



# National Fire Codes<sup>®</sup> 1985

# *National Fire Codes®*

A Compilation of NFPA Codes, Standards,  
Recommended Practices, Manuals and Guides

Volume 1



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藏书章

This is one of 8 volumes of the *National Fire Codes* published by the National Fire Protection Association. The complete set contains the codes, standards, recommended practices, manuals and guides developed by the technical committees of the Association and processed in accordance with the NFPA Regulations Governing Committee Projects.

National Fire Protection Association  
Batterymarch Park, Quincy, MA 02269

## **NATIONAL FIRE PROTECTION ASSOCIATION**

**Batterymarch Park, Quincy, MA 02269**

The National Fire Protection Association was organized in 1896 to promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure the cooperation of its members in establishing proper safeguards against loss of life and property by fire. The Association is an international, charitable, technical and educational organization. Its membership includes over one hundred and fifty national and regional societies and associations and over thirty-two thousand individuals, corporations, and organizations. Anyone interested may become a member; membership information is available on request.

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## *National Fire Codes*

The *National Fire Codes* are annual compilations of the Codes, Standards, Recommended Practices, Manuals, Guides and Model Laws prepared by Technical Committees organized under NFPA sponsorship in accordance with the published procedures of the Association. Only those documents which have been adopted by the Association are included in the *National Fire Codes*.

The Board of Directors of the Association appoints persons from those vitally interested, qualified, and active in the areas with which the Committees are concerned so as to achieve a fair balance of affected interests. All service on these NFPA Technical Committees is contributed voluntarily in support of the Association's program for firesafety. While these procedures assure the highest degree of care, neither the National Fire Protection Association, its members, nor those participating in its activities accept any liability resulting from compliance with the provisions given herein, for any restrictions imposed on materials or processes, or for the completeness of the text. Users should realize that complete reliance for firesafety can never rest exclusively on any single safeguard.

The committees responsible for the various texts published herein are given in the introductory sections preceding each. Current committee lists are published in the *NFPA Yearbook*, which may be obtained from the Association. Official records of the adoption of each standard will be found in the *NFPA Technical Committee Reports*, the *Technical Committee Documentation* and *Fire Journal*, a bimonthly membership publication of the Association.

Volumes 1 through 6 contain documents which have been judged suitable for legal adoption and enforcement (Codes and Standards).

Volumes 7 and 8 contain Recommended Practices, Manuals and Guides which are generally referred to as good engineering practices. Also included in these volumes are such documents as model laws and enabling acts which will be found to be particularly helpful to enforcing agencies.

Many of the documents have been approved by the American National Standards Institute as American National Standards. Most of the documents contained in these volumes are also published by the Association in separate pamphlet form.

Users of this document should consult applicable Federal, State and local laws and regulations. NFPA does not, by the publication of this document, intend to urge action which is not in compliance with applicable laws and this document may not be construed as doing so.

### **Policy adopted by NFPA Board of Directors on December 3, 1982**

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

# Official NFPA Definitions

Extracted from the *Regulations Governing Committee Projects*

## Section 2. Terms and Definitions.

**2-2 Definitions.** Where the following terms, commonly found in the Association Committee Documents, are used or defined in the body of the text of a Standard, Code, Recommended Practice, Manual or Guide, they shall be consistent with the intent of these meanings, but these "definitions" may be altered by a Committee to fit the individual needs of the Document. Such altered definition shall be clear and unambiguous in the context in which it is used.

**Approved:** means "acceptable to the authority having jurisdiction."

NOTE: 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 or 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 concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

**Authority Having Jurisdiction:** The "authority having jurisdiction" is the organization, office, or individual responsible for "approving" equipment, an installation, or a procedure.

NOTE: The phrase "authority having jurisdiction" 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, 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 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."

**Code:** A Document containing only mandatory provisions using the word "shall" to indicate requirements and in a form generally suitable for adoption into law. Ex-

planatory material may be included only in the form of "fine print" notes, in footnotes, or in an appendix.

**Labeled:** Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization 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 standard or performance in a specified manner.

**Listed:** Equipment or materials included in a list published by an organization acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing state either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

NOTE: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which 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.

**Manual or Guide:** A Document which is informative in nature and does not contain requirements.

**Recommended Practice:** A Document containing only advisory provisions (using the word "should" to indicate recommendations) in the body of the text.

