an effective date of May 18, 2019, and supersedes all previous editions.

This edition of NFPA 412 was approved as an American National Standard on May 18, 2019.

Origin and Development of NFPA 412

Work on this material started in 1955 when the NFPA Subcommittee on Aircraft Rescue and Fire Fighting (as then constituted) initiated a study on methods of evaluating aircraft rescue and fire-fighting vehicles. A tentative text was adopted by the Association in 1957, and a revised text was officially adopted in 1959. Revisions were made in 1960, 1964, 1965, 1969, 1973, and 1974. With the introduction of new types of foam liquid concentrates over the years for this specialized service, the text has been broadened to cover these concentrates.

In 1987, the standard was completely revised to bring it into conformance with the NFPA *Manual of Style* and to refine the test methods.

The 1993 edition of the standard established a single test method for expansion and drainage for all foams and also added information on using the conductivity meter for determining foam solution concentration. Problems with the apparatus of the single test method in the 1993 edition and with accurately determining results indicated a need to reinstate the simpler method for the 1998 edition as an alternative method. The simpler method is also in general field use.

The standard was revised for the 2003 edition with only minor editorial changes.

For the 2009 edition, the technical committee reaffirmed the requirements of the 2003 edition, and minor editorial changes were made.

For the 2014 edition, the technical committee revised many of the requirements regarding foam and the testing and test method requirements for foam. These updated requirements allowed a broader use and application of foams along with the methods and equipment that were used to evaluate the foam. The technical committee also made several changes according to the *Manual of Style for NFPA Technical Committee Documents*, and updated references to NFPA and non-NFPA documents.

The 2020 edition makes minor changes from the previous edition. The technical committee has added fluorine-free foam to the list of agents, as well as a new requirement to check the vehicle's foam tank for crystallization of foam concentrate. Annex material has been added to clarify procedures for input-based foam testing. Minor editorial changes and updates to referenced documents have also been made.

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Committee Scope: This Committee shall have primary responsibility for aircraft rescue and fire-fighting (ARFF) documents used by organizations providing ARFF services for operational procedures; training; foam testing and application; specialized equipment; and planning for aircraft emergencies.

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NFPA 412

Standard for

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2020 Edition

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

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

Chapter 1 Administration

1.1 Scope. This standard establishes test procedures for evaluating the foam fire-fighting equipment installed on aircraft rescue and fire-fighting vehicles designed in accordance with NFPA 414.

1.2 Purpose. The tests specified in this standard provide procedures for the evaluation of foam fire-fighting equipment in the field to determine compliance with NFPA 414 and NFPA 403.

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. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2018 edition.

NFPA 414, *Standard for Aircraft Rescue and Fire-Fighting Vehicles*, 2020 edition.

2.3 Other Publications.

Merriam-Webster’s *Collegiate Dictionary*, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam*, 2016 edition.

NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2018 edition.

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 defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. Merriam-Webster’s *Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

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. An NFPA Standard, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase “standards development process” or “standards development activities,” the term “standards” includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1* Foam. An aggregation of small bubbles used to form an air-excluding, vapor-suppressing blanket over the surface of a flammable liquid fuel. [403, 2018]

3.3.1.1* Alcohol-Resistant Foam Concentrate. A concentrate used for fighting fires on water-soluble materials and other fuels destructive to regular, AFFF, or FFFP foams, as well as for fires involving hydrocarbons. [11, 2016]