NFPA No.

10

PORTABLE FIRE EXTINGUISHERS 1975

NATIONAL FIRE PROTECTION ASSOCIATION
470 Atlantic Avenue, Boston, MA 02210

15M-12-75-FP
Printed in U.S.A.

See Inside Back Cover for Official NFPA Definitions

Standard for

Portable Fire Extinguishers

NFPA No. 10 – 1975

1975 Edition of No. 10

This Standard was prepared by the NFPA Committee on Portable Fire Extinguishers and this present edition was adopted at the 1975 Fall Meeting of the Association held in Pittsburgh, Pennsylvania, November 17–20, 1975. This edition supersedes all previous editions.

The 1974 edition of this standard was approved by the American National Standards Institute under date of December 23, 1974 and designated ANSI Z112.1. The 1975 edition is being submitted for similar approval.

Origin and Development of No. 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, and 1974. In 1965 the previous editions were divided in two separate texts, one covering "installation" and the second covering "maintenance and use." The 1974 edition recombined all the information previously contained in NFPA Nos. 10 and 10A. A new appendix was added to the 1974 edition to include information about the selection of extinguishers for home hazards. This edition of the standard is a revision of the 1974 edition.

TIA
NFPA 10
Reference: **4-4.1**

Tentative Interim Amendment to

Standard for Portable Fire Extinguishers

NFPA 10 — 1975

In accordance with the Regulations Governing Technical Committees, the Committee on Portable Fire Extinguishers has issued the following Tentative Interim Amendment to the 1975 Edition of the Standard on Portable Fire Extinguishers, NFPA 10. This Amendment was released by the NFPA Standards Council on April 29, 1976.

1. 4-4.1 revise Exception No. 1 to read:

Exception No. 1: It is not necessary during the annual maintenance to internally examine stored pressure extinguishers equipped with pressure indicators or gages. HOWEVER, such extinguishers shall be thoroughly examined externally in accordance with Section 4-4.2.

NATIONAL FIRE PROTECTION ASSOCIATION
470 Atlantic Avenue, Boston, MA 02210

3M SIS-1-78

Withdrawn by change 19-C

TIA
NFPA 10
Reference: **4-4.1**

Tentative Interim Amendment to

Standard for Portable Fire Extinguishers

NFPA 10 — 1975

In accordance with the Regulations Governing Technical Committees, the Committee on Portable Fire Extinguishers has issued the following Tentative Interim Amendment to the 1975 Edition of the Standard on Portable Fire Extinguishers, NFPA 10. This Amendment was released by the NFPA Standards Council on April 29, 1976.

1. 4-4.1 revise Exception No. 1 to read:

Exception No. 1: It is not necessary during the annual maintenance to internally examine stored pressure extinguishers equipped with pressure indicators or gages. HOWEVER, such extinguishers shall be thoroughly examined externally in accordance with Section 4-4.2.

NATIONAL FIRE PROTECTION ASSOCIATION
470 Atlantic Avenue, Boston, MA 02210

Committee on Portable Fire Extinguishers

John W. Clark, *Chairman*
Detroit Diesel Allison, Division of General Motors Corp.,
P.O. Box 894, Indianapolis, IN 46206

Marshall E. Petersen, *Vice Chairman*
Rolf Jensen & Associates, 100 Wilmot Road, Suite 301, Deerfield, IL 60015

C. R. Fredriksen, *Secretary*
Director of Special Services, National Association of Fire Equipment Distributors
111 East Wacker Drive, Chicago, IL 60601

J. E. Burkey, Sr., Edison Electric Institute
J. Randall Fuss, American International Group, Inc.
S. K. Goodwin, Factory Insurance Assn.
Paul Huston, Compressed Gas Assn.
L. C. Johns, American Petroleum Institute
Donald J. Kerlin, United States Coast Guard
Michael Kraus, Fire Equipment Manufacturers Assn.
Alfred W. Krulee
R. G. Lewis, Fire Equipment Manufacturing Institute of Canada
C. A. McCorrison, Factory Mutual Engineering Corp.
George B. Needham, Insurance Services Office, New England Region
Walter J. Orey, NFPA Industrial Fire Protection Section
R. R. Osman, National Safety Council
John Perry, Underwriters Laboratories, Inc.
Neal E. Reed, Manufacturing Chemists Assn.
Burdette L. Short, United States Fidelity & Guaranty Co.
Richard Tufts, American Insurance Alliance
R. J. Wright, Underwriters Laboratories of Canada
D. M. Yarlas, NFPA Industrial Fire Protection Section
Edward Zelenka, General Telephone & Electronics

Alternates

William F. Hudson, National Assn. of Fire Equipment Distributors (Alternate to C. R. Fredriksen)
Robert E. Lenhard, Compressed Gas Assn. (Alternate to Paul Huston)
J. F. McKenna, American Petroleum Institute (Alternate to L. C. Johns)
E. N. Proudfoot, NFPA Industrial Fire Protection Section (Alternate to Walter J. Orey and D. M. Yarlas)
John Quillman, Insurance Services Office of Illinois (Alternate to George Needham)
Timo Slimes, Fire Equipment Manufacturing Institute of Canada (Alternate to R. G. Lewis)
E. E. Williams, Factory Insurance Assn. (Alternate to S. K. Goodwin)
Don E. Wilson, National Safety Council (Alternate to R. R. Osman)

Nonvoting

Neil Darmstadter
(Nonvoting Liaison for Motor Vehicles & Highway Fire Protection Committee)

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

Interpretation Procedure of the Committee on Portable Fire Extinguishers

Those desiring an interpretation shall supply the Chairman with five identical copies of a statement in which shall appear specific reference to a single problem, paragraph, or section. Such a statement shall be on the business stationery of the inquirer and shall be duly signed.

When applications involve actual field situations they shall so state and all parties involved shall be named.

The Interpretations Committee will reserve the prerogative to refuse consideration of any application that refers specifically to proprietary items of equipment or devices. Generally inquiries should be confined to interpretation of the literal text or the intent thereof.

Requests for interpretations should be addressed to the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.

Table of Contents

Standard for

Portable Fire Extinguishers

NFPA No. 10 — 1975

NOTICE: An asterisk (*) preceding the number or letter designating a subsection indicates explanatory material on that section in Appendix A.

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 Subsections 3–1.1, 3–1.4, 3–2.1, 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).†

*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.

---

†Fixed systems are covered by the following NFPA standards: No. 11, Foam Extinguishing Systems; No. 11A, High Expansion Foam Systems; No. 12, Carbon Dioxide Extinguishing Systems; No. 12A, Halon 1301 Systems; No. 12B, Halon 1211 Systems; No. 13, Installation of Sprinkler Systems; No.14, Installation of Standpipe and Hose Systems; No. 15, Water Spray (Fixed) Systems for Fire Protection; No. 16, Foam-Water Sprinkler Systems and Foam-Water Spray Systems; and No. 17, Dry Chemical Extinguishing Systems.

1-3 Definitions.

1-3.1 The basic types of fires are Classes A, B, C, and D as defined in the following subsections.

1-3.1.1 Class A fires are fires in ordinary combustile materials, such as wood, cloth, paper, rubber, and many plastics.

1-3.1.2 Class B fires are fires in flammable liquids, gases and greases.