**Shall:** Indicates a mandatory requirement.

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

**Standard:** A Document containing only mandatory provisions using the word "shall" to indicate requirements. Explanatory material may be included only in the form of "fine print" notes, in footnotes, or in an appendix.

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*Notes and footnotes are informative only and are not mandatory.*

## NOTICE

All questions or other communications relating to documents in this volume should be sent only to NFPA Headquarters, addressed to the attention of the Committee responsible for the document.

For information on obtaining Formal Interpretations of the documents, proposing Tentative Interim Amendments, proposing amendments for Committee consideration, and on matters relating to the content of the document, write to the Secretary, Standards Council, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

A statement, written or oral, that is not processed in accordance with Section 16 of the Regulations Governing Committee Projects shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

## VOLUME 1

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**Standard for  
Portable Fire Extinguishers**

**NFPA 10-1984**

**1984 Edition of NFPA 10**

This edition of NFPA 10, *Standard for Portable Fire Extinguishers*, was prepared by the Technical Committee on Portable Fire Extinguishers and acted on by the National Fire Protection Association, Inc. at its Annual Meeting held May 21-24, 1984 in New Orleans, Louisiana. It was issued by the Standards Council on June 14, 1984, with an effective date of July 5, 1984, and supersedes all previous editions.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

**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 10A. A new appendix was added to the 1974 edition to include information about the selection of extinguishers for home hazards. Information on selection and distribution of extinguishers was added to the appendix of the 1978 edition. Major revisions to provide simplification and uniformity were made in the 1984 edition.

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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.

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## Standard for Portable Fire Extinguishers

NFPA 10-1984

NOTICE: An asterisk (\*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Information on referenced publications can be found in Chapter 6 and Appendix G.

### Chapter 1 Introduction

**1-1\* Scope.** The provisions of this standard apply to the selection, installation, inspection, maintenance and testing of portable extinguishing equipment. The requirements given herein are **MINIMUM**. Portable extinguishers are intended as a first line of defense to cope with fires of limited size. They are needed even though the property is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment (see 3-1.1, 3-1.4, 3-2.1, and 3-2.3). They do not apply to permanently installed systems for fire extinguishment, even though portions of such systems may be portable (such as hose and nozzles attached to a fixed supply of extinguishing agent).<sup>1</sup>

**1-2\* Purpose.** This standard is prepared for the use and guidance of persons charged with selecting, purchasing, installing, approving, listing, designing, and maintaining portable fire extinguishing equipment. 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.

Nothing in this standard shall be construed as a restriction on new technologies or alternative arrangements, provided that the level of protection as herein described is not lowered and is acceptable to the authority having jurisdiction.

### 1-3 Definitions.

**Approved.** Acceptable to the "authority having jurisdiction."

NOTE: 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 or 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 concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

**Authority Having Jurisdiction.** The "authority having jurisdiction" is the organization, office or individual responsible for "approving" equipment, an installation or a procedure.

NOTE: The phrase "authority having jurisdiction" 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, 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 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."

**BTC.** The Board of Transport Commissioners of Canada, which formerly had jurisdiction over compressed gas cylinders and cartridges.

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

**Class B Fires.** Class B fires are fires in flammable liquids, oils, greases, tars, oil base paints, lacquers, and flammable gases.

**Class C Fires.** Class C fires are fires which involve energized electrical equipment where the electrical non-conductivity of the extinguishing media is of importance. (When electrical equipment is de-energized, extinguishers for Class A or B fires may be used safely.)

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

**Compressed Gas Cylinders.** For purposes of this standard, compressed gas cylinders and cartridges are those containing carbon dioxide, nitrogen, or compressed air.

**CTC.** The Canadian Transport Commission, which has jurisdiction over compressed gas cylinders and cartridges.

**DOT.** The U.S. Department of Transportation, which has jurisdiction over compressed gas cylinders and cartridges.

**Factory Test Pressure.** The pressure at which the shell was tested at time of manufacture. This pressure is shown on the nameplate.

**ICC.** The Interstate Commerce Commission, which formerly had jurisdiction over compressed gas cylinders and cartridges prior to 1967.

