

NFPA® 10

Standard for Portable Fire Extinguishers

2013 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

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NFPA® 10
Standard for
Portable Fire Extinguishers
2013 Edition

This edition of NFPA 10, *Standard for Portable Fire Extinguishers*, was prepared by the Technical Committee on Portable Fire Extinguishers. It was issued by the Standards Council on November 27, 2012, with an effective date of December 17, 2012, and supersedes all previous editions.

This edition of NFPA 10 was approved as an American National Standard on December 17, 2012.

Origin and Development of NFPA 10

In 1918 and 1919, the NFPA Committee on Field Practice (predecessor of the present committee) was active in developing a standard on first aid protection. The earliest official NFPA standard on this subject was adopted in 1921. Revised editions were adopted by the association in 1926, 1928, 1929, 1930, 1931, 1932, 1936, 1938, 1942, 1945, 1950, 1953, 1955, 1956, 1957, 1958, 1959, 1961, 1962, 1963, 1965, 1966, 1967, 1968, 1969, 1970, 1972, 1973, 1974, 1975, 1978, and 1981. In 1965, the previous editions were divided into two separate texts, one covering installation and the second covering maintenance and use. The 1974 edition recombined all the information previously contained in NFPA 10 and NFPA 10A. A new appendix was added to the 1974 edition to include information about the selection of fire extinguishers for home hazards. Information on selection and distribution of fire extinguishers was added to the appendix of the 1978 edition. Major revisions to provide simplification and uniformity were made in the 1984 edition. The standard was revised in 1988, 1990, and 1994.

In 1998, NFPA 10R, *Recommended Practice for Portable Fire Extinguishing Equipment in Family Dwelling Units and Living Units*, was withdrawn. Information on this topic was incorporated as an annex of NFPA 10.

This standard was revised in 2002.

The 2007 edition of this standard was a complete revision.

The 2010 edition of this standard included changes to comply with the *Manual of Style for NFPA Technical Committee Documents* by removing unenforceable terms. Annex material was also added to clarify the need for removing obsolete extinguishers.

The 2013 edition of this standard has been revised to better address Class D extinguishing agents and the phase-out of listed halon extinguishers. The definition of halocarbons has been expanded to permit the use of any halocarbon agent acceptable under the U.S. EPA Significant New Alternatives Policy program. The list of NFPA documents that contain additional requirements that supersede those found in this standard was significantly expanded for easy reference. New travel distances for obstacle, gravity/three-dimensional, and pressure fire hazards have been added. Chapter 7, Inspection, Maintenance, and Recharging, and Annex E, Distribution, have been significantly revised and restructured. Instructions for inspection and maintenance of residential extinguishers have been added to Annex F, Selection of Residential Fire-Extinguishing Equipment.

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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 the installation, maintenance, and use of portable fire extinguishers and equipment. Does not apply to permanently installed fire extinguishing systems even though portions of those systems are portable, such as hose and nozzles, which may be attached to a fixed supply of extinguishing agent.



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NFPA 10

Standard for

Portable Fire Extinguishers

2013 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.

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

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 extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex K. 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 publications can be found in Chapter 2 and Annex K.

Chapter 1 Administration

1.1* Scope. The provisions of this standard apply to the selection, installation, inspection, maintenance, recharging, and testing of portable fire extinguishers and Class D extinguishing agents.

1.1.1 The requirements given herein are minimum.

1.1.2 The requirements shall not apply to permanently installed systems for fire extinguishment, even where portions of such systems are portable (such as hose and nozzles attached to a fixed supply of extinguishing agent).

1.2* Purpose. This standard is prepared for use by and guidance of persons charged with selecting, purchasing, installing, approving, listing, designing, and maintaining portable fire extinguishers and Class D extinguishing agents.

1.2.1 The fire protection requirements of this standard are general in nature and are not intended to abrogate the specific requirements of other NFPA standards for specific occupancies.

1.2.2 Nothing in this standard shall be construed as a restriction on new technologies or alternative arrangements, pro-

vided that the level of protection as herein described is not lowered and is acceptable to the authority having jurisdiction.

1.3 Units.

1.3.1 Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI).

1.3.1.1 The units are listed in Table 1.3.1.1 with conversion factors.

Table 1.3.1.1 Metric Units of Measurement

Name of Unit	Abbreviation	Conversion Factor
Liter	L	1 gal = 3.785 L
Millimeter	mm	1 in. = 25.4 mm
Meter	m	1 ft = 0.305 m
Kilogram	kg	1 lb (mass) = 0.454 kg
Degree Celsius	°C	$\frac{5}{9}(\text{°F} - 32) = \text{°C}$
Bar	bar	1 psi = 0.0689 bar

1.3.1.2 If a value for measurement as given in this standard is followed by an equivalent value in other units, the first stated is to be regarded as the requirement.

1.3.1.3 A given equivalent value shall be permitted to be considered approximate.

1.3.2 The conversion procedure for the SI units is to multiply the quantity by the conversion factor and then round the result to the appropriate number of significant digits.

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 1, *Fire Code*, 2012 edition.

NFPA 2, *Hydrogen Technologies Code*, 2011 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2013 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection*, 2013 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 2012 edition.

NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, 2012 edition.

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*, 2011 edition.

NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Film*, 2011 edition.

NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*, 2011 edition.

NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*, 2013 edition.

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, 2009 edition.

NFPA 52, *Vehicular Gaseous Fuel Systems Code*, 2013 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 2011 edition.



- NFPA 59, *Utility LP-Gas Plant Code*, 2012 edition.
- NFPA 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)*, 2013 edition.
- NFPA 72®, *National Fire Alarm and Signaling Code*, 2013 edition.
- NFPA 75, *Standard for the Fire Protection of Information Technology Equipment*, 2013 edition.
- NFPA 76, *Standard for the Fire Protection of Telecommunications Facilities*, 2012 edition.
- NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*, 2011 edition.
- NFPA 99, *Health Care Facilities Code*, 2012 edition.
- NFPA 99B, *Standard for Hypobaric Facilities*, 2010 edition.
- NFPA 101®, *Life Safety Code®*, 2012 edition.
- NFPA 102, *Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures*, 2011 edition.
- NFPA 115, *Standard for Laser Fire Protection*, 2012 edition.
- NFPA 120, *Standard for Fire Prevention and Control in Coal Mines*, 2010 edition.
- NFPA 122, *Standard for Fire Prevention and Control in Metal/Nonmetal Mining and Metal Mineral Processing Facilities*, 2010 edition.
- NFPA 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems*, 2010 edition.
- NFPA 140, *Standard on Motion Picture and Television Production Studio Soundstages, Approved Production Facilities, and Production Locations*, 2013 edition.
- NFPA 150, *Standard on Fire and Life Safety in Animal Housing Facilities*, 2013 edition.
- NFPA 160, *Standard for the Use of Flame Effects Before an Audience*, 2011 edition.
- NFPA 232, *Standard for the Protection of Records*, 2012 edition.
- NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*, 2013 edition.
- NFPA 301, *Code for Safety to Life from Fire on Merchant Vessels*, 2013 edition.
- NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, 2010 edition.
- NFPA 303, *Fire Protection Standard for Marinas and Boatyards*, 2011 edition.
- NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*, 2011 edition.
- NFPA 326, *Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair*, 2010 edition.
- NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids*, 2012 edition.
- NFPA 400, *Hazardous Materials Code*, 2013 edition.
- NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*, 2009 edition.
- NFPA 407, *Standard for Aircraft Fuel Servicing*, 2012 edition.
- NFPA 408, *Standard for Aircraft Hand Portable Fire Extinguishers*, 2010 edition.
- NFPA 409, *Standard on Aircraft Hangars*, 2011 edition.
- NFPA 410, *Standard on Aircraft Maintenance*, 2010 edition.
- NFPA 418, *Standard for Heliports*, 2011 edition.
- NFPA 423, *Standard for Construction and Protection of Aircraft Engine Test Facilities*, 2010 edition.
- NFPA 484, *Standard for Combustible Metals*, 2012 edition.
- NFPA 495, *Explosive Materials Code*, 2013 edition.
- NFPA 498, *Standard for Safe Havens and Interchange Lots for Vehicles Transporting Explosives*, 2013 edition.
- NFPA 501A, *Standard for Fire Safety Criteria for Manufactured Home Installations, Sites, and Communities*, 2013 edition.
- NFPA 502, *Standard for Road Tunnels, Bridges, and Other Limited Access Highways*, 2011 edition.
- NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations*, 2013 edition.
- NFPA 655, *Standard for Prevention of Sulfur Fires and Explosions*, 2012 edition.
- NFPA 731, *Standard for the Installation of Electronic Premises Security Systems*, 2011 edition.
- NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*, 2008 edition.
- NFPA 804, *Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants*, 2010 edition.
- NFPA 805, *Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants*, 2010 edition.
- NFPA 820, *Standard for Fire Protection in Wastewater Treatment and Collection Facilities*, 2012 edition.
- NFPA 909, *Code for the Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship*, 2013 edition.
- NFPA 914, *Code for Fire Protection of Historic Structures*, 2010 edition.
- NFPA 1123, *Code for Fireworks Display*, 2010 edition.
- NFPA 1124, *Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic Articles*, 2013 edition.
- NFPA 1125, *Code for the Manufacture of Model Rocket and High Power Rocket Motors*, 2012 edition.
- NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience*, 2011 edition.
- NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas*, 2012 edition.
- NFPA 1192, *Standard on Recreational Vehicles*, 2011 edition.
- NFPA 1194, *Standard for Recreational Vehicle Parks and Campgrounds*, 2011 edition.
- NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2013 edition.
- NFPA 1901, *Standard for Automotive Fire Apparatus*, 2009 edition.
- NFPA 1906, *Standard for Wildland Fire Apparatus*, 2012 edition.
- NFPA 1925, *Standard on Marine Fire-Fighting Vessels*, 2013 edition.
- NFPA 5000®, *Building Construction and Safety Code®*, 2012 edition.

2.3 Other Publications.

2.3.1 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D 5391, *Standard Test for Electrical Conductivity and Resistivity of a Flowing High Purity Water Sample*, 2005.

2.3.2 CGA Publications. Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923.

CGA C-1, *Methods of Hydrostatic Testing of Compressed Gas Cylinders*, 2006.

CGA G-10.1, *Commodity Specification for Nitrogen*, 2008.

2.3.3 NPCA Publications. National Paint and Coatings Association, 1500 Rhode Island Avenue, NW, Washington, DC 20005.

Hazardous Materials Identification System (HMIS), Implementation Manual, 1981.

Workplace Hazardous Materials Identification System (WHMIS) Reference Manual, 1996, Revised (Web Edition) 2000.

2.3.4 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 1093, *Standard for Halogenated Agent Fire Extinguishers*, 1995, Revised 2008.

UL 1803, *Standard for Factory Follow-Up on Third Party Certified Portable Fire Extinguishers*, 2006, Revised 2008.

2.3.5 ULC Publications. Underwriters' Laboratories of Canada, 7 Underwriters Road, Toronto, Ontario M1R 3A9, Canada.

CAN/ULC-S512, *Standard for Halogenated Agent Hand and Wheeled Fire Extinguishers*, 2005, Reaffirmed 2007.

2.3.6 UL/ULC Publications. The following publications are bi-nationally harmonized standards for Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096, and Underwriters' Laboratories of Canada, 7 Underwriters Road, Toronto, Ontario M1R 3A9, Canada.

ANSI/UL 8, CAN/ULC-S554, *Water Based Agent Fire Extinguishers*, 2005, Revised 2010.

ANSI/UL 154, CAN/ULC-S503, *Standard for Carbon-Dioxide Fire Extinguishers*, 2005, Revised 2010.

ANSI/UL 299, CAN/ULC-S504, *Standard for Dry Chemical Fire Extinguishers*, 2002, Revised 2009.

ANSI/UL 626, CAN/ULC-S507, *Standard for Water Fire Extinguishers*, 2005, Revised 2010.

ANSI/UL 711, CAN/ULC-S508, *Standard for Rating and Fire Testing of Fire Extinguishers*, 2004, Revised 2009.

ANSI/UL 2129, CAN/ULC-S566, *Standard for Halocarbon Clean Agent Fire Extinguishers*, 2005, Revised 2007.

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

Title 49, Code of Federal Regulations, Part 180.209(b), 2007.

Title 49, Code of Federal Regulations, Part 180.213(c)(1), 2007.