1-3.1.3 Class C fires are fires which involve energized electrical equipment where the electrical nonconductivity of the extinguishing media is of importance. (When electrical equipment is de-energized, extinguishers for Class A or B fires may be used safely.)

1-3.1.4 Class D fires are fires in combustible metals, such as magnesium, titanium, zirconium, sodium, and potassium.

1-3.2 Classification and Ratings of Fire Extinguishers.

1-3.2.1 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 by nationally recognized testing laboratories. This is based upon the preceding classification of fires and the fire-extinguishment potentials as determined by fire tests.

*1-3.2.2 The classification and rating system described in this standard is that used by 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-inch 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.

1-3.3 Classification of Hazards.

1-3.3.1 Light Hazard — Where the amount of combustibles or flammable liquids present is such that fires of small size may be expected. These may include offices, schoolrooms, churches, assembly halls, telephone exchanges, etc.

1-3.3.2 Ordinary Hazards — Where the amount of combustibles or flammable liquids present is such that fires of moderate size may be expected. These may include mercantile storage and display, auto showrooms, parking garages, light manufacturing, warehouses not classified as extra hazard, school shop areas, etc.

1-3.3.3 Extra Hazards — Where the amount of combustibles or flammable liquids present is such that fires of severe magnitude may be expected. These may include woodworking, auto repair, aircraft servicing, warehouses with high-piled (over 15 feet in solid piles, over 12 feet in piles that contain horizontal channels) combustibles, and processes such as flammable liquid handling, painting, dipping, etc.

1-4 General Requirements.

1-4.1 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 preceeding the classification letter.

1-4.2 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.

1-4.3 Extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. They shall be located along normal paths of travel, including exits from an area.

1-4.4 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.

***1-4.5** 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.

1-4.6 Extinguishers installed under conditions where they are subject to dislodgement shall be installed in brackets specifically designed to cope with this problem.

1-4.7 Extinguishers installed under conditions where they are subject to physical damage, shall be protected from impact.

1-4.8 Extinguishers having a gross weight not exceeding 40 pounds shall be installed so that the top of the extinguisher is *not more* than five feet above the floor. Extinguishers having a gross weight greater than 40 pounds (except wheeled types) shall be so installed that the top of the extinguisher is *not more* than 3½ feet above the floor. In no case shall the clearance between the bottom of the extinguisher and the floor be less than four inches.

1-4.9 The method of operation of an extinguisher shall be indicated prominently on the extinguisher and shall face outward.

1-4.10 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 Subsection 1–4.4*).

1-4.11 Extinguishers shall be suitable for use within a temperature range of at least +40° to +120° F.

Exception: When extinguishers are installed in locations subjected to temperatures outside this range, they shall be of a type approved or listed for the temperature to which they will be exposed, or placed in an enclosure capable of maintaining the temperature within the +40° to +120° F range.

1-4.12 An instruction manual shall be provided with each extinguisher 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 *Portable Fire Extinguishers, NFPA No. 10,* as a source of detailed instruction.

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, and placement 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 among the following: water types, foam, loaded stream, and multipurpose dry chemical.

***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 loaded stream.

***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.†

***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.

---

†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.

Chapter 3 Distribution of Extinguishers

3-1 General Requirements.

*3-1.1 The number of fire extinguishers needed to protect a property shall be determined as outlined in Chapter 3.

*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 having 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 graded generally as light hazard, ordinary hazard, or extra 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 standards *Indoor General Storage, No. 231; Storage of Cellular Rubber and Plastic Materials, No. 231B;* and *Rack Storage of Materials, No. 231C.*

*3-1.5 **Distribution of Extinguisher Listed Prior to 1955.** To determine the area of coverage applicable to fire extinguishers rated under procedures given in the 1955 and earlier editions of this standard, the approximate minimum equivalent ratings are given in Table A–3–1.5 of Appendix A.

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

3-2.1 Minimal sizes of fire extinguishers for the listed grades of hazard shall be provided on the basis of Table 3–2.1 except as modified by Subsection 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 Subsection 3–2.3.

Table 3-2.1

Basic Minimum Extinguisher Rating for Area Specified	Maximum Travel Distances to Extinguishers	Areas to be Protected per Extinguisher		
		Light Hazard Occupancy	Ordinary Hazard Occupancy	Extra Hazard Occupancy
1A	75 ft.	3000 sq. ft.	Not permitted	Not permitted
2A	75 ft.	6000 sq. ft.	3000 sq. ft.	**
3A	75 ft.	9000 sq. ft.	4500 sq. ft.	3000 sq. ft.
4A	75 ft.	11250 sq. ft.	6000 sq. ft.	4000 sq. ft.
6A	75 ft.	11250 sq. ft.	9000 sq. ft.	6000 sq. ft.
10A	75 ft.	11250 sq. ft.*	11250 sq. ft.*	9000 sq. ft.
20A	75 ft.	11250 sq. ft.*	11250 sq. ft.*	11250 sq. ft.*
40A	75 ft.	11250 sq. ft.*	11250 sq. ft.*	11250 sq. ft.*

*11250 sq. ft. is considered a practical limit.

**Not permitted except as specified in Subsection 3–2.2.

NOTE: Certain smaller extinguishers which are charged with multipurpose dry chemical 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 Subsection 3–2.1.

3-2.2 The protection requirements specified in Table 3–2.1 may be fulfilled by several extinguishers of lower ratings for ordinary or extra-hazard occupancies.

3-2.3 Up to one-half of the complement of extinguishers as specified in Table 3–2.1 may be replaced by uniformly spaced small hose stations for use by the occupants of the building. When hose stations are so provided they shall conform to the *Standard for the Installation of Standpipe and Hose Systems, NFPA No. 14.* 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.

3-2.4 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.

3-2.5 The protection requirements may be fulfilled with extinguishers of higher rating provided the travel distance to such larger extinguishers shall not exceed 75 feet.

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 Tables 3–3.1.1 or 3–3.1.2. Extinguishers shall be located so that the maximum travel distances shall not exceed those specified in the table used.

Table 3-3.1.1

(For Extinguishers labeled prior to June 1, 1969)

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers
Light	4B	50 ft.
Ordinary	8B	50 ft.
Extra	12B	50 ft.

Table 3-3.1.2

(For Extinguishers labeled after June 1, 1969)

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers
Light	5B	30 ft.
	10B	50 ft.
Ordinary	10B	30 ft.
	20B	50 ft.
Extra	20B	30 ft.
	40B	50 ft.

3-3.2 Two or more extinguishers of lower rating shall not be used to fulfill the protection requirements of Tables 3–3.1.1 and 3–3.1.2.

Exception: Up to three foam extinguishers may be used to fulfill these 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 feet.

3-4 Fire Extinguisher Size and Placement for Class B Fires in Flammable Liquids of Appreciable Depth.†

*3-4.1 Portable fire extinguishers shall not be installed as the sole protection for flammable liquid hazards of appreciable depth (greater than ¼ inch) where the surface area exceeds 20 square feet.

Exception: Where personnel who are fully trained in extinguishing fires in the protected hazards, or its counterpart, are available on the premises.

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 one numerical unit of Class B extinguishing potential per square foot of flammable liquid surface of the largest tank hazard within the area.

Exception: 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 Subsection 3–3.1 to protect areas in the vicinity of such protected hazards.

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 extinguishers may be used to fulfill these requirements.