<sup>1</sup>Fixed systems are covered by the following NFPA standards: NFPA 11, *Low Expansion Foam and Combined Agent Systems*; NFPA 11A, *Medium and High Expansion Foam Systems*; NFPA 12, *Carbon Dioxide Extinguishing Systems*; NFPA 12A, *Halon 1301 Fire Extinguishing Systems*; NFPA 12B, *Halon 1211 Fire Extinguishing Systems*; NFPA 13, *Installation of Sprinkler Systems*; NFPA 14, *Installation of Standpipe and Hose Systems*; NFPA 15, *Water Spray Fixed Systems*; NFPA 16, *Deluge Foam-Water Sprinkler Systems and Foam-Water Spray Systems*; NFPA 17, *Dry Chemical Extinguishing Systems*; and NFPA 96, *Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment*.

**Inspection.** A “quick check” that an extinguisher is available and will operate. It is intended to give reasonable assurance that the extinguisher is fully charged and operable. This is done by seeing that it is in its designated place, that it has not been actuated or tampered with, and that there is no obvious or physical damage or condition to prevent operation.

**Labeled.** Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization 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.

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

NOTE: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which 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.

**Maintenance.** A “thorough check” of the extinguisher. It is intended to give maximum assurance that an extinguisher will operate effectively and safely. It includes a thorough examination and any necessary repair or replacement. It will normally reveal the need for hydrostatic testing.

**Mild Steel Shell.** Except for stainless steel and steel used for compressed gas cylinders, all other steel shells are defined as “mild steel” shells.

**Portable Fire Extinguisher.** A portable device containing powder, liquid, or gases which can be expelled under pressure for the purpose of suppressing or extinguishing a fire.

**Recharging.** The replacement of the extinguishing agent and also includes the expellant for certain types of extinguishers.

**Service Pressure.** The normal operating pressure as indicated on the gauge and nameplate.

**Servicing.** Servicing includes one or more of the following: (1) maintenance, (2) recharging, and (3) hydrostatic testing.

**Shall.** Indicates a mandatory requirement.

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

## 1-4 Classification, Ratings and Performance of Fire Extinguishers.

**1-4.1** Portable fire extinguishers are classified for use on certain classes of fires and rated for relative extinguishing effectiveness at a temperature of plus 70°F (21.1°C) by testing laboratories. This is based upon the preceding classification of fires and the fire-extinguishment potentials as determined by fire tests.

**1-4.2\*** The classification and rating system described in this standard is that of Underwriters Laboratories Inc., and Underwriters' Laboratories of Canada and is based on extinguishing preplanned fires of determined size and description as follows:

CLASS A RATING — Wood and excelsior.

CLASS B RATING — Two-in. (5.1-cm) depth n-heptane fires in square pans.

CLASS C RATING — No fire test. Agent must be a nonconductor of electricity.

CLASS D RATING — Special tests on specific combustible metal fires.

**1-4.3** Portable fire extinguishers used to comply with this standard shall be listed and labeled and meet or exceed the requirements of one of the fire test standards and one of the appropriate performance standards shown below:

(a) Fire Test Standards: ANSI/UL 711, CAN4-S508-M83

(b) Performance Standards:

1. CO<sub>2</sub> Types: ANSI/UL 154, CAN4-S503.-M83
2. Dry Chemical Types: ANSI/UL 299, ULC-S504
3. Water Types: ANSI/UL 626, CAN4-S507.-M83
4. Halon Types: ANSI/UL 1093, ULC-S512
5. Foam Types: ANSI/UL 8

**1-4.4\*** The identification of the listing and labeling organization, the fire test, and performance standard which the extinguisher meets or exceeds shall be clearly marked on each extinguisher.

*Exception: Extinguishers manufactured prior to January 1, 1986.*

## 1-5 Classification of Hazards.

**1-5.1 Light (Low) Hazard.** Locations where the total amount of Class A combustible materials, including furnishings, decorations and contents, is of minor quantity. These may include buildings or rooms occupied as offices, classrooms, churches, assembly halls, etc. This classification anticipates that the majority of contents items are either noncombustible or so arranged that a fire is not likely to spread rapidly. Small amounts of Class B flammables used for duplicating machines, art departments, etc., are included provided that they are kept in closed containers and safely stored.

**1-5.2 Ordinary (Moderate) Hazard.** Locations where the total amount of Class A combustibles and Class B flammables are present in greater amounts than expected under Light (Low) Hazard occupancies. These occupancies could consist of offices, classrooms, mercantile shops

and allied storage, light manufacturing, research operations, auto showrooms, parking garages, workshop or support service areas of Light (Low) Hazard occupancies and warehouses containing Class I or Class II commodities as defined by NFPA 231, *Standard for Indoor General Storage*.