2.3.8 Other Publications.

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

2.4 References for Extracts in Mandatory Sections.

NFPA 17, *Standard for Dry Chemical Extinguishing Systems*, 2013 edition.

NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*, 2013 edition.

NFPA 18, *Standard on Wetting Agents*, 2011 edition.

NFPA 52, *Vehicular Gaseous Fuel Systems Code*, 2013 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* Approved. Acceptable to the authority having jurisdiction.

3.2.2* 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.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. Indicates a mandatory requirement.

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

3.2.7 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 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 *Manual of Style for NFPA Technical Committee Documents*.

3.3 General Definitions.

3.3.1 ANSI. American National Standards Institute. [52, 2013]

3.3.2 Antifreeze Charge. See 3.3.20, Loaded Stream Charge.

3.3.3* Carbon Dioxide. A colorless, odorless, electrically non-conductive inert gas that is a suitable medium for extinguishing Class B and Class C fires.

3.3.4 Chemical.

3.3.4.1* Dry Chemical. A powder composed of very small particles, usually sodium bicarbonate-, potassium bicarbonate-, or ammonium phosphate-based with added particulate material supplemented by special treatment to provide resistance to packing, resistance to moisture absorption (caking), and the proper flow capabilities. [17, 2013]

3.3.4.2* Wet Chemical. Normally an aqueous solution of organic or inorganic salts or a combination thereof that forms an extinguishing agent. [17A, 2013]

3.3.5 Clean Agent. Electrically non-conducting, volatile, or gaseous fire extinguishant that does not leave a residue upon evaporation.



3.3.6 Closed Recovery System.

3.3.6.1 Dry Chemical Closed Recovery System. A system that is constructed in a manner that does not introduce foreign material into the agent being recovered and has a means of visually inspecting the recovered agent for contaminants.

3.3.6.2 Halogenated Closed Recovery System. A system that provides for the transfer of halogenated agents between fire extinguishers, supply containers, and recharge and recovery containers so that none of the halogenated agent escapes to the atmosphere. Closed recovery systems for halogenated agents with an ozone depleting potential (ODP) of 0.2 or greater should be listed for use with that agent. The system's supply or recharge and recovery container is capable of maintaining the agent in a sealed environment until it is reused or returned to the agent manufacturer.

3.3.7 Cylinder.

3.3.7.1 High-Pressure Cylinder. Cylinders (and cartridges) containing nitrogen, compressed air, carbon dioxide, or other gases at a pressure higher than 500 psi (3447 kPa) at 70°F (21°C).

3.3.7.2 Low-Pressure Cylinder. Cylinders containing fire-extinguishing agent (medium), nitrogen, compressed air, or other compressed gases at a service pressure of 500 psi (3447 kPa) or lower at 70°F (21°C).

3.3.8 DOT. U.S. Department of Transportation. [52, 2013]

3.3.9* Dry Powder. Solid materials in powder or granular form designed to extinguish Class D combustible metal fires by crusting, smothering, or heat-transferring means.

3.3.10* Electronic Monitoring. A method of electronic communication (data transmission) between an in-place fire extinguisher and an electronic monitoring device/system.

3.3.11 Extinguisher Bracket. Extinguisher retention device designed to mount and secure a specific extinguisher model onto various surfaces by incorporating releasable straps or bands to secure the fire extinguisher.

3.3.12 Extinguisher Cabinet. An identifiable and readily accessible fire extinguisher housing device designed to store and protect fire equipment.

3.3.13 Extinguisher Hanger. Extinguisher mounting device designed for mounting a specific extinguisher model onto stationary vertical surfaces.

3.3.14* Extinguisher Inspection. A quick check that a fire extinguisher is in its designated place, that it has not been actuated or tampered with, and that there is no obvious physical damage or condition to prevent its operation.

3.3.15* Extinguisher Maintenance. A thorough examination of the fire extinguisher that is intended to give maximum assurance that a fire extinguisher will operate effectively and safely and to determine if physical damage or condition will prevent its operation, if any repair or replacement is necessary, and if hydrostatic testing or internal maintenance is required.

3.3.16* Film-Forming Foam Agents. Aqueous film-forming foam (AFFF) and film-forming fluoroprotein foam (FFFP).

3.3.17 Flammable Liquids of Appreciable Depth. Flammable liquids of appreciable depth are those with a depth greater than ¼ in. (6.3 mm).

3.3.18* Halogenated Agents. Halogenated (clean) agents referenced in this standard are of the following types.

3.3.18.1 Halocarbons. Halocarbon agents include hydrochlorofluorocarbon (HCFC), hydrofluorocarbon (HFC), perfluorocarbon (PFC), fluoriodocarbon (FIC) types of agents, and other halocarbons that are found acceptable under the Environmental Protection Agency Significant New Alternatives Policy program.

3.3.18.2 Halons. Halons include bromochlorodifluoromethane (Halon 1211), bromotrifluoromethane (Halon 1301), and mixtures of Halon 1211 and Halon 1301 (Halon 1211/1301).

3.3.19 Hydrostatic Testing. Pressure testing of the extinguisher to verify its strength against unwanted rupture.

3.3.20* Loaded Stream Charge. A water-based extinguishing agent that uses an alkali metal salt as a freezing point depressant.

3.3.21 Mild Steel Shell. All steel shells other than stainless steel and steel shells used for high-pressure cylinders.

3.3.22 Pressure.

3.3.22.1 Extinguisher Service Pressure. The normal operating pressure as indicated on the nameplate or cylinder of a fire extinguisher.

3.3.22.2 Factory Test Pressure. The pressure shown on the nameplate at which a shell was tested at time of manufacture.

3.3.23 Pressurized Flammable Liquid Fires. Fires resulting from liquids that are forced, pumped, or sprayed.

3.3.24 Recharging. The replacement of the extinguishing agent (also includes the expellant for certain types of fire extinguishers).

3.3.25 Servicing. Performing maintenance, recharging, or hydrostatic testing on a fire extinguisher.

3.3.26 TC. Transport Canada, formerly Canada Transport Commission (CTC), which has jurisdiction over high- and low-pressure cylinders and cartridges in Canada.

3.3.27 Travel Distance. The actual walking distance from any point to the nearest fire extinguisher fulfilling hazard requirements.

3.3.28 Wetting Agent. A concentrate which, when added to water reduces the surface tension and increases its ability to penetrate and spread. [18, 2011]

3.4 Fire Extinguisher Definitions.

3.4.1 Cartridge/Cylinder-Operated Fire Extinguisher. A fire extinguisher in which the expellant gas is in a separate container from the agent storage container.

3.4.2* Nonrechargeable (Nonrefillable) Fire Extinguisher. A fire extinguisher that is intended to be used one time and not capable of or intended to be recharged and returned to service.

3.4.3 Portable Fire Extinguisher. A portable device, carried or on wheels and operated by hand, containing an extinguishing agent that can be expelled under pressure for the purpose of suppressing or extinguishing fire.

3.4.4* Rechargeable (Refillable) Fire Extinguisher. A fire extinguisher capable of undergoing complete maintenance, including internal inspection of the pressure vessel, replacement of all substandard parts and seals, and hydrostatic testing.

3.4.5 Self-Expelling Fire Extinguisher. A fire extinguisher in which the agent has sufficient vapor pressure at normal operating temperatures to expel itself.

3.4.6 Stored-Pressure Fire Extinguisher. A fire extinguisher in which both the extinguishing agent and expellant gas are kept in a single container, and that includes a pressure indicator or gauge.

3.4.7 Water Mist Fire Extinguisher. A fire extinguisher containing distilled or de-ionized water and employing a nozzle that discharges the agent in a fine spray.

3.4.8 Water-Type Fire Extinguisher. A fire extinguisher containing water-based agents, such as water, film-forming foam agents (AFFF, FFFP), antifreeze, loaded stream, and wet chemical.

3.4.9 Wheeled Fire Extinguisher. A portable fire extinguisher equipped with a carriage and wheels intended to be transported to the fire by one person. (See A.5.3.2.7.)

Chapter 4 General Requirements

4.1 Listing and Labeling.

4.1.1* Portable fire extinguishers used to comply with this standard shall be listed and labeled and shall meet or exceed all the requirements of one of the following fire test standards and one of the following applicable performance standards:

- (1) Fire test standards:
ANSI/UL 711, CAN/ULC-S508, *Standard for Rating and Fire Testing of Fire Extinguishers*
- (2) Performance standards:
 - (a) Carbon dioxide types: ANSI/UL 154, CAN/ULC-S508, *Standard for Carbon-Dioxide Fire Extinguishers*
 - (b) Dry chemical types: ANSI/UL 299, CAN/ULC-S504, *Standard for Dry Chemical Fire Extinguishers*
 - (c) Water types: ANSI/UL 626, CAN/ULC-S507, *Standard for Water Fire Extinguishers*
 - (d) Halon types: CAN/ULC-S512, *Standard for Halogenated Agent Hand and Wheeled Fire Extinguishers*
 - (e) Film-forming foam types: ANSI/UL 8, CAN/ULC-S554, *Water Based Agent Fire Extinguishers*
 - (f) Halocarbon types: ANSI/UL 2129, CAN/ULC-S566, *Standard for Halocarbon Clean Agent Fire Extinguishers*

4.1.2* Each fire extinguisher shall be marked with the following:

- (1) Identification of the listing and labeling organization
- (2) Product category indicating the type of extinguisher
- (3) Extinguisher classification as indicated in Section 5.3
- (4) Performance and fire test standards that the extinguisher meets or exceeds

4.1.2.1 Fire extinguishers manufactured prior to January 1, 1986, shall not be required to comply with 4.1.2.

4.1.2.2 Halon extinguishers listed and labeled to UL 1093, *Standard for Halogenated Agent Fire Extinguishers*, shall be permitted to be used to comply with the requirements of this standard when installed, inspected, and maintained in accordance with this standard.

4.1.3* An organization listing fire extinguishers used to comply with the requirements of this standard shall utilize a third-party certification program for portable fire extinguishers that

meets or exceeds UL 1803, *Standard for Factory Follow-Up on Third Party Certified Portable Fire Extinguishers*.

4.1.3.1 Fire extinguishers manufactured prior to January 1, 1989, shall not be required to comply with 4.1.3.

4.1.3.2 Certification organizations accredited by the Standards Council of Canada shall not be required to comply with 4.1.3.

4.1.3.3 Listed and labeled Class D extinguishing agents intended to be manually applied to combustible metal fires shall comply with the fire test requirements specified in ANSI/UL 711, CAN/ULC-S508.

4.1.4 Electrical Conductivity. Extinguishers listed for the Class C rating shall not contain an agent that is a conductor of electricity.

4.1.4.1 In addition to successfully meeting the requirements of ANSI/UL 711, CAN/ULC-S508, water-based agents shall be tested in accordance with ASTM D 5391, *Standard Test for Electrical Conductivity and Resistivity of a Flowing High Purity Water Sample*.

4.1.4.2 Fire extinguishers containing water-based agents that have a conductivity higher than 1.00 $\mu\text{S}/\text{cm}$ at 25°C (77°F) shall be considered a conductor of electricity and therefore shall not be rated Class C.

4.1.4.3 Paragraphs 4.1.4.1 and 4.1.4.2 shall apply only to water-based extinguishers manufactured after August 15, 2002.

4.2* Identification of Contents. A fire extinguisher shall have a label, tag, or stencil attached to it providing the following information:

- (1) The content's product name as it appears on the manufacturer's Material Safety Data Sheet (MSDS)
- (2) Listing of the hazardous material identification in accordance with *Hazardous Materials Identification System (HMIS), Implementational Manual* [in Canada, *Workplace Hazardous Materials Identification System (WHMIS) Reference Manual*] developed by the National Paint and Coatings Association
- (3) List of any hazardous materials that are in excess of 1.0 percent of the contents
- (4) List of each chemical in excess of 5.0 percent of the contents
- (5) Information as to what is hazardous about the agent in accordance with the MSDS
- (6) Manufacturer's or service agency's name, mailing address, and phone number

4.3* Instruction Manual.

4.3.1 The owner or the owner's agent shall be provided with a fire extinguisher instruction manual that details condensed instructions and cautions necessary to the installation, operation, inspection, and maintenance of the fire extinguisher(s).