3-4.4 Travel distances for hand portable extinguishers shall not exceed those specified in Tables 3–3.1.1 and 3–3.1.2.

3-4.4.1 Travel distances should be given consideration with reference to special hazards and the availability of the extinguisher for such protection. Scattered or widely separated hazards shall

†For dip tanks containing flammable or combustible liquids exceeding 150 gallons liquid capacity or having a liquid surface exceeding 4 square feet, see NFPA No. 34, Dip Tanks, for requirements of automatic extinguishing facilities.

be individually protected if the specified travel distances in Subsections 3–3.1 and 3–3.3 are exceeded. Likewise, extinguishers in the proximity of a hazard shall be carefully located so as to be accessible in the presence of a fire without undue danger to the operator.

3-5 Class B Fire Extinguishers for Pressurized Flammable Liquids and Pressurized Gas Fires.

3-5.1 Fires of this nature are considered to be a special hazard. Some extinguishers containing foam or carbon dioxide which are classified for Class B fires are relatively ineffective on this 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.

3-5.2 Travel distances for hand portable extinguishers shall not exceed those specified in Tables 3–3.1.1 and 3–3.1.2.

3-6 Fire Extinguisher Size and Placement for Class C Hazards. Extinguishers with Class C ratings shall be required where energized electrical equipment may be encountered which would require a nonconducting extinguishing media. This will include fire either directly involving or surrounding electrical equipment. Since the fire itself is a Class A or Class B hazard the extinguishers are sized and located on the basis of the anticipated Class A or B hazard.

NOTE: Whenever possible electrical equipment should be de-energized before attacking a Class C fire.

3-7 Size and Placement for Class D Hazards.

3-7.1 Extinguishers or extinguishing agents with Class D ratings shall be provided for fires involving combustible metals.

3-7.2 Extinguishing equipment shall be located not more than 75 feet from the Class D hazard.

3-7.3 Size determination shall be on the basis of the specific combustible metal, its physical particle size, area to be covered and recommendations by the extinguisher manufacturer on data from control tests conducted.

Chapter 4 Inspection, Maintenance, and Recharging

4-1 General.

4-1.1 This chapter is concerned with the rules governing inspection, maintenance, and recharging of extinguishers, proper maintenance being of prime importance in insuring operation at the time of a fire.

4-1.2 The owner or occupant of a property in which extinguishers are located shall be responsible for such inspection, maintenance, and recharging.

4-1.3 Inspection is normally performed by employee personnel designated by the owner or occupant.

*__4-1.4__ Maintenance and recharging shall be performed by trained persons having available the proper types of tools, recharge materials, lubricants, and replacement parts.

4-2 Definitions.

4-2.1 Inspection. Inspection is 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.

4-2.2 Maintenance. Maintenance is 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.

4-2.3 Recharging. Recharging is the replacement or replenishment of the extinguishing agent. It also includes the replenishment of the expellant for certain types of extinguishers.

4-3 Inspection.

*__4-3.1 Frequency.__ Extinguishers shall be inspected monthly, or at more frequent intervals when circumstances require.

4-3.2 Procedures.

4-3.2.1 The extinguisher shall be in its designated place.

4-3.2.2 Access to, or visibility of, the extinguisher shall not be obstructed.

4-3.2.3 The operating instructions on the extinguisher nameplate shall be legible and face outward.

4-3.2.4 Any seals or tamper indicators that are broken or missing shall be replaced.

4-3.2.5 For water types without gages, their fullness shall be determined by "hefting."

4-3.2.6 Any obvious physical damage, corrosion, leakage, or clogged nozzles shall be noted.

4-3.2.7 Pressure gage readings when not in the operable range, shall be noted.

4-3.3 Corrective Actions. When an inspection reveals that tampering has occurred, or that the extinguisher is damaged, impaired, leaking, under or overcharged, or has obvious corrosion, the extinguisher shall be subjected to applicable maintenance procedures.

4-3.4 Record Keeping.

4-3.4.1 Personnel making inspections shall keep records for those extinguishers that were found to require corrective actions.

4-3.4.2 At least monthly, the date the inspection was performed and the initials of the person performing the inspection shall be recorded.

***4-4 Maintenance.**

4-4.1 Frequency. Extinguishers shall be subjected to maintenance not more than one year apart or when specifically indicated by an inspection.

Exception No. 1: Stored pressure extinguishers equipped with pressure indicators or gages are not required to be maintained at annual intervals in accordance with the provisions of Subsection 4–4.1. Each such extinguisher should be thoroughly examined in accordance with the guidance given in Section A–4–4.2 of the Appendix whenever an inspection determines the need for such action or whenever the pressure indicator or gage shows the extinguisher to be in other than fully operable condition.

Exception No. 2: Factory sealed ("disposable type") extinguishers shall be inspected and maintained only in accordance with the nameplate instructions.

4-4.1.1 Every 6 years, stored pressure dry chemical extinguishers that require a 12-year hydrostatic test shall be emptied and subjected to the applicable maintenance procedures.

Exception No. 1: Dry chemical extinguishers having non-refillable disposable containers are exempt.

Exception No. 2: When periodic recharging or hydrotesting is performed, the 6-year requirement shall begin from that date.

4-4.1.2 Extinguishers out of service for maintenance or recharge shall be replaced by spare extinguishers having the same classification and at least equal rating.

*4-4.2 **Procedures.** Maintenance procedures shall include a thorough examination of the 3 basic elements of an extinguisher: (1) mechanical parts, (2) extinguishing agent, and (3) expelling means.

*4-4.3 **Record Keeping.** Each extinguisher shall have a tag or label securely attached that indicates the month and year the maintenance was performed and shall identify the person performing the service.† The same record tag or label shall indicate if recharging was also performed.

4-4.3.1 For the 6-year requirement of Subsection 4–4.1.1, this information shall be included on the maintenance tag or label. This information shall be transferred to each subsequent maintenance tag or label.

4-5 Recharging.

4-5.1 General. All extinguishers shall be recharged after use or as indicated by an inspection or when performing maintenance. When performing the recharging, the instructions on the nameplate shall be followed. For recharge chemicals, see 4–5.3.1.

4-5.2 Frequency.

4-5.2.1 Annual Recharging. Every 12 months soda-acid, foam, pump tank water, and pump tank calcium chloride base antifreeze types of extinguishers shall be recharged with new chemicals or water, as applicable.

---

†Under special circumstances, or when local requirements are in effect additional information may be desirable or required on record tags.

4-5.3 Procedures.

*4-5.3.1 **Recharge Chemicals.** Only those materials specified on the nameplate, or materials proven to have equal chemical composition and physical characteristics, shall be used. Tests shall be conducted to assure equal performance.

4-5.3.2 Pails or drums containing dry powder agents for scoop or shovel application for use on metal fires shall be kept full and covered at all times. The dry powder shall be replaced if found damp.

4-5.3.3 **Conversion of Extinguisher Types.** No extinguisher shall be converted from one type to another, nor shall any extinguisher be converted to use a different type of extinguishing agent.

*4-5.3.4 **Removal of Moisture.** For all nonwater types of extinguishers any moisture shall be removed before recharging.

*4-5.3.5 **Carbon Dioxide Recharging.** The vapor phase of carbon dioxide shall not be less than 99.5 percent carbon dioxide. The water content of the liquid phase shall not be more than 0.01 percent by weight (minus 30°F dew point). Oil content of the carbon dioxide shall not exceed 10 p.p.m. by weight.