**1-5.3 Extra (High) Hazard.** Locations where the total amount of Class A combustibles and Class B flammables are present, in storage, production use and/or finished product over and above those expected and classed as ordinary (moderate) hazards. These occupancies could consist of woodworking, vehicle repair, aircraft and boat servicing, individual product display showrooms, product convention center displays, storage and manufacturing processes such as painting, dipping, coating, including flammable liquid handling. Also included is warehousing of, or in-process storage of other than Class I and Class II commodities.

## 1-6 General Requirements.

**1-6.1** The classification of extinguishers shall consist of a LETTER which indicates the class of fire on which an extinguisher has been found to be effective, preceded by a rating NUMERAL (Class A and B only) which indicates the relative extinguishing effectiveness.

*Exception: Extinguishers classified for use on Class C or D hazards shall not be required to have a numeral preceding the classification letter.*

**1-6.2** Portable extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times when they are not being used.

**1-6.3** Extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. Preferably they shall be located along normal paths of travel, including exits from an area.

**1-6.4** Cabinets housing extinguishers shall not be locked.

*Exception: Where extinguishers are subject to malicious use, locked cabinets may be used provided they include means of emergency access.*

**1-6.5** Extinguishers shall not be obstructed or obscured from view.

*Exception: In large rooms, and in certain locations where visual obstruction cannot be completely avoided, means shall be provided to indicate the location.*

**1-6.6\*** Extinguishers shall be installed on the hangers or in the brackets supplied, mounted in cabinets, or set on shelves unless the extinguishers are of the wheeled type.

**1-6.7** Extinguishers installed under conditions where they are subject to dislodgement shall be installed in brackets specifically designed to cope with this problem.

**1-6.8** Extinguishers installed under conditions where they are subject to physical damage shall be protected from impact.

**1-6.9** Extinguishers having a gross weight not exceeding 40 lb (18.14 kg) shall be installed so that the top of the extinguisher is *not more* than 5 ft (1.53 m) above the floor. Extinguishers having a gross weight greater than 40 lb (18.14 kg) (except wheeled types) shall be so installed that the top of the extinguisher is *not more* than 3½ ft (1.07 m) above the floor. In no case shall the clearance between the bottom of the extinguisher and the floor be less than 4 in. (102 mm).

**1-6.10** Operating instructions shall be located on the front of the extinguisher. Other labels and markings shall not be placed on the front.

*Exception: In addition to manufacturers' labels, other labels that specifically relate to operation, classification or warning information shall be permitted on the front.*

**1-6.11** Extinguishers mounted in cabinets or wall recesses or set on shelves shall be placed in a manner such that the extinguisher operating instructions face outward. The location of such extinguishers shall be marked conspicuously (see 1-6.5).

**1-6.12\*** Where extinguishers are installed in sealed cabinets which are exposed to elevated temperatures, cabinets shall be provided with screened openings and drains.

**1-6.13\*** Water type (water, foam, AFFF, wetting agent, and soda-acid) extinguishers shall not be installed in areas where temperatures are outside the range of 40°F to 120°F (4°C to 49°C). All other types shall not be installed in areas where temperatures are outside the range of -40°F to 120°F (-40°C to 49°C).

*Exception No. 1: When extinguishers are installed in locations subject to temperatures outside these ranges, they shall be of a type approved and listed for the temperature to which they are exposed, or they must be placed in an enclosure capable of maintaining the stipulated range of temperatures.*

*Exception No. 2: Extinguishers containing plain water only can be protected to temperatures as low as -40°F (-40°C) by the addition of an antifreeze stipulated on the extinguisher nameplate. Calcium chloride solutions shall not be used in stainless steel extinguishers.*

*Exception No. 3: Some extinguishers that use nitrogen as an expellant gas rather than carbon dioxide are approved or listed for temperatures as low as -65°F (-54°C).*

**1-6.14** An extinguisher instruction manual shall be provided to the owner or his agent giving condensed instructions and cautions necessary to the installation, operation, inspection, and maintenance. The manual may be specific to the extinguisher involved or it may cover many types. The manual shall refer to this standard as a source of detailed instruction.

**1-7 Units.** Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI). One unit (liter), outside of but recognized by SI, is commonly used in international fire protection. The units are listed in Table 1-7 with conversion factors.