4.3.2 The manual shall refer to this standard as a source of detailed instruction.

4.4 Obsolete Fire Extinguishers. The following types of fire extinguishers are considered obsolete and shall be removed from service:

- (1) Soda acid
- (2) Chemical foam (excluding film-forming agents)
- (3) Vaporizing liquid (e.g., carbon tetrachloride)
- (4) Cartridge-operated water
- (5) Cartridge-operated loaded stream
- (6) Copper or brass shell (excluding pump tanks) joined by soft solder or rivets
- (7) Carbon dioxide extinguishers with metal horns



- (8) Solid charge-type AFFF extinguishers (paper cartridge)
- (9) Pressurized water fire extinguishers manufactured prior to 1971
- (10) Any extinguisher that needs to be inverted to operate
- (11) Any stored pressure extinguisher manufactured prior to 1955
- (12) Any extinguishers with 4B, 6B, 8B, 12B, and 16B fire ratings
- (13) Stored-pressure water extinguishers with fiberglass shells (pre-1976)

4.4.1* Dry chemical stored-pressure extinguishers manufactured prior to October 1984 shall be removed from service at the next 6-year maintenance interval or the next hydrotest, whichever comes first.

4.4.1.1 Subsection 4.4.1 shall not apply to wheeled-type dry chemical stored-pressure fire extinguishers.

4.4.2* Any fire extinguisher that can no longer be serviced in accordance with the manufacturer's maintenance manual is considered obsolete and shall be removed from service.

Chapter 5 Selection of Portable Fire Extinguishers

5.1 General Requirements. The selection of fire extinguishers for a given situation shall be determined by the applicable requirements of Sections 5.2 through 5.6 and the following factors:

- (1) Type of fire most likely to occur
- (2) Size of fire most likely to occur
- (3) Hazards in the area where the fire is most likely to occur
- (4) Energized electrical equipment in the vicinity of the fire
- (5) Ambient temperature conditions
- (6) Other factors (*See Section H.2.*)

5.1.1 Portable fire extinguishers shall be installed as a first line of defense to cope with fires of limited size, except as required by 5.5.5.

5.1.2 The selection of extinguishers shall be independent of whether the building is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment.

5.2 Classifications of Fires. Fires shall be classified in accordance with the guidelines specified in 5.2.1 through 5.2.5.

5.2.1 Class A Fires. Class A fires are fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.

5.2.2 Class B Fires. Class B fires are fires in flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohols, and flammable gases.

5.2.3 Class C Fires. Class C fires are fires that involve energized electrical equipment.

5.2.4 Class D Fires. Class D fires are fires in combustible metals, such as magnesium, titanium, zirconium, sodium, lithium, and potassium.

5.2.5 Class K Fires. Class K fires are fires in cooking appliances that involve combustible cooking media (vegetable or animal oils and fats).

5.3 Extinguisher Classification System.

5.3.1 The classification of fire extinguishers shall consist of a letter that indicates the class of fire on which a fire extinguisher has been found to be effective.

5.3.1.1 Fire extinguishers classified for use on Class A or Class B hazards shall be required to have a rating number preceding the classification letter that indicates the relative extinguishing effectiveness.

5.3.1.2 Fire extinguishers classified for use on Class C, Class D, or Class K hazards shall not be required to have a number preceding the classification letter.

5.3.2 Fire extinguishers shall be selected for the class(es) of hazards to be protected in accordance with 5.3.2.1 through 5.3.2.5. (*For specific hazards, see Section 5.5.*)

5.3.2.1* Fire extinguishers for the protection of Class A hazards shall be selected from types that are specifically listed and labeled for use on Class A fires. (*For halon agent-type extinguishers, see 5.3.2.6.*)

5.3.2.2* Fire extinguishers for the protection of Class B hazards shall be selected from types that are specifically listed and labeled for use on Class B fires. (*For halon agent-type extinguishers, see 5.3.2.6.*)

5.3.2.3* Fire extinguishers for the protection of Class C hazards shall be selected from types that are specifically listed and labeled for use on Class C hazards. (*For halon agent-type fire extinguishers, see 5.3.2.6.*)

5.3.2.4* Fire extinguishers and extinguishing agents for the protection of Class D hazards shall be of the types specifically listed and labeled for use on the specific combustible metal hazard.

5.3.2.5 Fire extinguishers for the protection of Class K hazards shall be selected from types that are specifically listed and labeled for use on Class K fires.

5.3.2.6* Use of halon agent fire extinguishers shall be limited to applications where a clean agent is necessary to extinguish fire efficiently without damaging the equipment or area being protected or where the use of alternative agents has the potential to cause a hazard to personnel in the area.

5.3.2.6.1* Placement of portable fire extinguishers containing halogenated agents shall conform to minimum confined space volume requirement warnings contained on the fire extinguisher nameplates.

5.3.2.7* Wheeled fire extinguishers shall be considered for hazard protection in areas in which a fire risk assessment has shown the following:

- (1) High hazard areas are present.
- (2) Limited available personnel are present, thereby requiring an extinguisher that has the following features:
 - (a) High agent flow rate
 - (b) Increased agent stream range
 - (c) Increased agent capacity

5.4 Classification of Hazards.

5.4.1 Classifying Occupancy Hazard. Rooms or areas shall be classified as being light hazard, ordinary hazard, or extra hazard.

5.4.1.1* Light Hazard. Light hazard occupancies shall be classified as locations where the quantity and combustibility of Class A combustibles and Class B flammables are low and fires with relatively low rates of heat release are expected. These occupancies consist of fire hazards having normally expected quantities of Class A combustible furnishings, and/or the total

quantity of Class B flammables typically expected to be present is less than 1 gal (3.8 L) in any room or area.

5.4.1.2* Ordinary Hazard. Ordinary hazard occupancies shall be classified as locations where the quantity and combustibility of Class A combustible materials and Class B flammables are moderate and fires with moderate rates of heat release are expected. These occupancies consist of fire hazards that only occasionally contain Class A combustible materials beyond normal anticipated furnishings, and/or the total quantity of Class B flammables typically expected to be present is from 1 gal to 5 gal (3.8 L to 18.9 L) in any room or area.

5.4.1.3* Extra Hazard. Extra hazard occupancies shall be classified as locations where the quantity and combustibility of Class A combustible material are high or where high amounts of Class B flammables are present and rapidly developing fires with high rates of heat release are expected. These occupancies consist of fire hazards involved with the storage, packaging, handling, or manufacture of Class A combustibles, and/or the total quantity of Class B flammables expected to be present is more than 5 gal (18.9 L) in any room or area.

5.4.1.4 Limited areas of greater or lesser hazard shall be protected as required.

5.4.2* Selection by Occupancy. Fire extinguishers shall be provided for the protection of both the building structure and the occupancy hazards contained therein regardless of the presence of any fixed fire suppression systems.

5.4.2.1 Required building protection shall be provided by fire extinguishers for Class A fires.

5.4.2.2* Occupancy hazard protection shall be provided by fire extinguishers for such Class A, B, C, D, or K fire potentials as might be present.

5.4.2.3 Fire extinguishers provided for building protection shall be permitted to also be considered for the protection of occupancies having a Class A fire potential.

5.4.2.4 Buildings having an occupancy hazard subject to Class B or Class C fires, or both, shall have a standard complement of Class A fire extinguishers for building protection, plus additional Class B or Class C fire extinguishers, or both.

5.4.2.5 Where fire extinguishers have more than one letter classification (such as 2-A:20-B:C), they shall be permitted to satisfy the requirements of each letter class.

5.5 Selection for Specific Hazards.

5.5.1 Class B Fires.

5.5.1.1* Extinguishers for Pressurized Flammable Liquids and Pressurized Gas Fires.

5.5.1.1.1 Selection of fire extinguishers for this type of hazard shall be made on the basis of recommendations by manufacturers of this specialized equipment.

5.5.1.1.2* Large-capacity dry chemical extinguishers of 10 lb (4.54 kg) or greater and a discharge rate of 1 lb/sec (0.45 kg/sec) or more shall be used to protect these hazards.

5.5.2 Three-Dimensional Fires. Large-capacity dry chemical extinguishers of 10 lb (4.54 kg) or greater and having a discharge rate of 1 lb/sec (0.45 kg/sec) or more shall be used to protect these hazards.

5.5.3 Water-Soluble Flammable Liquid Fires (Polar Solvents). Aqueous film-forming foam (AFFF) and film-forming fluoro-protein foam (FFFP) types of fire extinguishers shall not be used for the protection of water-soluble flammable liquids, such as alcohols, acetone, esters, ketones, and so forth, unless specifically referenced on the fire extinguisher nameplate.

5.5.4 Obstacle Fires. Selection of a fire extinguisher for this type of hazard shall be based on one of the following:

- (1) Extinguisher containing a vapor-suppressing foam agent
- (2)* Multiple extinguishers containing non-vapor-suppressing Class B agents intended for simultaneous application
- (3) Larger capacity extinguishers of 10 lb (4.54 kg) or greater and a minimum discharge rate of 1 lb/sec (0.45 kg/sec)

5.5.5* Class K Cooking Media Fires. Fire extinguishers provided for the protection of cooking appliances that use combustible cooking media (vegetable or animal oils and fats) shall be listed and labeled for Class K fires.

5.5.5.1 Class K fire extinguishers manufactured after January 1, 2002, shall not be equipped with extended wand-type discharge devices.

5.5.5.2 Fire extinguishers installed specifically for the protection of cooking appliances that use combustible cooking media (animal or vegetable oils and fats) without a Class K rating shall be removed from service.

5.5.5.3* Where a hazard is protected by an automatic fire protection system, a placard shall be conspicuously placed near the extinguisher that states that the fire protection system shall be actuated prior to using the fire extinguisher.

5.5.6* Electronic Equipment Fires. Fire extinguishers for the protection of delicate electronic equipment shall be selected from types specifically listed and labeled for Class C hazards. (See 5.3.2.3.)

5.5.6.1* Dry chemical fire extinguishers shall not be installed for the protection of delicate electronic equipment.

5.5.7 Areas Containing Oxidizers.

5.5.7.1 Only water-type extinguishers shall be installed in areas containing oxidizers, such as pool chemicals.

5.5.7.2* Multipurpose dry chemical fire extinguishers shall not be installed in areas containing oxidizers, such as pool chemicals.

5.5.8 Class D Combustible Metal Fires. Fire extinguishers or containers of Class D extinguishing agents provided for the protection of Class D fires shall be listed and labeled for Class D fires.

5.5.8.1* Class D fire extinguishers and agents shall be compatible with the specific metal for which protection is provided.

5.6 Selection for Specific Locations.

5.6.1* Where portable fire extinguishers are required to be installed, the following documents shall be reviewed for the occupancies outlined in their respective scopes:

- (1) NFPA 1, *Fire Code*
- (2) NFPA 2, *Hydrogen Technologies Code*
- (3) NFPA 22, *Standard for Water Tanks for Private Fire Protection*
- (4) NFPA 30, *Flammable and Combustible Liquids Code*
- (5) NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*
- (6) NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*