*4-5.3.6 **Leak Test.** After recharging, a leak test shall be performed on stored pressure and self-expelling types.

Chapter 5 Hydrostatic Testing

5-1 General.

5-1.1 Hydrostatic testing shall be performed by persons having a practical knowledge of pressure testing procedures and safeguards, and having available suitable testing equipment and facilities.

5-1.2 If, at any time, an extinguisher shows evidence of corrosion or mechanical injury, it shall be hydrostatically tested, subject to the provisions of Subsection 5–1.3.

Exception: Pump tanks do not require a hydrostatic test.

5-1.3 Examination of Cylinder Condition. When an extinguisher cylinder or shell has one or more conditions listed in this subdivision, it shall not be hydrostatically tested but shall be destroyed:

(a) When there exist repairs by soldering, welding, brazing, or use of patching compounds.

NOTE: "For welding or brazing on mild steel shells, consult the manufacturer of the extinguisher."

(b) When the cylinder or shell threads are damaged.

(c) When there exists corrosion that has caused pitting, including under removable nameplate band assemblies.

(d) When the extinguisher has been burned in a fire.

(e) When a calcium chloride type of extinguishing agent was used in a stainless steel extinguisher.

5-2 Definitions.

5-2.1 Service Pressure. The service pressure is the normal operating pressure as indicated on the gage and nameplate.

5-2.2 Factory Test Pressure. The factory test pressure is the pressure at which the shell was tested at time of manufacture. This pressure is shown on the nameplate.

5-2.3 Mild Steel Shell. Except for stainless steel and steel used for compressed gas cylinders, all other steel shells are defined as "mild steel" shells.

5-2.4 Compressed Gas Cylinders. For purposes of this standard, compressed gas cylinders and cartridges are those containing carbon dioxide, nitrogen, or compressed air.

5-2.5 DOT. DOT is the U. S. Department of Transportation, which has jurisdiction over compressed gas cylinders and cartridges as of 1967.

5-2.6 ICC. ICC is the Interstate Commerce Commission, which formerly had jurisdiction over compressed gas cylinders and cartridges prior to 1967.

5-2.7 CTC. CTC is the Canadian Transport Commission, which has jurisdiction over compressed gas cylinders and cartridges.

5-2.8 BTC. BTC is the Board of Transport Commissioners of Canada, which formerly had jurisdiction over compressed gas cylinders and cartridges.

5-3 Frequency. At intervals not exceeding those specified in Table 5–3, extinguishers shall be hydrostatically tested. For those with a designated test interval of five years, the first retest may be conducted within a five- to six-year interval, but shall be less than a full six-year period.

Table 5-3

Hydrostatic Test Interval for Extinguishers

Extinguisher Type	Test Interval (Years)
Soda Acid	5
Cartridge operated Water and/or Antifreeze	5
Stored Pressure Water and/or Antifreeze	5
Wetting Agent	5
Foam	5
Loaded Stream	5
Dry Chemical with Stainless Steel Shells or Soldered Brass Shells	5
Carbon Dioxide	5
Dry Chemical, Stored Pressure, with Mild Steel Shells, Brazed Brass Shells, or Aluminum Shells	12
Dry Chemical, Cartridge operated, with Mild Steel Shells	12
Bromotrifluoromethane — Halon 1301	12
Bromochlorodifluoromethane — Halon 1211	12
Dry Powder, Cartridge operated, with Mild Steel Shells	12

Exception No. 1: Nonrefillable factory-sealed disposable containers do not require hydrostatic testing.

Exception No. 2: Carbon dioxide extinguishers utilizing a cylinder fabricated to DOT and CTC specifications shall be hydrostatically tested, or replaced, according to the requirements of DOT and CTC.

5-3.1 Compressed Gas Cylinders and Cartridges. Nitrogen cylinders or cartridges used for inert gas storage used as an expellant for wheeled extinguishers shall be hydrostatically tested every 5 years.

Exception: Cylinders (except those charged with carbon dioxide) complying with Part 173.34 (e) 15, Title 49, Code of Federal Regulations, may be hydrostatically tested every 10 years.

5-3.2 Hose Assemblies. A hydrostatic test shall be performed on extinguisher hose assemblies which are equipped with a shutoff nozzle at the end of the hose. The test interval shall be the same as specified for the extingisher on which the hose is installed.

5-4 Test Pressures.

5-4.1 Compressed Gas Cylinders.

5-4.1.1 Carbon dioxide extinguishers shall be tested at 5/3 the service pressure as stamped into the cylinder.

Exception: Carbon dioxide extinguishers having cylinder specification ICC3 shall be tested at 3000 psi.

5-4.1.2 Nitrogen cylinders and carbon dioxide cylinders used with wheeled extinguishers shall be tested at 5/3 the service pressure as stamped into the cylinder.

5-4.2 Stored Pressure Types. All stored pressure and bromochlorodifluoromethane (Halon 1211) types of extinguishers shall be hydrostatically tested at the factory test pressure not to exceed two times the service pressure.

5-4.3 Self-Generating and Cartridge Operated Types. All self-generating types (soda acid, foam) and cartridge operated types of extinguishers shall be hydrostatically tested to their original factory test pressure as shown on the nameplate.

5-4.4 Test Pressures for Hose Assemblies.

5-4.4.1 Carbon dioxide hose assemblies requiring a hydrostatic pressure test shall be tested at 1,250 psi.

5-4.4.2 Dry chemical and dry powder hose assemblies requiring a hydrostatic pressure test shall be tested at 300 psi.

5-5 Test Equipment and Procedures.

5-5.1 General.

5-5.1.1 Air or gas pressure shall not be used for pressure testing. The failure of an extinguisher shell may be violent and dangerous.

5-5.1.2 When extinguisher shells, cylinders, or cartridges fail a hydrostatic pressure test, they shall be destroyed.

5-5.2 Test Equipment for Compressed Gas Types.

5-5.2.1 The equipment for testing cylinders and cartridges shall be of the water jacket type that meets the specifications of the pamphlet *Methods for Hydrostatic Testing of Compressed Gas Cylinders* (Pamphlet C–1, 1970 edition), published by the Compressed Gas Association.

5-5.2.2 Hose assemblies of carbon dioxide extinguishers that require a hydrostatic test shall be tested within a protective cage device.

*5-5.3 Test Equipment for Non-Compressed Gas Types.

5-5.3.1 The equipment for testing non-compressed gas types consists of the following:

(a) A hydrostatic test pump, hand or power operated, to be capable of producing not less than 150 percent of the test pressure. It is to include appropriate check valves and fittings.

(b) A flexible connection for attachment to the test pump. It shall be provided with necessary fittings to test through the extinguisher nozzle, test bonnet, or hose outlet, as is applicable.

(c) A protective cage or barrier for personnel protection, designed to provide visual observation of the extinguisher under test.

*5-5.3.2 Drying equipment is required to dry all non-water types of extinguishers that have passed the hydrostatic test.

5-6 Testing Procedures.

5-6.1 Compressed Gas Types.

5-6.1.1 In addition to the visual examinations required prior to test as stated in Section 5–1.3, an internal examination shall be made prior to the hydrostatic test. The procedures for this

internal examination shall be in accordance with the requirements of the *Standard for Visual Inspection of Compressed Gas Cylinders* (CGA C–6, 1972 edition), published by the Compressed Gas Association.