Table 1-7

Name of Unit	Unit Symbol	Conversion Factor
liter	L	1 gal = 3.785 L
cu decimeter	dm <sup>3</sup>	1 gal = 3.785 dm <sup>3</sup>

For additional conversions and information see ASTM E380, *Standard for Metric Practice*.

**1-7.1** 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. A given equivalent value may be approximate.

**1-7.2** The conversion procedure for the SI units has been to multiply the quantity by the conversion factor and then round the result to the appropriate number of significant digits.

## Chapter 2 Selection of Extinguishers

**2-1\* General Requirements.** The selection of extinguishers for a given situation shall be determined by the character of the fires anticipated, the construction and occupancy of the individual property, the vehicle or hazard to be protected, ambient-temperature conditions, and other factors. (See *Table A-2-1, Appendix A.*) The number, size, placement, and limitations of use of extinguishers required shall be determined by using Chapter 3.

### 2-2 Selection by Hazard.

**2-2.1** Extinguishers shall be selected for the specific class or classes of hazards to be protected in accordance with the following subdivisions.

**2-2.1.1\*** Extinguishers for protecting Class A hazards shall be selected from the following: water, antifreeze, soda-acid, foam, aqueous film forming foam (AFFF), wetting agent, loaded stream, multipurpose dry chemical, and bromochlorodifluoromethane (Halon 1211).

**2-2.1.2** Extinguishers for protection of Class B hazards shall be selected from the following: bromotrifluoromethane (Halon 1301), bromochlorodifluoromethane (Halon 1211), carbon dioxide, dry chemical types, foam, and aqueous film forming foam (AFFF).

**2-2.1.3\*** Extinguishers for protection of Class C hazards shall be selected from the following: bromotrifluoromethane (Halon 1301), bromochlorodifluoromethane (Halon 1211), carbon dioxide, and dry chemical types.<sup>1</sup>

<sup>1</sup>Carbon dioxide extinguishers equipped with metal horns are not considered safe for use on fires in energized electrical equipment and, therefore, are not classified for use on Class C hazards.

**2-2.1.4\*** Extinguishers and extinguishing agents for the protection of Class D hazards shall be of types approved for use on the specific combustible-metal hazard.

### 2-3 Application for Specific Hazards.

**2-3.1 Class B Fire Extinguishers for Pressurized Flammable Liquids and Pressurized Gas Fires.** Fires of this nature are considered to be a special hazard. Class B fire extinguishers containing agents other than dry chemical are relatively ineffective on this type of hazard due to stream and agent characteristics. Selection of extinguishers for this type of hazard shall be made on the basis of recommendations by manufacturers of this specialized equipment. The system used to rate extinguishers on Class B fires (flammable liquids in depth) is not applicable to these types of hazards. It has been determined that special nozzle design and rates of agent application are required to cope with such hazards. Caution: It is undesirable to attempt to extinguish this type of fire unless there is reasonable assurance that the source of fuel can be promptly shut off.

**2-3.2 Fire Extinguisher Size and Placement for Cooking Grease Fires.** Extinguishers provided for the protection of cooking grease fires shall be only of the sodium bicarbonate or potassium bicarbonate dry chemical type. Installation shall be in accordance with Table 3-3.1 for Extra (High) Hazard.

**2-3.3 Three-dimensional Class B Fires.** A three-dimensional Class B fire involves Class B materials in motion such as pouring, running, or dripping flammable liquids and generally includes vertical as well as one or more horizontal surfaces. Fires of this nature are considered to be a special hazard. Selection of extinguishers for this type of hazard shall be made on the basis of recommendations by manufacturers of this specialized equipment. The system used to rate extinguishers on Class B fires (flammable liquids in depth) is not directly applicable to this type of hazard.

NOTE: The installation of fixed systems should be considered when applicable.

**2-3.4 Water Soluble Flammable Liquid Fires.** Foam and AFFF type fire extinguishers shall not be used for the protection of water soluble flammable liquids, such as alcohols, acetone, esters, ketones, etc., unless specifically referenced on the extinguisher nameplate.

**2-3.5\* Electronic Equipment Fires.** Extinguishers for the protection of delicate electronic equipment shall be selected from the following: bromotrifluoromethane (Halon 1301), bromochlorodifluoromethane (Halon 1211) and carbon dioxide.

## Chapter 3 Distribution of Extinguishers

### 3-1 General Requirements.

**3-1.1\*** The minimum number of fire extinguishers needed to protect a property shall be determined as outlined in Chapter 3. Frequently, additional extinguishers may be installed to provide more suitable protection. Extinguishers having ratings less than specified in Tables 3-2.1 and 3-3.1 may be installed provided they are not used in fulfilling the minimum protective requirements of this chapter.