- (7) NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Film*
- (8) NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*
- (9) NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*
- (10) NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*
- (11) NFPA 52, *Vehicular Gaseous Fuel Systems Code*
- (12) NFPA 58, *Liquefied Petroleum Gas Code*
- (13) NFPA 59, *Utility LP-Gas Plant Code*
- (14) NFPA 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)*
- (15) NFPA 72, *National Fire Alarm and Signaling Code*
- (16) NFPA 75, *Standard for the Fire Protection of Information Technology Equipment*
- (17) NFPA 76, *Standard for the Fire Protection of Telecommunications Facilities*
- (18) NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*
- (19) NFPA 99, *Health Care Facilities Code*
- (20) NFPA 99B, *Standard for Hypobaric Facilities*
- (21) NFPA 101, *Life Safety Code*
- (22) NFPA 102, *Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures*
- (23) NFPA 115, *Standard for Laser Fire Protection*
- (24) NFPA 120, *Standard for Fire Prevention and Control in Coal Mines*
- (25) NFPA 122, *Standard for Fire Prevention and Control in Metal/Nonmetal Mining and Metal Mineral Processing Facilities*
- (26) NFPA 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems*
- (27) NFPA 140, *Standard on Motion Picture and Television Production Studio Soundstages, Approved Production Facilities, and Production Locations*
- (28) NFPA 150, *Standard on Fire and Life Safety in Animal Housing Facilities*
- (29) NFPA 160, *Standard for the Use of Flame Effects Before an Audience*
- (30) NFPA 232, *Standard for the Protection of Records*
- (31) NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*
- (32) NFPA 301, *Code for Safety to Life from Fire on Merchant Vessels*
- (33) NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*
- (34) NFPA 303, *Fire Protection Standard for Marinas and Boatyards*
- (35) NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*
- (36) NFPA 326, *Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair*
- (37) NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquids*
- (38) NFPA 400, *Hazardous Materials Code*
- (39) NFPA 403, *Standard for Aircraft Rescue and Fire-Fighting Services at Airports*
- (40) NFPA 407, *Standard for Aircraft Fuel Servicing*
- (41) NFPA 408, *Standard for Aircraft Hand Portable Fire Extinguishers*
- (42) NFPA 409, *Standard on Aircraft Hangars*
- (43) NFPA 410, *Standard on Aircraft Maintenance*
- (44) NFPA 418, *Standard for Heliports*
- (45) NFPA 423, *Standard for Construction and Protection of Aircraft Engine Test Facilities*
- (46) NFPA 484, *Standard for Combustible Metals*
- (47) NFPA 495, *Explosive Materials Code*
- (48) NFPA 498, *Standard for Safe Havens and Interchange Lots for Vehicles Transporting Explosives*
- (49) NFPA 501A, *Standard for Fire Safety Criteria for Manufactured Home Installations, Sites, and Communities*
- (50) NFPA 502, *Standard for Road Tunnels, Bridges, and Other Limited Access Highways*
- (51) NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations*
- (52) NFPA 655, *Standard for Prevention of Sulfur Fires and Explosions*
- (53) NFPA 731, *Standard for the Installation of Electronic Premises Security Systems*
- (54) NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*
- (55) NFPA 804, *Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants*
- (56) NFPA 805, *Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants*
- (57) NFPA 820, *Standard for Fire Protection in Wastewater Treatment and Collection Facilities*
- (58) NFPA 909, *Code for the Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship*
- (59) NFPA 914, *Code for Fire Protection of Historic Structures*
- (60) NFPA 1123, *Code for Fireworks Display*
- (61) NFPA 1124, *Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic Articles*
- (62) NFPA 1125, *Code for the Manufacture of Model Rocket and High Power Rocket Motors*
- (63) NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience*
- (64) NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas*
- (65) NFPA 1192, *Standard on Recreational Vehicles*
- (66) NFPA 1194, *Standard for Recreational Vehicle Parks and Campgrounds*
- (67) NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*
- (68) NFPA 1901, *Standard for Automotive Fire Apparatus*
- (69) NFPA 1906, *Standard for Wildland Fire Apparatus*
- (70) NFPA 1925, *Standard on Marine Fire-Fighting Vessels*
- (71) NFPA 5000, *Building Construction and Safety Code*

5.6.2 In no case shall the requirements of the documents in 5.6.1 be less than those specified in this standard.

Chapter 6 Installation of Portable Fire Extinguishers

6.1 General.

6.1.1* Number of Extinguishers. The minimum number of fire extinguishers needed to protect a property shall be determined as outlined in this chapter.

6.1.1.1 The installation of extinguishers shall be independent of whether the building is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment.

6.1.1.2 Additional extinguishers shall be permitted to be installed to provide more protection as necessary.

6.1.1.3 Fire extinguishers having ratings less than those specified in Table 6.2.1.1 and Table 6.3.1.1 shall be permitted to be installed, provided they are not used in fulfilling the minimum protective requirements of this chapter, except as modified in 6.2.1.3.1, 6.2.1.4, and 6.3.1.1.

6.1.2 Extinguisher Readiness. Portable fire extinguishers shall be maintained in a fully charged and operable condition and shall be kept in their designated places at all times when they are not being used.

6.1.3 Placement.

6.1.3.1 Fire extinguishers shall be conspicuously located where they are readily accessible and immediately available in the event of fire.

6.1.3.2 Fire extinguishers shall be located along normal paths of travel, including exits from areas.

6.1.3.3 Visual Obstructions.

6.1.3.3.1 Fire extinguishers shall not be obstructed or obscured from view.

6.1.3.3.2* In large rooms and in certain locations where visual obstructions cannot be completely avoided, means shall be provided to indicate the extinguisher location.

6.1.3.3.3 Where signs are used to indicate fire extinguisher location, the signs shall comply with the following:

- (1) They shall be located in close proximity to the extinguisher.
- (2) They shall be visible from the normal path of travel.

6.1.3.4* Portable fire extinguishers other than wheeled extinguishers shall be installed using any of the following means:

- (1) Securely on a hanger intended for the extinguisher
- (2) In the bracket supplied by the extinguisher manufacturer
- (3) In a listed bracket approved for such purpose
- (4) In cabinets or wall recesses

6.1.3.5 Wheeled fire extinguishers shall be located in designated locations.

6.1.3.6 Fire extinguishers installed in vehicles or under other conditions where they are subject to dislodgement shall be installed in approved strap-type brackets specifically designed for this application.

6.1.3.7 Fire extinguishers installed under conditions where they are subject to physical damage (e.g., from impact, vibration, the environment) shall be protected against damage.

6.1.3.8 Installation Height.

6.1.3.8.1 Fire extinguishers having a gross weight not exceeding 40 lb (18.14 kg) shall be installed so that the top of the fire extinguisher is not more than 5 ft (1.53 m) above the floor.

6.1.3.8.2 Fire extinguishers having a gross weight greater than 40 lb (18.14 kg) (except wheeled types) shall be installed so that the top of the fire extinguisher is not more than 3½ ft (1.07 m) above the floor.

6.1.3.8.3 In no case shall the clearance between the bottom of the hand portable fire extinguisher and the floor be less than 4 in. (102 mm).

6.1.3.9 Label Visibility.

6.1.3.9.1 The extinguisher operating instructions shall be located on the front of the extinguisher and shall be clearly visible.

6.1.3.9.2 Hazardous materials identification systems (HMIS) labels, 6-year maintenance labels, hydrostatic test labels, or other labels shall not be located or placed on the front of the extinguisher.

6.1.3.9.3 The restrictions of 6.1.3.9.2 shall not apply to the original manufacturer's labels, labels that specifically relate to the extinguisher's operation or fire classification, or inventory control labels specific to that extinguisher.

6.1.3.10 Cabinets.

6.1.3.10.1 Cabinets housing fire extinguishers shall not be locked, except where fire extinguishers are subject to malicious use and cabinets include a means of emergency access.

6.1.3.10.2 The location of fire extinguishers as described in 6.1.3.3.2 shall be marked conspicuously.

6.1.3.10.3 Fire extinguishers mounted in cabinets or wall recesses shall be placed so that the fire extinguisher's operating instructions face outward.

6.1.3.10.4* Where fire extinguishers are installed in closed cabinets that are exposed to elevated temperatures, the cabinets shall be provided with screened openings and drains.

6.1.3.10.5 Cabinets or wall recesses for fire extinguishers shall be installed such that the extinguisher mounting heights specified in 6.1.3.8.1 and 6.1.3.8.2 are met.

6.1.3.11* Fire extinguishers shall not be exposed to temperatures outside the listed temperature range shown on the fire extinguisher label.

6.1.4 Antifreeze.

6.1.4.1 Fire extinguishers containing only plain water shall be protected to temperatures as low as -40°F (-40°C) by the addition of an antifreeze that is stipulated on the fire extinguisher nameplate.

6.1.4.2 Calcium chloride solutions shall not be used in stainless steel fire extinguishers.

6.1.5 Electronic Monitoring and Alarm System.

6.1.5.1 The connection to the electronic monitoring device shall be continuously supervised for integrity.

6.1.5.2 The power source for the electronic monitoring device shall be supervised for continuity of power.

6.2 Installations for Class A Hazards.

6.2.1 Fire Extinguisher Size and Placement for Class A Hazards.

6.2.1.1 Minimal sizes of fire extinguishers for the listed grades of hazards shall be provided on the basis of Table 6.2.1.1, except as modified by 6.2.1.3.1 and 6.2.1.4.

6.2.1.2 The minimum number of extinguishers for Class A hazards shall be sufficient to meet the requirements of 6.2.1.2.1 through 6.2.1.2.3.

6.2.1.2.1 The minimum number of fire extinguishers for Class A hazards for each floor of a building shall be determined by dividing the total floor area by the maximum area to be protected per extinguisher as determined by Table 6.2.1.1. (*See Annex E.*)

6.2.1.2.2 Fire extinguishers shall be located so that the maximum travel distances shall not exceed 75 ft (22.9 m), except as modified by 6.2.1.4.

6.2.1.2.3 Where the quantity of extinguishers required to satisfy 6.2.1.2.2 exceeds the number calculated in 6.2.1.2.1, additional extinguishers shall be installed.

Table 6.2.1.1 Fire Extinguisher Size and Placement for Class A Hazards

Criteria	Light Hazard Occupancy	Ordinary Hazard Occupancy	Extra Hazard Occupancy
Minimum rated single extinguisher	2-A	2-A	4-A
Maximum floor area per unit of A	3000 ft ²	1500 ft ²	1000 ft ²
Maximum floor area for extinguisher	11,250 ft ²	11,250 ft ²	11,250 ft ²
Maximum travel distance to extinguisher	75 ft	75 ft	75 ft

For SI units, 1 ft = 0.305 m; 1 ft² = 0.0929 m².

Note: For maximum floor area explanations, see E.3.3.

6.2.1.3 Smaller fire extinguishers that are rated on Class B and Class C fires but do not have a minimum 1-A rating shall not be used to meet the requirements of 6.2.1.1.

6.2.1.3.1 Fire extinguishers of lesser rating shall be permitted to be installed but shall not be considered as fulfilling any part of the requirements of Table 6.2.1.1, except as permitted in 6.2.1.3.1.1 and 6.2.1.3.1.2.

6.2.1.3.1.1 Up to two water-type extinguishers, each with 1-A rating, shall be permitted to be used to fulfill the requirements of one 2-A rated extinguisher.

6.2.1.3.1.2 Two 2½ gal (9.46 L) water-type extinguishers shall be permitted to be used to fulfill the requirements of one 4-A rated extinguisher.

6.2.1.4 Up to one-half of the complement of fire extinguishers specified in Table 6.2.1.1 shall be permitted to be replaced by uniformly spaced 1½ in. (38 mm) hose stations for use by the occupants of the building.

6.2.1.4.1 Where hose stations are so provided, they shall conform to NFPA 14.

6.2.1.4.2 The location of hose stations and the placement of fire extinguishers shall be such that the hose stations do not replace more than every other fire extinguisher.

6.2.1.5 Where the area of the floor of a building is less than that specified in Table 6.2.1.1, at least one fire extinguisher of the minimum size required shall be provided.

6.2.1.6 The protection requirements shall be permitted to be fulfilled with fire extinguishers of higher rating, provided the travel distance to such larger fire extinguishers does not exceed 75 ft (22.9 m).

6.3 Installations for Class B Hazards.

6.3.1 Spill Fires.

6.3.1.1 Minimum ratings of fire extinguishers for the listed grades of hazard shall be provided in accordance with Table 6.3.1.1.

6.3.1.1.1 Two or more fire extinguishers of lower rating shall not be used to fulfill the protection requirements of Table 6.3.1.1, except as permitted by 6.3.1.1.2 and 6.3.1.1.3.

Table 6.3.1.1 Fire Extinguisher Size and Placement for Class B Hazards

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers	
		ft	m
Light	5-B	30	9.14
	10-B	50	15.25
Ordinary	10-B	30	9.14
	20-B	50	15.25
Extra	40-B	30	9.14
	80-B	50	15.25

Note: The specified ratings do not imply that fires of the magnitudes indicated by these ratings will occur, but, rather, they are provided to give the operators more time and agent to handle difficult spill fires that have the potential to occur.

6.3.1.1.2 Up to three AFFF or FFFP fire extinguishers of at least 2½ gal (9.46 L) capacity shall be permitted to be used to fulfill extra hazard requirements.

6.3.1.1.3 Two AFFF or FFFP fire extinguishers of at least 1.6 gal (6 L) capacity shall be permitted to be used to fulfill ordinary hazard requirements.

6.3.1.2 Fire extinguishers of lesser rating, designed for small specific hazards within the general hazard area, shall be permitted to be installed but shall not be considered as fulfilling any part of the requirements of Table 6.3.1.1, unless permitted by 6.3.1.1.1 or 6.3.1.1.2.

6.3.1.3 Fire extinguishers shall be located so that the maximum travel distances do not exceed those specified in Table 6.3.1.1.