5-6.1.2 The hydrostatic testing of compressed gas cylinders and cartridges shall be in accordance with the procedures specified in pamphlet *Methods for Hydrostatic Testing of Compressed Gas Cylinders* (Pamphlet C–1, 1970 edition), published by the Compressed Gas Association.

***5-6.2 Testing Procedures for Non-Compressed Gas Types.** The testing procedures for non-compressed gas cylinders and shells and hose assemblies are detailed in Appendix A of this standard.

***5-6.3 Testing Procedures for Hose Assemblies.** The testing procedures for hose assemblies requiring a hydrostatic test are detailed in Appendix A.

5-6.4 Recording of Tests.

5-6.4.1 Compressed Gas Types. For compressed gas cylinders and cartridges passing a hydrostatic test, the month and year shall be stamped into the cylinder in accordance with the requirements set forth by DOT or the Canadian Transport Commission.

NOTE: It is important that the recording (stamping) be placed only on the shoulder, top head, neck, or footring (when so provided) of the cylinder.

***5-6.4.2 Non-Compressed Gas Types.** Extinguisher shells of the non-compressed gas types that pass a hydrostatic test shall have the test information recorded on a suitable metallic label or equally durable material. The label shall be affixed by a heatless process to the shell. These labels shall be self-destructive when removal from an extinguisher shell is attempted. The label shall include the following information:

(a) Month and year the test was performed, indicated by a perforation, such as by a hand punch.

(b) Test pressure used.

(c) Name or initials of person performing the test, or name of agency performing the test.

5-6.4.3 Hose assemblies passing a hydrostatic test do not require recording.

Appendix A

This Appendix is not a part of this NFPA Standard but is included for information purposes only.

A-1-1 Principles of Fire Extinguishment.

Many fires are small at origin and may be extinguished by the use of proper portable fire extinguishers. It is strongly recommended that the fire department be notified as soon as a fire is discovered. This alarm should not be delayed awaiting results of 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 extinguisher is properly located and in working order.

2. The extinguisher is of proper type for a fire which may occur.

3. The fire is discovered while still small enough for the extinguisher to be effective.

4. The fire is discovered by a person, ready, willing, and able to use the extinguisher.

A-1-2 Responsibility.

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 name plate(s) and instruction manual should be read and thoroughly understood by all persons who may be expected to use extinguishers.

To discharge this obligation he should give proper attention to the inspection, maintenance, and recharging of this fire protective equipment. He should also train his personnel in the correct use of fire extinguishers on the different types of fire which may occur on his property.

An owner or occupant should recognize fire hazards on his property and plan in advance exactly how and with what a fire will

be fought. He must see that everyone knows how to call the Fire Department and stress that they should do so for every fire, no matter how small it may be.

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

Portable fire extinguishers are appliances to be used by the occupants of a fire-endangered building or area. They are primarily of value for immediate use on small fires. They have a limited quantity of extinguishing material, and therefore must be used properly so this material is not wasted.

Extinguishers are mechanical devices. They need care and maintenance at periodic intervals to be sure they are ready to operate properly and safely. Parts or internal chemicals may deteriorate in time and need replacement. They are pressure vessels in most cases, and so must be treated with respect and handled with care.

A-1-3.2.2 The classification and rating is found on the label of Underwriters' Laboratories, Inc. and Underwriters' Laboratories of Canada which is affixed to the extinguisher.

EXAMPLE: An extinguisher is rated and classified 4-A; 20-B:C. This indicates the following:

1. It should extinguish approximately twice as much Class A fire as a 2-A (2½-gallon water) rated extinguisher.

2. It should extinguish approximately twenty times as much Class B fire as a 1-B rated extinguisher.

3. It is suitable for use on energized electrical equipment.

Currently Underwriters' Laboratories, Inc., and Underwriters' Laboratories of Canada classify extinguishers for use on Class A fires with the following ratings: 1–A, 2–A, 3–A, 4–A, 6–A, 10–A, 20–A, 30–A, and 40–A. Effective June 1, 1969, extinguishers classified for use on Class B fires have the following ratings: 1–B, 2–B, 5–B, 10–B, 20–B, 30–B, 40–B, 60–B, 80–B, 120–B, 160–B, 240–B, 320–B, 480–B and 640–B. Ratings from 1–A to 20–A and 1–B to 20–B, inclusive, are based on indoor fire tests; ratings at or above 30–A and 30–B are based on outdoor fire tests.

Ratings of 4–B, 6–B, 8–B, 12–B, and 16–B previously used to classify individual extinguisher for use on Class B fires, were not used for new extinguishers after June 1, 1969. Existing extinguishers having these ratings are acceptable if they have been properly inspected and maintained in accordance with *NFPA No. 10.*

Conversion of Discontinued Class B Ratings.

Discontinued Rating	Approximate Present Ratings
4–B	2–B
6–B	5–B
8–B	5–B
12–B	10–B
16–B	10–B

For Class B fires it must be recognized that the amount of fire which can be extinguished by a particular extinguisher is related to the degree of training and experience of the operator.

For fire extinguishers classified for use on Class C fires, no NUMERAL is used since Class C fires are essentially either Class A or Class B fires involving energized electrical wiring and equipment. The size of the different suitable extinguishers installed should be commensurate with the size and extent of the Class A or Class B components, or both, of the electrical hazard or containing equipment being protected (*see Section 2–6*).

For extinguishers classified for use on Class D fires, no NUMERAL is used. The relative effectiveness of these extinguishers for use on specific combustible metal fires is detailed on the extinguisher nameplate.

Extinguishers which are effective on more than one Class of fire have multiple LETTER and NUMERAL-LETTER classifications and ratings.

A-1-4.5 In situations where extinguishers must be temporarily provided, a good practice is to provide portable stands, consisting of a horizontal bar on uprights with feet, on which the extinguishers may be hung.

A-2-1 Conditions of Selection.

A. Physical Conditions that Affect Selection.

(1) *Gross Weight.* In the selection of an extinguisher, the physical ability of the user shall be contemplated. When the hazard exceeds the capability of a hand portable extinguisher, wheeled extinguishers or fixed systems (*see Section 1–1*) should be considered.

(2) *Corrosion.* In some extinguisher installations, there exists a possibility of exposing the extinguisher to a corrosive atmosphere. When this is the case, consideration should be given to providing the extinguishers so exposed with proper protection or providing extinguishers which have been found suitable for use in these conditions.

(3) *Agent Reaction.* The possibility of adverse reactions, contamination, or other effects of an extinguishing agent on either manufacturing processes or on equipment, or both, should be considered in the selection of an extinguisher.

(4) *Wheeled Units.* When wheeled extinguishers are used, consideration should be given to the mobility of the extinguisher within the area in which it will be used. For outdoor locations, the use of proper rubber-tired or wide-rimmed wheel designs should be considered according to terrain. For indoor locations, the size of doorways and passages should be large enough to permit ready passage of the extinguisher.

(5) *Wind and Draft.* If the hazard is subject to winds or draft, the use of extinguishers and agents having sufficient range to overcome these conditions should be considered.

(6) *Availability of Personnel.* Consideration should be given to the number of persons available to operate the extinguishers, the degree of training provided, and the physical capability of the operator.