**3-1.2\*** Fire extinguishers shall be provided for the protection of both the building structure, if combustible, and the occupancy hazards contained therein.

**3-1.2.1** Required building protection shall be provided by fire extinguishers suitable for Class A fires.

**3-1.2.2\*** Occupancy hazard protection shall be provided by fire extinguishers suitable for such Class A, B, C, or D fire potentials as may be present.

**3-1.2.3** Extinguishers provided for building protection may be considered also for the protection of occupancies having a Class A fire potential.

**3-1.2.4** Combustible buildings having an occupancy hazard subject to Class B and/or Class C fires shall have a standard complement of Class A fire extinguishers for building protection, plus additional Class B and/or Class C extinguishers. Where fire extinguishers have more than one letter classification (such as 2-A:20-B:C), they may be considered to satisfy the requirements of each letter class.

**3-1.3** Rooms or areas shall be classified generally as light (low) hazard, ordinary (moderate) hazard, or extra (high) hazard. Limited areas of greater or lesser hazard shall be protected as required.

**3-1.4** The type, size, number, and placement for special storage occupancies is covered by NFPA 231, *Indoor General Storage*, NFPA 231C, *Rack Storage of Materials*, and NFPA 231D, *Storage of Rubber Tires*.

### 3-2 Fire Extinguisher Size and Placement for Class A Hazards.

**3-2.1** Minimal sizes of fire extinguishers for the listed grades of hazards shall be provided on the basis of Table 3-2.1 except as modified by 3-2.3. Extinguishers shall be located so that the maximum travel distances shall not exceed those specified in Table 3-2.1, except as modified by 3-2.3.

**3-2.1.1** Certain smaller extinguishers which are charged with multipurpose dry chemical or Halon 1211 are rated on Class B and Class C fires, but have insufficient effectiveness to earn the minimum 1-A rating even though they have value in extinguishing smaller Class A fires. They shall not be used to meet the requirements of 3-2.1.

Table 3-2.1

	Light (Low) Hazard Occupancy	Ordinary (Moderate) Hazard Occupancy	Extra (High) Hazard Occupancy
Minimum rated single extinguisher	2-A	2-A	4-A*
Maximum floor area per unit of A	3,000 sq ft	1,500 sq ft	1,000 sq ft
Maximum floor area for extinguisher	11,250 sq ft**	11,250 sq ft**	11,250 sq ft**
Maximum travel distance to extinguisher	75 ft	75 ft	75 ft

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

\*\*See Appendix E-3.3.

NOTE: 1 ft = 0.305 m  
1 sq ft = 0.0929 m²

**3-2.2** Up to one-half of the complement of extinguishers as specified in Table 3-2.1 may be replaced by uniformly spaced 1½-in. (3.81-cm) hose stations for use by the occupants of the building. When hose stations are so provided they shall conform to NFPA 14, *Installation of Standpipe and Hose Systems*. The location of hose stations and the placement of fire extinguishers shall be in such a manner that the hose stations do not replace more than every other extinguisher.

**3-2.3** Where the floor area of a building is less than that specified in Table 3-2.1, at least one extinguisher of the minimum size recommended shall be provided.

**3-2.4** The protection requirements may be fulfilled with extinguishers of higher rating provided the travel distance to such larger extinguishers shall not exceed 75 ft (22.7 m).

**3-2.5** For Class A extinguishers rated under the rating classification system used prior to 1955, their equivalency shall be in accordance with Table 3-2.5.

Table 3-2.5

All Water & Loaded Stream Types	Pre-1955 Rating	Equivalency
1¼ to 1¾ gal	A-2	1-A
2½ gal	A-1	2-A
4 gal	A-1	3-A
5 gal	A-1	4-A
17 gal	A	10-A
33 gal	A	20-A

NOTE: 1 gal = 3.785 L.



### 3-3 Fire Extinguisher Size and Placement for Class B Fires Other than for Fires in Flammable Liquids of Appreciable Depth.

3-3.1 Minimal sizes of fire extinguishers for the listed grades of hazard shall be provided on the basis of Table 3-3.1. Extinguishers shall be located so that the maximum travel distances shall not exceed those specified in the table used.