6.3.1.4 The protection requirements shall be permitted to be fulfilled with fire extinguishers of higher ratings, provided the travel distance to such larger fire extinguishers does not exceed 50 ft (15.25 m).

6.3.2 Flammable Liquids of Appreciable Depth.

6.3.2.1 Portable fire extinguishers shall not be installed as the sole protection for flammable liquid hazards of appreciable depth where the surface area exceeds 10 ft² (0.93 m²).

6.3.2.2* Where personnel who are trained in extinguishing fires in the protected hazards are located on the premises and capable of responding immediately, the maximum surface area shall not exceed 20 ft² (1.86 m²).

6.3.2.3 For flammable liquid hazards of appreciable depth, a Class B fire extinguisher shall be provided on the basis of at least 2 numerical units of Class B extinguishing potential per 1 ft² (0.09 m²) of flammable liquid surface of the largest hazard area.

6.3.2.4 AFFF- or FFFP-type fire extinguishers shall be permitted to be provided on the basis of 1-B of protection per 1 ft² (0.09 m²) of hazard. (For fires involving water-soluble flammable liquids, see 5.5.3.)

6.3.2.5 Two or more fire extinguishers of lower ratings, other than AFFF- or FFFP-type fire extinguishers, shall not be used in lieu of the fire extinguisher required for the largest hazard area.

6.3.2.6 Up to three AFFF- or FFFP-type fire extinguishers shall be permitted to fulfill the requirements, provided the sum of the Class B ratings meets or exceeds the value required for the largest hazard area.

6.3.2.7 Travel distances for portable fire extinguishers shall not exceed 50 ft (15.25 m). (See Annex E.)

6.3.2.7.1 Scattered or widely separated hazards shall be individually protected.

6.3.2.7.2 A fire extinguisher in the proximity of a hazard shall be located to be accessible in the presence of a fire without undue danger to the operator.

6.3.3 Obstacle, Gravity/Three-Dimensional, and Pressure Fire Hazards.

6.3.3.1 Where hand portable fire extinguishers are installed or positioned for obstacle, gravity/three-dimensional, or pressure fire hazards, the actual travel distance to hazard shall not exceed 30 ft (9.1 m) unless otherwise specified. (See 5.6.1.)

6.3.3.2 Where wheeled fire extinguishers of 125 lb (56.7 kg) agent capacity or larger are installed or positioned for obstacle, gravity/three-dimensional, or pressure fire hazards, the actual travel distance to hazard shall not exceed 100 ft (30.5 m) unless otherwise specified. (See 5.6.1.)

6.4* Installations for Class C Hazards.

6.4.1 Fire extinguishers with Class C ratings shall be required where energized electrical equipment can be encountered.

6.4.2 The requirement in 6.4.1 shall include situations where fire either directly involves or surrounds electrical equipment.

6.4.3 Because fire is a Class A or Class B hazard, the fire extinguishers shall be sized and located on the basis of the anticipated Class A or Class B hazard.

6.5 Installations for Class D Hazards.

6.5.1* Fire extinguishers or extinguishing agents with Class D ratings shall be provided for fires involving combustible metals.

6.5.2 Fire extinguishers or extinguishing agents (media) shall be located not more than 75 ft (22.9 m) of travel distance from the Class D hazard. (See Section E.6.)

6.5.3* Portable fire extinguishers or extinguishing agents (media) for Class D hazards shall be provided in those work areas where combustible metal powders, flakes, shavings, chips, or similarly sized products are generated.

6.5.4* Size determination shall be on the basis of the specific combustible metal, its physical particle size, area to be covered, and recommendations by the fire extinguisher manufacturer based on data from control tests.

6.6 Installations for Class K Hazards.

6.6.1 Class K fire extinguishers shall be provided for hazards where there is a potential for fires involving combustible cooking media (vegetable or animal oils and fats).

6.6.2 Maximum travel distance shall not exceed 30 ft (9.1 m) from the hazard to the extinguishers.

6.6.3 All solid fuel cooking appliances (whether or not under a hood) with fire boxes of 5 ft³ (0.14 m³) volume or less shall have at least a listed 2-A rated water-type fire extinguisher or a 1.6 gal (6 L) wet chemical fire extinguisher that is listed for Class K fires.

Chapter 7 Inspection, Maintenance, and Recharging

7.1* General.

7.1.1 Responsibility. The owner or designated agent or occupant of a property in which fire extinguishers are located shall be responsible for inspection, maintenance, and recharging. (See 7.1.2.)

7.1.2 Personnel.

7.1.2.1* Persons performing maintenance and recharging of extinguishers shall be certified.

7.1.2.1.1 Persons training to become certified shall be permitted to perform maintenance and recharging of extinguishers under the direct supervision and in the immediate presence of a certified person.

7.1.2.1.2* Certification requires that a person pass a test administered by an organization acceptable to the AHJ.

7.1.2.1.3 The test shall, at a minimum, be based upon knowledge of the chapters and annexes of this standard.

7.1.2.1.4 The testing process shall permit persons to use the standard during the test.

7.1.2.1.5 Persons passing the test required in 7.1.2.1.2 shall be issued a document or a certificate.

7.1.2.1.6 The document or certificate shall be made available when requested by the authority having jurisdiction.

7.1.2.2 Persons performing maintenance and recharging of extinguishers shall be trained and shall have available the appropriate manufacturer's servicing manual(s), the correct tools, recharge materials, lubricants, and manufacturer's replacement parts or parts specifically listed for use in the fire extinguisher.

7.1.2.3* Persons performing inspections shall not be required to be certified.

7.1.3 Replacement While Servicing. Fire extinguishers removed from service for maintenance or recharging shall be replaced by a fire extinguisher suitable for the type of hazard being protected and shall be of at least equal rating.

7.1.4 Tags or Labels.

7.1.4.1 Tags or labels intended for recording inspections, maintenance, or recharging shall be affixed so as not to obstruct the fire extinguisher use, fire extinguisher classification, or manufacturer's labels.

7.1.4.2 Labels indicating fire extinguisher use or classification, or both, shall be permitted to be placed on the front of the fire extinguisher.

7.2 Inspection.

7.2.1 Inspection Frequency.

7.2.1.1* Fire extinguishers shall be manually inspected when initially placed in service.

7.2.1.2* Fire extinguishers and Class D extinguishing agents shall be inspected either manually or by means of an electronic monitoring device/system at intervals not exceeding 31 days.

7.2.1.2.1 Fire extinguishers and Class D extinguishing agents shall be inspected at least once per calendar month.



7.2.1.3* Fire extinguishers and Class D extinguishing agents shall be manually inspected daily or weekly when conditions exist that indicate the need for more frequent inspections.

7.2.1.4 Extinguishers that are electronically monitored for location only, such as those monitored by means of a switch to indicate when the extinguisher is removed from its bracket or cabinet, shall be manually inspected in accordance with 7.2.2.

7.2.2 Inspection Procedures. Periodic inspection or electronic monitoring of fire extinguishers shall include a check of at least the following items:

- (1) Location in designated place
- (2) No obstruction to access or visibility
- (3) Pressure gauge reading or indicator in the operable range or position
- (4) Fullness determined by weighing or hefting
- (5) Condition of tires, wheels, carriage, hose, and nozzle for wheeled extinguishers
- (6) Indicator for nonrechargeable extinguishers using push-to-test pressure indicators

7.2.2.1* In addition to 7.2.2, fire extinguishers shall be visually inspected in accordance with 7.2.2.2 if they are located where any of the following conditions exists:

- (1) High frequency of fires in the past
- (2) Severe hazards
- (3) Locations that make fire extinguishers susceptible to mechanical injury or physical damage
- (4) Exposure to abnormal temperatures or corrosive atmospheres

7.2.2.2 Where required by 7.2.2.1, the following inspection procedures shall be in addition to those addressed in 7.2.2:

- (1) Verify that operating instructions on nameplates are legible and face outward
- (2) Check for broken or missing safety seals and tamper indicators
- (3) Examine for obvious physical damage, corrosion, leakage, or clogged nozzle

7.2.2.3 Inspection Procedure for Containers of Class D Extinguishing Agent. Periodic inspection of containers of Class D extinguishing agent used to protect Class D hazards shall include verification of at least the following:

- (1) Located in designated place
- (2) No obstruction to access or visibility
- (3) Lid is sealed
- (4) Fullness by hefting or weighing
- (5) No obvious physical damage to container

7.2.3 Corrective Action. When an inspection of any fire extinguisher reveals a deficiency in any of the conditions in 7.2.2 or 7.2.2.2, immediate corrective action shall be taken.

7.2.3.1 Rechargeable Fire Extinguishers. When an inspection of any rechargeable fire extinguisher reveals a deficiency in any of the conditions in 7.2.2(3), 7.2.2(4), 7.2.2(5), or 7.2.2.2(1) through 7.2.2.2(3), the extinguisher shall be subjected to applicable maintenance procedures.

7.2.3.2 Nonrechargeable Dry Chemical Fire Extinguisher. When an inspection of any nonrechargeable dry chemical fire extinguisher reveals a deficiency in any of the conditions listed in 7.2.2(3), 7.2.2(4), 7.2.2(6), or 7.2.2.2(1) through 7.2.2.2(3), the extinguisher shall be removed from further use, dis-

charged, and destroyed at the direction of the owner or returned to the manufacturer.

7.2.3.3 Nonrechargeable Halon Agent Fire Extinguisher. When an inspection of any nonrechargeable fire extinguisher containing a halon agent reveals a deficiency in any of the conditions listed in 7.2.2(3), 7.2.2(4), 7.2.2(6), or 7.2.2.2(1) through 7.2.2.2(3), the extinguisher shall be removed from service, shall not be discharged, and shall be returned to the manufacturer, a fire equipment dealer, or a distributor to permit recovery of the halon.

7.2.4 Inspection Record Keeping.

7.2.4.1 Manual Inspection Records.

7.2.4.1.1 Where manual inspections are conducted, records for manual inspections shall be kept on a tag or label attached to the fire extinguisher, on an inspection checklist maintained on file, or by an electronic method.

7.2.4.1.2 Where manual inspections are conducted, the month and year the manual inspection was performed and the initials of the person performing the inspection shall be recorded.

7.2.4.1.3 Personnel making manual inspections shall keep records of all fire extinguishers inspected, including those found to require corrective action.

7.2.4.1.4 Records for manual inspection shall be kept to demonstrate that at least the last 12 monthly inspections have been performed.

7.2.4.2 Electronic Inspection Records.

7.2.4.2.1 Where electronically monitored systems are employed for inspections, records shall be kept for fire extinguishers found to require corrective action.

7.2.4.2.2 Records for electronic monitoring shall be kept to demonstrate that at least the last 12 monthly inspections have been performed.

7.2.4.2.3 For electronically monitored fire extinguishers, where the extinguisher causes a signal at a control unit when a deficiency in any of the conditions listed in 7.2.2 occurs, record keeping shall be provided in the form of an electronic event log at the control panel.

7.3 Extinguisher Maintenance.

7.3.1* Maintenance Procedures. Where required by another section of this standard, maintenance procedures shall include the procedures detailed in the manufacturer's service manual and a thorough examination of the basic elements of the fire extinguisher, including the following:

- (1) Mechanical parts of all fire extinguishers
- (2) Extinguishing agent
- (3) Expelling means
- (4) Physical condition

7.3.2 Annual External Examination of All Extinguishers.

7.3.2.1 Physical Condition. An annual external visual examination of all fire extinguishers shall be made to detect obvious physical damage, corrosion, or nozzle blockage to verify that the operating instructions are present, legible, and facing forward, and that the HMIS information is present and legible, and to determine if a 6-year interval examination or hydrostatic test is due.

7.3.2.2* Seals or Tamper Indicators. At the time of the maintenance, the tamper seal of a rechargeable fire extinguisher shall be removed by operating the pull pin or locking device.

7.3.2.2.1 After the applicable maintenance procedures are completed, a new listed tamper seal shall be installed.

7.3.2.2.2 Seals or tamper indicators on nonrechargeable-type extinguishers shall not be removed.

7.3.2.3* Boots, Foot Rings, and Attachments. All removable extinguisher boots, foot rings, and attachments shall be removed to accommodate thorough annual cylinder examinations.

7.3.2.4 When subjected to temperatures at or above their listed rating, stored-pressure fire extinguishers that require a 12-year hydrostatic test shall be emptied and subjected to the applicable maintenance and recharge procedures on an annual basis.