B. Health and Safety Conditions that Affect Selection.

(1) In the selection of an extinguisher, consideration shall be given to health and safety hazards involved in its maintenance and use, as described in the following paragraphs.

(2) Prominent caution labels on the extinguisher, warning signs at entry points to confined spaces, provision for remote application, extra-long-range extinguisher nozzles, special ventilation, provision of breathing apparatus and other personal protective equipment, and adequate training of personnel are among measures which should be considered to minimize the effects of these hazards.

(3) Bromotrifluoromethane (Halon 1301) and bromochlorodifluoromethane (Halon 1211) extinguishers contain extinguishing agents whose vapor has a low toxicity. However, their decomposition products can be hazardous. When using these extinguishers in unventilated places, such as small rooms, closets, motor vehicles, or other confined spaces, operators and others should avoid breathing the gases produced by thermal decomposition of the agent.

(4) Carbon dioxide extinguishers contain an extinguishing agent which will not support life when used in sufficient concentration to extinguish a fire. The use of this type of extinguisher in an unventilated space can dilute the oxygen supply. Prolonged occupancy of such spaces can result in loss of consciousness due to oxygen deficiency.

(5) Extinguishers not rated for Class C hazards (water types, loaded stream, foam, and including carbon dioxide with metal horns) present a shock hazard if used on fires involving energized electrical equipment.

(6) Dry chemical extinguishers, when used in a small unventilated area, can greatly reduce visibility. Dry chemical, discharged in an area, may also clog filters in air-cleaning systems.

(7) Most fires produce toxic decomposition products of combustion and some materials may produce highly toxic gases. Fires may also consume available oxygen or produce dangerously high exposure to convected or radiated heat. All of these may affect the degree to which a fire can be safely approached with extinguishers. (*See Underwriters' Laboratories, Inc., Bulletin of Research No. 53 — July, 1963.*†)

Table A-2-1 Characteristics of Extinguishers.

The following Table summarizes the characteristics of extinguishers and may be used as an aid in selecting extinguishers in accordance with Chapter 2. *The ratings given are those which were in effect at the time this standard was prepared. Current listings should be consulted for up-to-date ratings.*

A-2-2.1.1 It is recommended that inverting types of extinguishers be replaced with currently available models. Manufacture of inverting types of extinguishers and their listing by Underwriters' Laboratories, Inc. was discontinued in 1969. As the availability of suitable replacement parts and recharge materials diminishes, it will become increasingly difficult to maintain these types of extinguishers in a safe and reliable operating condition.

A-2-2.1.2 For exposed liquefied fat or oil in depth such as fat fryers, alkaline dry chemical types should be used having a rating no less than 20-B:C. (Alkaline types are sodium bicarbonate base or potassium bicarbonate base.) Acidic base dry chemical types, such as ammonium phosphate base multipurpose, impede saponification (*see Standard on Vapor Removal from Cooking Equipment, NFPA No. 96*).

---

†Survey of Available Information on the Toxicity of the Combustion and Thermal Decomposition Products of Certain Building Materials under Fire Conditions.

Table A-2-1 — Characteristics of Extinguishers

Extinguishing Agent	Method of Operation	Capacity	Horizontal Range of Stream	Approximate Time of Discharge	Hydrostatic Test Interval	Protection Required Below 40°F	UL or ULC Classifications*
Water	Stored Pressure	2½ gal.	30-40 ft.	1 min.	5 yr.	Yes	2-A
Water	Pump	1½ gal.	30-40 ft.	45 sec.	—	Yes	1-A
	Pump	2½ gal.	30-40 ft.	1 min.	—	Yes	2-A
	Pump	4 gal.	30-40 ft.	2 min.	—	Yes	3-A
	Pump	5 gal.	30-40 ft.	2-3 min.	—	Yes	4-A
Water (Antifreeze	Cartridge & Stored Pressure	1¼, 1½ gal.	30-40 ft.	30 sec.	5 yr.	No	1-A
Calcium Chloride)	Cartridge & Stored Pressure	2½ gal.	30-40 ft.	1 min.	5 yr.	No	2-A
	Cartridge & Stored Pressure	33 gal. (wheeled)	50 ft.	3 min.	5 yr.	No	20-A
Water (Wetting Agent)	Cartridge & Stored Pressure	25 gal. (wheeled)	35 ft.	1½ min.	5 yr.	Yes	10-A
	Cartridge & Stored Pressure	45 gal. (wheeled)	35 ft.	2 min.	5 yr.	Yes	20 A
Water (Soda Acid)	Chemically generated expellent	1¼, 1½ gal.	30-40 ft.	30 sec.	5 yr.	Yes	1-A
	Chemically generated expellent	2½ gal.	30-40 ft.	1 min.	5 yr.	Yes	2-A
	Chemically generated expellent	17 gal. (wheeled)	50 ft.	3 min.	5 yr.	Yes	10-A
	Chemically generated expellent	33 gal. (wheeled)	50 ft.	3 min.	5 yr.	Yes	20-A
Loaded Stream	Stored Pressure	2½ gal.	30-40 ft.	1 min.	5 yr.	No	2 to 3-A and 1-B
	Cartridge and Stored Pressure	33 gal. (wheeled)	50 ft.	3 min.	5 yr.	No	20-A

Table A-2-1 — Characteristics of Extinguishers (Continued)

Extinguishing Agent	Method of Operation	Capacity	Horizontal Range of Stream	Approximate Time of Discharge	Hydrostatic Test Interval	Protection Required Below 40°F	UL or ULC Classifications*
Foam	Pressurized	21 oz.	4-6 ft.	24 sec.	—	Yes	1-B
Foam	Chemically generated expellent	1¼, 1½ gal.	30-40 ft.	40 sec.	5 yr.	Yes	1-A; 2-B
	Chemically generated expellent	2½ gal.	30-40 ft.	1½ min.	5 yr.	Yes	2-A:4-B to 2-A:6-B
	Chemically generated expellent	5 gal.	30-40 ft.	2 min.	5 yr.	Yes	4-A:6-B
	Chemically generated expellent	17 gal. (wheeled)	50 ft.	3 min.	5 yr.	Yes	10-A:10-B to 10-A:12-B
	Chemically generated expellent	33 gal. (wheeled)	50 ft.	3 min.	5 yr.	Yes	20-A:20-B to 20-A:40-B
Carbon Dioxide **	Self Expellent	2½ to 5 lb.	3-8 ft.	8 to 30 sec.	5 yr.	No	1 to 5-B:C
		10 to 15 lb.	3-8 ft.	8 to 30 sec.	5 yr.	No	2 to 10-B:C
		20 lb.	3-8 ft.	10 to 30 sec.	5 yr.	No	10-B:C
		50 to 100 lb. (wheeled)	3-10 ft.	10 to 30 sec.	5 yr.	No	10 to 40-B:C
Dry Chemical (Sodium Bicarbonate)††	Stored Pressure	1 lb.	5-8 ft.	8 to 10 sec.	5 or 12 yrs.	No	1-B:C
	Stored Pressure	1½ to 2½ lb.	5-8 ft.	8 to 12 sec.	5 or 12 yrs.	No	2 to 5-B:C
	Cartridge and Stored Pressure	2¾ to 5½ lb.	5-20 ft.	8 to 20 sec.	5 or 12 yrs.	No	5 to 10-B:C
	Cartridge and Stored Pressure	7½ to 30 lb.	5-20 ft.	10 to 25 sec.	5 or 12 yrs.	No	10 to 60-B:C
	Nitrogen cylinder or Stored Pressure	75 to 350 lb. (wheeled)	15 to 45 ft.	20 to 105 sec.	5 or 12 yrs.	No	40 to 240-B:C