*Exception:* Extinguishers of lesser rating, desired for small specific hazards within the general hazard area, may be used, but shall not be considered as fulfilling any part of the requirements of Table 3-3.1.

Table 3-3.1

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers (Ft)	(m)
Light (low)	5B	30	9.15
	10B	50	15.25
Ordinary (moderate)	10B	30	9.15
	20B	50	15.25
Extra (high)	40B	30	9.15
	80B	50	15.25

NOTE 1: The specified ratings do not imply that fires of the magnitudes indicated by these ratings will occur, but rather to give the operators more time and agent to handle difficult spill fires that may occur.

NOTE 2: For fires involving water soluble flammable liquids see 2-3.6.

NOTE 3: For specific hazard applications see Section 2-3.

3-3.2 Two or more extinguishers of lower rating shall not be used to fulfill the protection requirements of Table 3-3.1.

*Exception No. 1:* Up to three foam extinguishers of at least 2½ gal (9.46 L) capacity may be used to fulfill light (low) hazard requirements.

*Exception No. 2:* Up to three AFFF extinguishers of at least 2½ gal (9.46 L) capacity may be used to fulfill extra (high) hazard requirements.

3-3.3 The protection requirements may be fulfilled with extinguishers of higher ratings provided the travel distance to such larger extinguishers shall not exceed 50 ft (15.25 m).

3-3.4 For Class B extinguishers rated under the rating classification system used prior to 1955, their equivalency shall be in accordance with Table 3-4.5.

### 3-4 Fire Extinguisher Size and Placement for Class B Fires in Flammable Liquids of Appreciable Depth.<sup>1</sup>

3-4.1\* Portable fire extinguishers shall not be installed as the sole protection for flammable liquid hazards of appreciable depth [greater than ¼ in. (0.64 cm)] where the surface area exceeds 10 sq ft (0.93 m²).

<sup>1</sup>For dip tanks containing flammable or combustible liquids exceeding 150 gal (568 L) liquid capacity or having a liquid surface exceeding 4 sq ft (0.38 m²), see NFPA 34, *Dip Tanks*, for requirements of automatic extinguishing facilities.

*Exception:* Where personnel who are trained in extinguishing fires in the protected hazards, or a counterpart, are available on the premises, the maximum surface area shall not exceed 20 sq ft (1.86 m²).

3-4.2 For flammable liquid hazards of appreciable depth such as in dip or quench tanks, a Class B fire extinguisher shall be provided on the basis of at least two numerical units of Class B extinguishing potential per sq ft (0.0929 m²) of flammable liquid surface of the largest tank hazard within the area.

*Exception No. 1:* Where approved automatic fire protection devices or systems have been installed for a flammable liquid hazard, additional portable Class B fire extinguishers may be waived. Where so waived, Class B extinguishers shall be provided as covered in 3-3.1 to protect areas in the vicinity of such protected hazards.

*Exception No. 2:* Foam or AFFF type extinguishers may be provided on the basis of 1B of protection per sq ft of hazard.

3-4.3 Two or more extinguishers of lower ratings shall not be used in lieu of the extinguisher required for the largest tank.

*Exception:* Up to three foam or AFFF extinguishers of 2½ gal (9.46 L) capacity may be used to fulfill these requirements.

3-4.4 Travel distances for portable extinguishers shall not exceed 50 ft (15.25 m).

3-4.4.1 Scattered or widely separated hazards shall be individually protected. An extinguisher in the proximity

Table 3-4.5

Type and Capacity	Pre-1955	Equivalency
<i>Foam</i>		
2½ gal	B-1	2-B
5 gal	B-1	5-B
17 gal	B	10-B
33 gal	B	20-B
<i>Carbon Dioxide</i>		
Under 7 lb	B-2	1-B
7 lb	B-2	2-B
10 to 12 lb	B-2	2-B
15 to 20 lb	B-1	2-B
25 to 26 lb	B-1	5-B
50 lb	B-1	10-B
75 lb	B-1	10-B
100 lb	B	10-B
<i>Dry Chemical</i>		
4 to 6¼ lb	B-2	2-B
7½ lb	B-2	5-B
10 to 15 lb	B-1	5-B
20 lb	B-1	10-B
30 lb	B-1	20-B
75 lb and up	B	40-B

NOTE 1: 1 gal = 3.785 L 1 lb = 0.454 kg

NOTE 2: Vaporizing liquid extinguishers (carbon tetrachloride or chlorobromomethane base) are not recognized in this standard.