7.3.2.5 Corrective Action. When an external examination of any fire extinguisher reveals a deficiency, immediate corrective action shall be taken.

7.3.3 Annual Internal Examination of Certain Types of Extinguishers.

7.3.3.1* Maintenance Intervals. Fire extinguishers shall be internally examined at intervals not exceeding those specified in Table 7.3.3.1.

Table 7.3.3.1 Maintenance Involving Internal Examination

Extinguisher Type	Internal Examination Interval (years)
Stored-pressure loaded stream and antifreeze	1
Pump tank water and pump tank, calcium chloride based	1
Dry chemical, cartridge- and cylinder-operated, with mild steel shells	1*
Dry powder, cartridge- and cylinder-operated, with mild steel shells	1*
Wetting agent	1
Stored-pressure water	5
AFFF (aqueous film-forming foam)	3†
FFFP (film-forming fluoroprotein foam)	3†
Stored-pressure dry chemical, with stainless steel shells	5
Carbon dioxide	5
Wet chemical	5
Dry chemical stored-pressure, with mild steel shells, brazed brass shells, and aluminum shells	6
Halogenated agents	6
Dry powder, stored-pressure, with mild steel shells	6

*Dry chemical and dry powder in cartridge- or cylinder-operated extinguishers are examined annually.

†The extinguishing agent in liquid charge-type AFFF and FFPF extinguishers is replaced every 3 years, and an internal examination (tear-down) is normally conducted at that time.

7.3.3.2 Loaded Stream Charge. Stored-pressure types of fire extinguishers containing a loaded stream agent shall be disassembled on an annual basis and subjected to complete maintenance.

7.3.3.2.1 The loaded stream charge shall be permitted to be recovered and re-used, provided it is subjected to agent analysis in accordance with the extinguisher manufacturer's instructions.

7.3.3.2.2 When the internal maintenance procedures are performed during periodic recharging or hydrostatic testing, the 1-year requirement shall begin from that date.

7.3.3.3 Cartridge- or Cylinder-Operated Extinguishers. The extinguishing agent of cartridge- or cylinder-operated extinguishers shall be internally examined annually.

7.3.3.4 Wetting Agent Extinguishers. Wetting agent extinguishers shall be disassembled on an annual basis and subjected to complete maintenance.

7.3.3.5 Pump Tank Extinguishers. Pump tank extinguishers shall be internally examined annually.

7.3.3.6 Annual internal examination shall not be required for nonrechargeable fire extinguishers, carbon dioxide fire extinguishers, or stored-pressure fire extinguishers, except for those types specified in 7.3.3.2.

7.3.4* Annual Maintenance Record Keeping.

7.3.4.1 Each fire extinguisher shall have a tag or label securely attached that indicates that maintenance was performed.

7.3.4.1.1 The tag or label, as a minimum, shall identify the following:

- (1) Month and year maintenance was performed
- (2) Person performing the work
- (3) Name of the agency performing the work

7.3.4.2 Each extinguisher that has undergone maintenance that includes internal examination, except extinguishers identified in 7.3.3.3 and 7.3.3.5 shall have a verification-of-service collar located around the neck of the container.

7.3.4.3 Verification-of-Service Collar (Maintenance or Recharging).

7.3.5 Corrective Action. When maintenance of any fire extinguisher reveals a deficiency, immediate corrective action shall be taken.

7.3.6 Six-Year Internal Examination of Certain Types of Extinguishers. Every 6 years, stored-pressure fire extinguishers that require a 12-year hydrostatic test shall be emptied and subjected to the applicable internal and external examination procedures as detailed in the manufacturer's service manual and this standard.

7.3.6.1 When the applicable maintenance procedures are performed during periodic recharging or hydrostatic testing, the 6-year requirement shall begin from that date.

7.3.6.2* The removal of agent from halon agent fire extinguishers shall only be done using a listed halon closed recovery system.

7.3.6.3 Nonrechargeable fire extinguishers shall not be required to have a 6-year internal examination and shall not be hydrostatically tested but shall be removed from service at a maximum interval of 12 years from the date of manufacture.



7.3.6.3.1 Nonrechargeable halon agent fire extinguishers shall be disposed of in accordance with 7.2.3.3.

7.3.6.4 Corrective Action. When an internal examination of any fire extinguisher reveals a deficiency, immediate corrective action shall be taken.

7.3.6.5* Six-Year Internal Examination Label. Fire extinguishers that pass the applicable 6-year requirement of 7.3.6 shall have the maintenance information recorded on a durable weatherproof label that is a minimum of 2 in. × 3½ in. (51 mm × 89 mm).

7.3.6.5.1 The new label shall be affixed to the shell by a heatless process, and any previous 6-year internal examination labels shall be removed.

7.3.6.5.2 These labels shall be of the self-destructive type when their removal from a fire extinguisher is attempted.

7.3.6.5.3 The 6-year internal examination label shall, as a minimum, identify the following:

- (1) Month and year the 6-year internal examination was performed
- (2) Person performing the work
- (3) Name of the agency performing the work

7.4* Carbon Dioxide Hose Assembly Conductivity Test. A conductivity test shall be conducted annually on all carbon dioxide hose assemblies.

7.4.1 Carbon dioxide hose assemblies that fail the conductivity test shall be replaced.

7.4.2 Record Keeping for Conductivity Testing of Carbon Dioxide Hose Assemblies.

7.4.2.1 Carbon dioxide hose assemblies that pass a conductivity test shall have the test information recorded on a durable weatherproof label that is a minimum of ½ in. × 3 in. (13 mm × 76 mm).

7.4.2.2 The label shall be affixed to the hose by means of a heatless process.

7.4.2.3 The label shall include the following information:

- (1) Month and year the test was performed, indicated by perforation, such as is done by a hand punch
- (2) Name or initials of person performing the test and the name of the agency performing the test

7.5 Electronic Monitoring System Maintenance.

7.5.1 Electronic Monitoring. The components of the monitoring device/system shall be tested and maintained annually in accordance with the manufacturer's listed maintenance manual, with the following items included as a minimum:

- (1) Power supply inspection/battery change
- (2) Obstruction sensor inspection
- (3) Location sensor inspection
- (4) Pressure indication inspection
- (5) Connection continuity inspection (*See 7.5.1.1 and 7.5.1.2.*)

7.5.1.1 One hundred percent of all units shall be tested upon initial installation or reacceptance with verification of receipt of signal at the control panel or a local alarm.

7.5.1.2 Twenty percent of units shall be tested annually on a rotating basis so that all units are tested within a 5-year period.

7.5.2 When used in conjunction with fire alarm systems, fire extinguisher electronic monitoring devices shall be inspected and maintained in accordance with *NFPA 72* and 7.5.1.

7.5.3 Corrective Action. When maintenance of any monitoring system reveals a deficiency, immediate corrective action shall be taken.

7.6 Maintenance of Wheeled Extinguisher Hoses and Regulators.

7.6.1 Discharge hoses on wheeled-type fire extinguishers shall be completely uncoiled and examined for damage annually.

7.6.2* Wheeled Unit Hoses. Discharge hoses on wheeled extinguishers shall be coiled in a manner to prevent kinks and to allow rapid deployment in accordance with the manufacturer's instructions.

7.6.3 Pressure Regulators. Pressure regulators provided with wheeled-type fire extinguishers shall be tested annually for outlet static pressure and flow rate in accordance with the manufacturer's instructions.

7.6.4 Corrective Action. When maintenance of any fire extinguisher hose or pressure regulator reveals a deficiency, immediate corrective action shall be taken.

7.7 Extinguisher Recharging and Extinguishing Agents.

7.7.1* General.

7.7.1.1 All rechargeable-type fire extinguishers shall be recharged after any use or when the need is indicated by an inspection or servicing.

7.7.1.2* When recharging is performed, the manufacturer's service manual shall be followed. (*For recharge agents, see 7.7.3.*)

7.7.1.3* The amount of recharge agent shall be verified by weighing.

7.7.1.3.1 For those fire extinguishers that do not have the gross weight marked on the nameplate or valve, a permanent label that indicates the gross weight shall be affixed to the cylinder.

7.7.1.3.2 The added label containing the gross weight shall be a durable material of a pressure-sensitive, self-destructive type. (*For stored-pressure water-type extinguishers, see 7.7.3.10.*)

7.7.1.3.3 Pump tank water and pump tank calcium chloride-based antifreeze types shall not be required to have weight marked.

7.7.1.3.4* After recharging, a leak test shall be performed on stored-pressure and self-expelling types of fire extinguishers.

7.7.1.3.5 In no case shall an extinguisher be recharged if it is beyond its specified hydrostatic test date.

7.7.2 Extinguisher Recharging Frequency for Certain Types of Extinguishers.

7.7.2.1 Pump Tank. Every 12 months, pump tank water and pump tank calcium chloride-based antifreeze types of fire extinguishers shall be recharged with new chemicals or water as applicable.

7.7.2.2 Wetting Agent. The agent in stored-pressure wetting agent fire extinguishers shall be replaced annually.

7.7.2.2.1 Only the agent specified on the nameplate shall be used for recharging.

7.7.2.2.2 The use of water or any other additives shall be prohibited.

7.7.2.3 AFFF and FFFP.

7.7.2.3.1 The premixed agent in liquid charge-type AFFF and FFFP fire extinguishers shall be replaced at least once every 3 years.

7.7.2.3.2 Only the foam agent specified on the extinguisher nameplate shall be used for recharge.

7.7.2.3.3 The agent in nonpressurized AFFF and FFFP fire extinguishers that is subjected to agent analysis in accordance with manufacturer's instructions shall not be required to comply with 7.7.2.3.1.

7.7.3* Recharge Agents.

7.7.3.1 Only those agents specified on the nameplate or agents proven to have equal chemical composition, physical characteristics, and fire-extinguishing capabilities shall be used.

7.7.3.1.1 Agents listed specifically for use with that fire extinguisher shall be considered to meet these requirements.

7.7.3.2* Mixing of Dry Chemicals. Multipurpose dry chemicals shall not be mixed with alkaline-based dry chemicals.

7.7.3.3 Topping Off.

7.7.3.3.1 The remaining dry chemical in a discharged fire extinguisher shall be permitted to be re-used, provided that it is thoroughly checked for the proper type, contamination, and condition.

7.7.3.3.2 Dry chemical found to be of the wrong type or contaminated shall not be re-used.

7.7.3.4 Dry Chemical Agent Re-Use.

7.7.3.4.1 The dry chemical agent shall be permitted to be re-used, provided a closed recovery system is used and the agent is stored in a sealed container to prevent contamination.

7.7.3.4.2 Prior to re-use, the dry chemical shall be thoroughly checked for the proper type, contamination, and condition.

7.7.3.4.3 Where doubt exists with respect to the type, contamination, or condition of the dry chemical, the dry chemical shall be discarded.

7.7.3.4.4 Dry Chemical Closed Recovery System.

7.7.3.4.4.1 The system shall be constructed in a manner that does not introduce foreign material into the agent being recovered.

7.7.3.4.4.2 The system shall have a means for visual inspection of the recovered agent for contaminants.

7.7.3.5 Dry Powder.

7.7.3.5.1 Pails or drums containing dry powder agents for scoop or shovel application for use on metal fires shall be kept full and sealed with the lid provided with the container.

7.7.3.5.2 The dry powder shall be replaced if found damp. (See A.7.7.3.)

7.7.3.6* Removal of Moisture. For all non-water types of fire extinguishers, any moisture shall be removed before recharging.

7.7.3.7* Halogenated Agent. Halogenated agent fire extinguishers shall be charged with only the type and weight of agent specified on the nameplate.

7.7.3.8 Halogenated Agent Re-Use.

7.7.3.8.1 The removal of Halon 1211 from fire extinguishers shall be done using only a listed halon closed recovery system.

7.7.3.8.2 The removal of agent from other halogenated agent fire extinguishers shall be done using only a closed recovery system.

7.7.3.8.3 The fire extinguisher shall be examined internally for contamination or corrosion or both.

7.7.3.8.4 The halogenated agent retained in the system recovery cylinder shall be re-used only if no evidence of internal contamination is observed in the fire extinguisher cylinder.

7.7.3.8.5 Halogenated agent removed from fire extinguishers that exhibits evidence of internal contamination or corrosion shall be processed in accordance with the fire extinguisher manufacturer's instructions.

7.7.3.9* Carbon Dioxide.