Table A-2-1 — Characteristics of Extinguishers (Continued)

Extinguishing Agent	Method of Operation	Capacity	Horizontal Range of Stream	Approximate Time of Discharge	Hydrostatic Test Interval	Protection Required Below 40°F	UL or ULC Classifications*
Dry Chemical (Potassium Bicarbonate)††	Stored Pressure	1 to 2 lb.	5-8 ft.	8 to 10 sec.	5 yrs.	No	1 to 5-B:C
	Stored Pressure	2¼ to 5 lb.	5-12 ft.	8 to 10 sec.	5 or 12 yrs.	No	5 to 20-B:C
	Cartridge or Stored Pressure	5½ to 10 lbs.	5-20 ft.	8 to 20 sec.	5 or 12 yrs.	No	10 to 60-B:C
	Cartridge or Stored Pressure	16 to 30 lbs.	10-20 ft.	8 to 25 sec.	5 or 12 yrs.	No	40 to 80-B:C
	Nitrogen cylinder or Stored Pressure	125 to 300 lbs. (wheeled)	15-45 ft.	30 to 60 sec.	5 or 12 yrs.	No	80 to 320-B:C
Dry Chemical (Potassium chloride)††	Stored Pressure	2 to 2½ lbs.	5-8 ft.	8 to 10 sec.	5 or 12 yrs.	No	5 to 10-B:C
	Cartridge or Stored Pressure	5 to 10 lbs.	5-20 ft.	8 to 25 sec.	5 or 12 yrs.	No	20 to 40-B:C
	Cartridge or Stored Pressure	19½ to 30 lbs.	15-45 ft.	8 to 25 sec.	5 or 12 yrs.	No	60 to 80-B:C
	Nitrogen cylinder or Stored Pressure	50 to 160 lbs. (wheeled)	15-45 ft.	30 to 60 sec.	5 or 12 yrs.	No	120 to 160-B:C
Dry Chemical (Ammonium phosphate)††	Stored Pressure †	1 to 5 lbs.	5-12 ft.	8 to 10 sec.	5 or 12 yrs.	No	2 to 10-B:C
Dry Chemical (Ammonium phosphate)††	Stored Pressure or Cartridge	2½ to 8½ lbs.	5-12 ft.	8 to 12 sec.	5 or 12 yrs.	No	1 to 3-A and 10 to 40-B:C
	Stored Pressure or Cartridge	9 to 17 lbs.	5-20 ft.	10 to 25 sec.	5 or 12 yrs.	No	2 to 4-A and 10 to 60-B:C
	Stored Pressure or Cartridge	17 to 30 lbs.	5-20 ft.	10 to 25 sec.	5 or 12 yrs.		3 to 20-A and 30 to 80-B:C
	Nitrogen Cylinder or Stored Pressure	50 to 300 lbs. (wheeled)	15-45 ft.	30 to 60 sec.	5 or 12 yrs.		20 to 40-A and 60 to 240-B:C

Table A-2-1 — Characteristics of Extinguishers (Continued)

Extinguishing Agent	Method of Operation	Capacity	Horizontal Range of Stream	Approximate Time of Discharge	Hydrostatic Test Interval	Protection Required Below 40°F	UL or ULC Classifications*
Dry Chemical (Foam Compatible)††	Cartridge and Stored Pressure	4¾ to 9 lbs.	5-20 ft.	8 to 10 sec.	5 or 12 yrs.	No	10 to 20-B:C
	Cartridge and Stored Pressure	9 to 27 lbs.	5-20 ft.	10 to 25 sec.	5 or 12 yrs.	No	20 to 30-B:C
	Cartridge and Stored Pressure	18 to 30 lbs.	5-20 ft.	10 to 25 sec.	5 or 12 yrs.	No	40 to 60-B:C
	Nitrogen cylinder and Stored Pressure	150 to 350 lbs. (wheeled)	15-45 ft.	20 to 150 sec.	5 or 12 yrs.	No	80 to 240-B:C
Dry Chemical (Foam Compatible) (Potassium Chloride)††	Cartridge and Stored Pressure	2½ to 5 lbs.	5-12 ft.	8 to 10 sec.	5 or 12 yrs.	No	10 to 20-B:C
	Cartridge and Stored Pressure	9½ to 20 lbs.	5-20 ft.	8 to 25 sec.	5 or 12 yrs.	No	40 to 60-B:C
	Cartridge and Stored Pressure	19½ to 30 lbs.	5-20 ft.	10 to 25 sec.	5 or 12 yrs.	No	60 to 80-B:C
	Nitrogen cylinder and Stored Pressure	50 lbs. (wheeled)	15-45 ft.	30 sec.	5 or 12 yrs.	No	120-B:C
Dry Chemical (Foam Compatible) (Potassium Bicarbonate Urea based)††	Stored Pressure	5 to 11 lbs.	11-22 ft.	13 to 18 secs.	12 yrs.	No	40 to 80 B:C
	Stored Pressure	17 to 19 lbs.	15-30 ft.	26 to 30 secs.	12 yrs.	No	120 B:C
		175 lbs. (wheeled)	70 ft.	62 secs.	12 yrs.	No	480 B:C
Bromotrifluoromethane	Self Expellent	2½ lbs.	4-6 ft.	8 to 10 sec.	12 yrs.	No	2-B:C
	Stored Pressure	4½ lbs.	6-10 ft.	8 to 10 sec.	12 yrs.	No	5-B:C
Bromochlorodifluoromethane	Stored Pressure	2 to 4 lbs.	8-12 ft.	8 to 12 secs.	12 yrs.	No	2 to 5 B:C
		5½ to 9 lbs.	9-15 ft.	8 to 15 secs.	12 yrs.	No	10 B:C

See notes to Table A2.1 p. 33.

Notes to Table A-2-1

***UL and ULC ratings checked as of December 27, 1974. Readers concerned with subsequent ratings should review the pertinent "Lists" and "Supplements" issued by these Laboratories: (Write Underwriters' Laboratories, Inc., 207 East Ohio St., Chicago, Illinois, 60611, or Underwriters' Laboratories of Canada, 7 Crouse Road, Scarborough, Ont., Canada).**

****Carbon-Dioxide extinguishers with metallic horns do not carry a "C" classification.**

†Some small extinguishers containing ammonium phosphate dry chemical do not carry an "A" classification.

††Certain pressurized types have special requirements for hydrotesting to comply with regulations of the U.S. Department of Transportation.

Vaporizing liquid extinguishers (Carbon tetrachloride or chlorobromomethane base) are not recognized in this standard and reference to them has thus been deleted from this Table as compared to earlier editions.

See also Subsection A-1-3.2.2 in Appendix A. Ratings of 4-B, 6-B, 8-B, 12-B, and 16-B were eliminated June 1, 1969.

A-2-2.1.3 The use of dry chemical extinguishers on wet energized electrical equipment (such as rain-soaked utility poles, high voltage switch gear, and transformers) may aggravate electrical leakage problems. The dry chemical in combination with moisture provides an electrical path which can reduce the effectiveness of insulation protection. The removal of all traces of dry chemical from such equipment after extinguishment is recommended.