7.7.3.9.1 The vapor phase of carbon dioxide shall be not less than 99.5 percent carbon dioxide.

7.7.3.9.2 The water content shall be not more than 60 parts per million (ppm) by weight at -52°F (-47°C) dew point.

7.7.3.9.3 Oil content shall not exceed 10 ppm by weight.

7.7.3.10* Water Types. The amount of liquid agent shall be determined by using one of the following:

- (1) Exact measurement by weight
- (2) Exact measurement by volume
- (3) Anti-overfill tube, if provided
- (4) Fill mark on fire extinguisher shell, if provided

7.7.3.10.1 Only the agent specified on the extinguisher nameplate shall be used for recharge.

7.7.3.10.2 Only additives identified on the original nameplate shall be permitted to be added to water-type extinguishers.

7.7.3.11 Wet Chemical and Water Mist Agent Re-Use.

7.7.3.11.1 Wet chemical and water mist agents shall not be re-used.

7.7.3.11.2 If a wet chemical or water mist extinguisher is partially discharged, all remaining wet chemical or water mist shall be discarded.

7.7.3.11.3 Wet chemical or water mist agent shall be discarded and replaced at the hydrostatic test interval.

7.7.3.11.3.1 Only the agent specified on the extinguisher nameplate shall be used for recharge.

7.7.4 Recharging Expellant Gas for Stored-Pressure Fire Extinguishers.

7.7.4.1 Only standard industrial-grade nitrogen with a maximum dew point of -60°F (-51°C), in accordance with CGA G-10.1, *Commodity Specification for Nitrogen*, shall be used to pressurize stored-pressure dry chemical and halogenated-type fire extinguishers that use nitrogen as a propellant.

7.7.4.2 Halogenated-type fire extinguishers that require argon shall be pressurized with argon with a dew point of -65°F (-54°C) or lower.

7.7.4.3 Compressed air shall be permitted to be used from special compressor systems capable of delivering air with a dew point of -60°F (-51°C) or lower. (See Annex J.)

7.7.4.3.1 The special compressor system shall be equipped with an automatic monitoring and alarm system to ensure that the dew point remains at or below -60°F (-51°C) at all times.

7.7.4.3.2 Compressed air through moisture traps shall not be used for pressurizing even though so stated in the instructions on older fire extinguishers.

7.7.4.3.3 Compressed air without moisture removal devices shall be permitted for pressurizing water extinguishers and foam hand extinguishers only.

7.7.4.4* Class D wet chemical, water mist, and halogenated agent fire extinguishers shall be repressurized only with the type of expellant gas referred to on the fire extinguisher label.

7.7.4.5 A rechargeable stored-pressure-type fire extinguisher shall be pressurized only to the charging pressure specified on the fire extinguisher nameplate.

7.7.4.5.1 The manufacturer's pressurizing adapter shall be connected to the valve assembly before the fire extinguisher is pressurized.

7.7.4.5.2 A regulated source of pressure, set no higher than 25 psi (172 kPa) above the operating (service) pressure, shall be used to pressurize fire extinguishers.

7.7.4.5.3 The gauge used to set the regulated source of pressure shall be calibrated at least annually.

7.7.4.6* An unregulated source of pressure, such as a nitrogen cylinder without a pressure regulator, shall not be used.

7.7.4.7* A fire extinguisher shall not be left connected to the regulator of a high-pressure source for an extended period of time.

7.7.4.8 Recharge Record Keeping.

7.7.4.8.1 Each fire extinguisher shall have a tag or label attached that indicates the month and year recharging was performed, identifies the person performing the service, and identifies the name of the agency performing the work.

7.7.4.8.2 Each extinguisher that has been recharged shall have a verification-of-service collar located around the neck of the container, except as identified in 7.10.4.

7.8* Pressure Gauges.

7.8.1 Replacement pressure gauges shall have the correct indicated charging (service) pressure.

7.8.2 Replacement pressure gauges shall be marked for use with the agent in the fire extinguisher.

7.8.3 Replacement pressure gauges shall be compatible with the fire extinguisher valve body material.

7.9 Prohibition on Uses of Extinguishers and Conversion of Fire Extinguisher Types.

7.9.1 Fire extinguishers shall not be used for any purpose other than that of a fire extinguisher.

7.9.2 Fire extinguishers shall not be converted from one type to another, modified, or altered.

7.9.3 Fire extinguishers shall not be converted for the use of a different type of extinguishing agent.

7.10* Maintenance and Recharge Service Collar. Each extinguisher that has undergone maintenance that included internal examination or that has been recharged requiring the removal of the valve assembly shall have a verification-of-service collar located around the neck of the container.

7.10.1 The collar shall be a single circular piece of uninterrupted material forming a hole of a size that does not permit the collar assembly to move over the neck of the container unless the valve is completely removed.

7.10.2 The collar shall not interfere with the operation of the fire extinguisher.

7.10.3 The verification of service collar shall, as a minimum, identify the following:

- (1) Month and year the recharging or internal examination was performed
- (2) Name of the agency performing the work

7.10.4 Service Collar Exemptions.

7.10.4.1 New extinguishers requiring an initial charge in the field (such as pressurized water, AFFF, FFFP, or wet chemical extinguishers) shall not be required to have a verification-of-service collar installed.

7.10.4.2 Liquefied gas, halogenated agent, and carbon dioxide extinguishers that have been recharged without valve removal shall not be required to have a verification-of-service collar installed following recharge.

7.10.4.3 Cartridge- and cylinder-operated extinguishers shall not be required to have a verification-of-service collar installed.

7.11* Weight Scales. Weight scales used for the maintenance and recharge of fire extinguishers shall have the reading increments and the accuracy necessary to verify the charge weights required in the service manuals and on the nameplates.

Chapter 8 Hydrostatic Testing

8.1 General.

8.1.1 Pressure vessels used as fire extinguishers and specified components of fire extinguishers shall be hydrostatically tested in accordance with this chapter.

8.1.2 Cylinders and cartridges bearing U.S. Department of Transportation (DOT) or Transport Canada (TC) markings shall be retested in accordance with the applicable DOT or TC regulations.

8.1.2.1 Hydrostatic testing shall be performed by persons who are trained in pressure testing procedures and safeguards complying with 7.1.2 and who have testing equipment, facilities, and an appropriate manufacturer's service manual(s) available.

8.1.2.1.1 Personnel performing hydrostatic testing shall be certified by an organization with a certification program acceptable to the authority having jurisdiction.

8.1.2.1.2 Hydrostatic testing facilities with a DOT certification [requalification identification number (RIN)] or a TC certification shall be permitted to perform the task of hydrostatic testing without having additional certification as a fire extinguisher technician as outlined in 7.1.2.

8.1.2.1.3* Where hydrostatic testing is subcontracted to a facility described in 8.1.2.1.1, an extinguisher technician complying with 7.1.2 shall perform assembly and disassembly of valves and cylinders, replacement of any parts or components, and all other extinguisher service work.

8.1.3 A hydrostatic test shall always include both an internal and an external visual examination of the cylinder.

8.1.4 Hydrostatic testing shall be conducted using water or another compatible noncompressible fluid as the test medium.

8.1.4.1 Air or other gases shall not be used as the sole medium for pressure testing.

8.1.4.2 All air shall be vented prior to hydrostatic testing, to prevent violent and dangerous failure of the cylinder.

8.1.5* Fire extinguishers having aluminum cylinders or shells suspected of being exposed to temperatures in excess of 350°F (177°C) shall be removed from service and subjected to a hydrostatic test.

8.2* Test Equipment.

8.2.1 Pressure Gauges.

8.2.1.1 Test pressure gauges shall be certified accurate to ± 0.5 percent, or better, of the full range of the gauge.

8.2.1.2 Test pressure gauges shall be capable of being read to within 1 percent of the test pressure. Interpolation of mid-point between smallest graduations shall be permitted.

8.2.1.3 Test pressure gauges shall be capable of indicating 90 percent to 110 percent of the test pressure.

8.2.1.4 Pressure gauges used on test equipment shall be calibrated at least semiannually.

8.2.1.5 Master gauges or dead weight testers shall be calibrated at least annually.

8.2.2 Drying Equipment.

8.2.2.1 All hydrostatically tested cylinders and apparatus, except water-type extinguishers, shall be thoroughly dried after testing.

8.2.2.2 The temperature used for drying shall not exceed 150°F (66°C) inside the shell.

8.2.3 Test Equipment for High-Pressure Cylinders. The equipment for hydrostatic testing of high-pressure cylinders and cartridges (DOT 3 series) shall meet the specifications of CGA C-1, *Methods of Hydrostatic Testing of Compressed Gas Cylinders*.

8.2.4 Test Equipment for Low-Pressure Cylinders and Hose Assemblies (Proof Pressure Test).

8.2.4.1 Cylinders and hose assemblies shall be tested within a protective cage device or placed behind a protective shield that permits visual observation while under pressure for leaks, bulges, and other harmful defects.

8.2.4.2 A hydrostatic test pump, hand- or power-operated, shall be capable of producing not less than 150 percent of the test pressure and shall include appropriate check valves and fittings.

8.2.4.3 A flexible connection between the test pump and the test cylinder shall be provided so that it is possible to test through the cylinder opening, test bonnet, hose outlet, or nozzle, as applicable.

8.3 Frequency.

8.3.1 General. At intervals not exceeding those specified in Table 8.3.1, fire extinguishers shall be hydrostatically retested.

Table 8.3.1 Hydrostatic Test Intervals for Extinguishers

Extinguisher Type	Test Interval (years)
Stored-pressure water, water mist, loaded stream, and/or antifreeze	5
Wetting agent	5
AFFF (aqueous film-forming foam)	5
FFFP (film-forming fluoroprotein foam)	5
Dry chemical with stainless steel shells	5
Carbon dioxide	5
Wet chemical	5
Dry chemical, stored-pressure, with mild steel shells, brazed brass shells, or aluminum shells	12
Dry chemical, cartridge- or cylinder-operated, with mild steel shells	12
Halogenated agents	12
Dry powder, stored-pressure, cartridge- or cylinder-operated, with mild steel shells	12

8.3.1.1 The hydrostatic retest shall be conducted within the calendar year of the specified test interval.

8.3.2 Cylinders and Cartridges.

8.3.2.1 Nitrogen cylinders, argon cylinders, carbon dioxide cylinders, or cartridges used for inert gas storage that are used as expellants for wheeled fire extinguishers and carbon dioxide extinguishers shall be hydrostatically tested every 5 years.

8.3.2.1.1 Cylinders (except those charged with carbon dioxide) complying with 49 CFR 180.209(b) shall be permitted to be hydrostatically tested every 10 years in lieu of the requirement in 8.3.2.1.

8.3.2.2 Nitrogen cartridges, argon cartridges, and carbon dioxide cartridges used as expellants for hand portable fire extinguishers that have DOT or TC markings shall be hydrostatically tested or replaced according to the requirements of DOT or TC.

8.3.2.2.1 DOT 3E cartridges or TC 3EM cartridges shall be exempt from periodic hydrostatic retest.

8.3.3 Hose Assemblies.

8.3.3.1 A hydrostatic test shall be performed on fire extinguisher hose assemblies equipped with a shutoff nozzle at the end of the hose.

8.3.3.2 High-pressure and low-pressure accessory hose (other than agent discharge hose) used on wheeled extinguishers shall be hydrostatically tested.

8.3.3.3 The test interval for 8.3.3.1 and 8.3.3.2 shall be the same as that specified for the fire extinguisher or fire extinguisher agent cylinder on which the hose is installed.

8.4 Extinguisher Examination.

8.4.1 General. If, at any time, a fire extinguisher shows evidence of dents, mechanical injury, or corrosion to the extent as to indicate weakness, it shall be condemned or hydrostatically retested subject to the provisions of 8.4.2 and Section 8.8.

8.4.1.1 Pump tanks shall not be required to comply with 8.4.1.

8.4.1.2 Nonrechargeable fire extinguishers other than halogenated agent types shall not be required to comply with 8.4.1 but shall be discharged and discarded where the fire extinguisher shows evidence of dents, mechanical injury, or corrosion to the extent of indicating weakness.

8.4.1.3 Nonrechargeable halon agent-type fire extinguishers that show evidence of dents, mechanical injury, or corrosion to the extent indicating weakness shall be removed from service, shall not be discharged, and shall be returned to the manufacturer, a fire equipment dealer, or a distributor to permit recovery of the halon.

8.4.2* Examination of Cylinder Condition. Where a fire extinguisher cylinder or shell exhibits one or more of the following conditions, it shall not be hydrostatically tested but shall be condemned or destroyed by the owner or at the owner's direction:

- (1)*Where repairs by soldering, welding, brazing, or use of patching compounds exist
- (2) Where the cylinder threads are worn, corroded, broken, cracked, or nicked
- (3) Where corrosion has caused pitting, including pitting under a removable nameplate or nameband assembly
- (4) Where the fire extinguisher has been exposed to excessive heat, flame, or fire
- (5) Where a calcium chloride-type extinguishing agent has been used in a stainless steel fire extinguisher
- (6) Where the shell is of copper or brass construction joined by soft solder or rivets
- (7) Where the depth of a dent exceeds $\frac{1}{10}$ of the greatest dimension of the dent if not in a weld or exceeds $\frac{1}{4}$ in. (6 mm) if the dent includes a weld
- (8) Where any local or general corrosion, cuts, gouges, or dings have removed more than 10 percent of the minimum cylinder wall thickness
- (9) Where a fire extinguisher has been used for any purpose other than that of a fire extinguisher

8.5 Testing Procedures.

8.5.1 General.

8.5.1.1 The pressure in a hydrostatic test of a cylinder shall be maintained for a minimum of 30 seconds, but for a time not less than is required for complete expansion of the cylinder and to complete the visual examination of the cylinder.

8.5.1.2 All valves, internal parts, and hose assemblies shall be removed, and the fire extinguisher shall be emptied before testing.

8.5.1.2.1 On certain dry chemical and dry powder fire extinguishers (cartridge-operated), where the manufacturer recommends that certain internal parts not be removed, those parts shall not be removed.

8.5.1.3 All types of extinguishers, except the water type, shall have all traces of extinguishing agents removed from the inside of the extinguisher before they are filled with water.

8.5.1.4 A complete internal and external visual examination shall be conducted before any hydrostatic test.

8.5.1.4.1 The procedures for the visual examination shall be in accordance with 8.4.2.

8.5.1.5 All tests shall be conducted using test fittings and adapters.

8.5.2 Low-Pressure Cylinders.

8.5.2.1 The hydrostatic testing of dry chemical and dry powder fire extinguishers having an externally mounted gas cartridge shall have the cartridge and cartridge receiver removed and a plug inserted into the opening.

8.5.2.2 All hose shall be removed from cylinders prior to hydrostatic testing.

8.5.2.3 All stored-pressure extinguishers shall have the valve removed from the cylinder and replaced with a test bonnet or adapter.

8.5.2.4 All cartridge- or cylinder-operated wheeled extinguishers shall have pressure relief devices removed and replaced with a plug prior to the test.

8.5.2.4.1 The manufacturer's recommendations shall be followed.

8.5.2.5 Any distortion of the cylinder shall be cause for rejection.

8.5.2.6 A drop in pressure of the test gauge, which is an indication of a leak, shall be cause for rejection or retest.

8.5.2.7 Cylinders passing the hydrostatic test shall be thoroughly dried internally before being returned to service.

8.5.2.8 If heated air is used to dry the cylinders, the temperature shall not exceed 150°F (66°C) inside the shell.

8.5.3 High-Pressure Cylinders.

8.5.3.1 The hydrostatic testing of high-pressure cylinders and cartridges shall be in accordance with the procedures of TC, DOT, and CGA C-1.

8.5.3.2 Cylinders passing the hydrostatic test shall be thoroughly dried internally before being returned to service.

8.5.3.3 If heated air is used to dry the cylinders, the temperature shall not exceed 150°F (66°C) inside the shell.

8.5.4 Hose Assemblies.

8.5.4.1 The discharge valve shall be removed from the hose assembly without removal of any hose couplings.

8.5.4.2 The location of all couplings shall be marked prior to the hydrostatic test.

8.5.4.3 The hose shall be completely filled with water before testing.

8.5.4.4 For dry chemical and dry powder types, all traces of dry chemical or dry powder shall be removed prior to testing.

8.5.4.5 The hose assembly shall be placed within a protective cage or device whose design permits visual observation during the test.

8.5.4.6 Pressure shall be applied at a rate of rise such that the test pressure is reached in 1 minute.

8.5.4.7 Test pressure for hose assemblies shall be maintained for a minimum of 1 minute.

8.5.4.7.1 Observations shall be made to detect any distortion or leakage while the hose is pressurized.

8.5.4.7.2 Leakage, distortion, or permanent movement of couplings shall constitute a failure of the hydrostatic test.

8.5.4.8 Hose passing the hydrostatic test shall be thoroughly dried internally.

8.5.4.9 If heat is used, the temperature shall not exceed 150°F (66°C).

8.6 Test Pressures.

8.6.1 Low-Pressure Cylinders.

8.6.1.1 Stored-Pressure Types. Stored-pressure fire extinguishers shall be hydrostatically tested to the pressure specified on the extinguisher nameplate.

8.6.1.1.1 Where pressure is not specified on the extinguisher nameplate, the extinguisher shall be tested at the factory test pressure, not to exceed three times the extinguisher service pressure.

8.6.1.1.2 Fire extinguishers that are required to be returned to the manufacturer for recharging shall be hydrostatically tested only by the manufacturer.

8.6.1.2 Cartridge-Operated Types. Cartridge- or cylinder-operated dry chemical and dry powder types of extinguishers shall be hydrostatically tested at their original factory test pressure as shown on the nameplate or shell.

8.6.2 High-Pressure Cylinders.

8.6.2.1 DOT 3A, 3AA, or 3AL cylinders used as carbon dioxide extinguishers or nitrogen cylinders, argon cylinders, or carbon dioxide cylinders that are used with wheeled extinguishers shall be tested at $\frac{5}{8}$ the service pressure as stamped into the cylinder.

8.6.2.2 Carbon dioxide fire extinguishers having cylinder specification ICC3 shall be tested at 3000 psi (20.68 MPa).

8.6.3 Hose Assemblies.

8.6.3.1 Carbon dioxide hose assemblies requiring a hydrostatic pressure test shall be tested at 1250 psi (8619 kPa).

8.6.3.2 Dry chemical, dry powder, water, foam, and halogenated agent discharge hose assemblies requiring a hydrostatic pressure test shall be tested at 300 psi (2068 kPa) or at service pressure, whichever is higher.

8.6.3.3 Low-pressure accessory hose used on wheeled extinguishers shall be tested at 300 psi (2068 kPa).

8.6.3.4 High-pressure accessory hose used on wheeled extinguishers shall be tested at 3000 psi (20.68 MPa).

8.7 Recording of Hydrostatic Tests.

8.7.1* Records. The record of a hydrostatic test shall be maintained by the organization that performed the test until either the expiration of the test period or until the cylinder is again tested, whichever occurs first.

8.7.2* Low-Pressure Cylinders.

8.7.2.1 Fire extinguisher cylinders of the low-pressure non-DOT type that pass a hydrostatic test shall have the following information recorded on a label:

- (1) Month and year the test was performed, indicated by a perforation, such as is done by a hand punch
- (2) Test pressure used
- (3) Name or initials of the person performing the test and name of the agency performing the test

8.7.2.2 The label shall meet the following criteria:

- (1) Sized at a minimum of 2 in. $\times$ 3½ in. (51 mm $\times$ 89 mm)
- (2) Affixed by a heatless process
- (3) Self-destructs when removed from a fire extinguisher cylinder shell
- (4) Made of a durable, weatherproof material with a pressure-sensitive adhesive

8.7.2.3 In addition to the information in 8.7.2.1, DOT specification cylinders shall be labeled in accordance with 49 CFR 180.213(c) (1).

8.7.3 High-Pressure Cylinders and Cartridges.

8.7.3.1 Cylinders or cartridges that pass the hydrostatic test shall be stamped with the retester's identification number and the month and year of the retest per DOT/TC requirements.

8.7.3.2 Stamping shall be placed only on the shoulder, top, head, neck, or foot ring (where provided) of the cylinder or in accordance with 49 CFR 180.213(c) (1).

8.7.4 Hose Assemblies. Hose assemblies that pass a hydrostatic test shall not require recording, labeling, or marking.

8.8 Condemning Extinguishers.

8.8.1 Fails Test or Examination. When a fire extinguisher cylinder, shell, or cartridge fails a hydrostatic pressure test or fails to pass a visual examination as specified in 8.4.2, it shall be condemned or destroyed by the owner or the owner's agent.

8.8.1.1 When a cylinder is required to be condemned, the retester shall notify the owner in writing that the cylinder is condemned and that it cannot be reused.

8.8.1.2 A condemned cylinder shall not be repaired.

8.8.2 Marking Condemned Extinguishers.

8.8.2.1 Condemned cylinders shall be stamped "CON-DEM-NED" on the top, head, shoulder, or neck with a steel stamp.

8.8.2.2 No person shall remove or obliterate the "CON-DEM-NED" marking.

8.8.2.3 Minimum letter height shall be ⅛ in. (3 mm).

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.1 Many fires are small at origin and can be extinguished by the use of portable fire extinguishers. Notification of the fire department as soon as a fire is discovered is strongly rec-



ommended. This alarm should not be delayed by awaiting results of the application of portable fire extinguishers.

Fire extinguishers can represent an important segment of any overall fire protection program. However, their successful functioning depends upon the following conditions having been met:

- (1) The fire extinguisher is located in accordance with the requirements of Chapter 6 and is in working order.
- (2) The fire extinguisher is of the correct type for a fire that can occur.
- (3) The fire is discovered while still small enough for the fire extinguisher to be effective.
- (4) The fire is discovered by a person ready, willing, and able to use the fire extinguisher.

Fixed systems are covered by the following NFPA standards:

- (1) NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam*
- (2) NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*
- (3) NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems*
- (4) NFPA 13, *Standard for the Installation of Sprinkler Systems*
- (5) NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*
- (6) NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*
- (7) NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*
- (8) NFPA 17, *Standard for Dry Chemical Extinguishing Systems*
- (9) NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*
- (10) NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*
- (11) NFPA 750, *Standard on Water Mist Fire Protection Systems*
- (12) NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*

A.1.2 The owner or occupant of a property in which fire extinguishers are located has an obligation for the care and use of these extinguishers at all times. The nameplate(s) and instruction manual should be read and thoroughly understood by all persons who could be expected to use the fire extinguishers.

To discharge this obligation, the owner or occupant should give attention to the inspection, maintenance, and recharging of this fire-protective equipment and should also train personnel in the correct use of fire extinguishers on the different types of fires that could occur on the property.

The owner or occupant should recognize fire hazards on the property and plan in advance the exact means and equipment with which a fire will be fought. The owner/occupant should ensure that everyone knows how to call the fire department and should stress that they do so for every fire, no matter how small.

On larger properties, a private fire brigade should be established and trained. Personnel need to be assigned to inspect each fire extinguisher periodically. Other personnel can have the duty of maintaining and recharging such equipment at scheduled intervals.

Portable fire extinguishers are appliances to be used principally by the occupants of a fire-endangered building or area who are familiar with the location and operation of the extinguisher through education or training. Portable fire extinguishers are primarily of value for immediate use on small fires. They have a limited quantity of extinguishing material and, therefore, need to be used properly so that this material is not wasted.

Fire extinguishers are mechanical devices. They need care and maintenance at periodic intervals to ensure that they are ready to operate properly and safely. Parts and internal chemicals can deteriorate with time and need replacement. They are pressure vessels, in most cases, and so need to be treated with respect and handled with care.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase “authority having jurisdiction,” or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.4 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.3 Carbon Dioxide. Liquid carbon dioxide forms dry ice (“snow”) when released directly into the atmosphere. Carbon dioxide gas is 1½ times heavier than air. Carbon dioxide extinguishes fire by reducing the concentrations of oxygen, the vapor phase of the fuel, or both in the air to the point where combustion stops.

A.3.3.4.1 Dry Chemical. European and ISO standards do not distinguish between dry chemical agents and dry powder agents. Their use of the term *dry powder* includes both dry chemical and dry powder as defined in this standard.

A.3.3.4.2 Wet Chemical. While loaded stream and wet chemical agent charges can comprise similar materials, their formulations could dictate differing maintenance procedures.

A.3.3.9 Dry Powder. See A.3.3.4.1.

A.3.3.10 Electronic Monitoring. Electronic monitoring can be accomplished utilizing low-voltage wiring or a wireless communication method. It can convey information about an in-place fire extinguisher that includes status, pressure level, presence, condition, and whether there is an obstruction to the extinguisher.