A-2-2.1.4 Extinguishers and Extinguishing Agents for Class D Hazards.

(1) Chemical reaction between burning metals and many extinguishing agents (including water) may range from explosive to inconsequential, depending in part on the type, form, and quantity of metal involved. In general, the hazards from a metal fire are significantly increased when such extinguishing agents are applied.

NOTE: The advantages and limitation of a wide variety of commerically available metal fire extinguishing agents are discussed in Section 15, Chapter VI of the NFPA Fire Protection Handbook (13th Edition).

(2) The agents and extinguishers discussed in this section are of specialized types and their use often involves special techniques peculiar to a particular combustible metal. A given agent will not necessarily control or extinguish all metal fires. Some agents are valuable in working with several metals; others are useful in combating only one type of metal fire. The authorities having jurisdiction should be consulted in each case to determine the desired protection for the particular hazard involved.

(3) Certain combustible metals and reactive chemicals require special extinguishing agents or techniques. If there is doubt, applicable NFPA standards should be consulted or reference made to *NFPA No. 49, Hazardous Chemicals Data*, or *NFPA No. 325M, Fire-Hazard Properties of Flammable Liquids, Gases, and Volatile Solids.*

(4) Reference should be made to the manufacturer's recommendations for use and special technique for extinguishing fires in various combustible metals.

(5) Fire of high intensity may occur in certain metals. Ignition is generally the result of frictional heating, exposure to moisture, or exposure from a fire in other combustible materials. The greatest hazard exists when these metals are in the molten state in finely divided forms of dust, turnings, or shavings.

NOTE: The properties of a wide variety of combustible metals and the agents available for extinguishing fires in these metals are discussed in Section 15, Chapter VI of the NFPA Fire Protection Handbook (13th Edition).

A-3-1.1 Distribution Considerations. Items that affect distribution of portable fire extinguishers are: the area and arrangement of the building occupancy conditions, the severity of the hazard, the anticipated classes of fire, other protective systems or devices, and the distances to be traveled to reach extinguishers. In addition, anticipated rate of fire spread, the intensity and rate of heat development, the smoke contributed by the burning materials, and the accessibility of a fire to close approach with portable extinguishers should be considered. Wheeled extinguishers have additional agent and range and should be considered for areas where the additional protection is needed. Portable extinguishers offer the occupant a means to assist in evacuation of a building or occupancy. They are useful to knock down the fire if it occurs in the evacuation route. Whenever possible the individual property should be surveyed for actual protection requirements.

A-3-1.2 Most buildings have Class A fire hazards. In any occupancy, there may be a predominant hazard with "special hazard" areas requiring supplemental protection. For example, a hospital will generally have need for Class A extinguishers covering patients' rooms, corridors, offices, etc., but will need Class B extinguishers in laboratories, kitchens and where flammable anesthetics are stored or handled, and Class C extinguishers in electrical switch gear or generator rooms.

A-3-1.2.2 If extinguishers intended for different classes of fires are grouped, their intended use should be marked conspicuously to aid in the choice of the proper extinguisher at the time of a fire. In

an emergency the tendency is to reach for the closest extinguisher. If this extinguisher is of the wrong type, he may well endanger himself and the property he is endeavoring to protect. Wherever possible, it is preferable to have only those extinguishers available that can be safely used on any type of fire in the immediate vicinity.

A-3-1.5 The method of classifying extinguishers used in the 1955 and earlier editions of *NFPA No. 10* differs from subsequent methods used. Columns 3 and 4 of Table A–3–1.5 enable approximate evaluation of older extinguishers in terms of the classification method used between 1955 and June 1, 1969.

NOTE: A further revision of the method of rating extinguishers classified for Class B fires was adopted in 1969. (*See A-1-3.2.2.*)

(a) Under the post-1955 methods of classification it is possible for units of the same size to have different classifications. For example, 15-pound carbon dioxide extinguishers may have a classification of from 2–B:C to 10–B:C according to the fire extinguishing potential of the individual units as determined by Underwriters' Laboratories, Inc. and Underwriters' Laboratories of Canada. Therefore, an exact conversion from the old method (pre-1955) to the new method of classification (since 1955) is not practical.

(b) Whenever fire extinguishers are found with the post 1955 classification on the label, Table A–3–1.5 should not be used. The classification is usable directly in the application of Chapter 3.

(c) Whenever fire extinguishers are found with the pre-1955 classification on the label, use this table for approximate conversion and use the resulting classification value in applying Chapter 3 of this standard. For example, a 15-pound carbon dioxide extinguisher has the classification "B–1, C–1" on the label. From this table, it is found that the approximate classification under the 1955–1959 method is "4–B, C" and this can be used in applying the requirements of Table 3–3.1.1 in Chapter 3.

A-3-4.1 Where such personnel are not available, the hazard should be protected by fixed systems.

A-4 Inspection, Maintenance and Recharging.

A-4-1.4 A fire equipment servicing agency is usually the most reliable means available to the public for having maintenance and recharging performed. Large industries may find it desirable to establish their own maintenance and recharge facilities training men to perform these functions.

A-4-3.1 Frequency of extinguisher inspections should be based on the need of the area in which extinguishers are located. The required monthly inspection is minimum and should be more frequent if any of the following exist:

(*Continued on page 38*)

Table A-3-1.5

Conversion of Extinguisher Rating

Extinguishing Agent	Extinguisher Type and Size	Pre-1955 UL Rating	Rating 1955 to June 1, 1969
Chemical Solution (Soda-Acid)	1¼, 1½ gallon	A-2	1-A
	2½ gallon	A-1	2-A
	17 gallon	A	10-A
	33 gallon	A	20-A
Water	1½, 1¾ gallon (pump or pressure)	A-2	1-A
	2½ gallon (pump or pressure)	A-1	2-A
	4 gallon (pump or pressure)	A-1	3-A
	5 gallon (pump or pressure)	A-1	4-A
	17 gallon (pressure)	A	10-A
	33 gallon (pressure)	A	20-A
	5 12-quart or 6 10-quart water-filled pails; 55-gallon water-filled drum with 3 fire pails; 25- to 55-gallon water-filled bucket tank with 5 or 6 fire pails	A-1	2-A
Loaded Stream	1 gallon	A-2, B-4	1-A
	1¾ and 2½ gallon	A-1, B-2	2-A, ½-B†
	33 gallon	A	20-A

†NOTE: Portable fire extinguishers with fractional ratings are not considered as meeting the requirements of this standard.

Table A-3-1.5 — Conversion of Extinguisher Rating (Con't)

Extinguishing Agent	Extinguisher Type and Size	Pre-1955 UL Rating	Rating 1955 to June 1, 1969
Foam	1¼ and 1½ gallon	A-2, B-2	1-A, 2-B
	2½ gallon	A-1, B-1	2-A, 4-B
	5 gallon	A-1, B-1	4-A, 6-B
	10 gallon	A, B	6-A, 8-B
	17 gallon	A, B	10-A, 10-B
	33 gallon	A, B	20-A, 20-B
Carbon Dioxide	6 or less pounds of carbon dioxide	B-2, C-2	1-B, C
	7½ pounds of carbon dioxide	B-2, C-1	2-B, C
	10 to 12 pounds of carbon dioxide	B-2, C-1	4-B, C
	15 to 20 pounds of carbon dioxide	B-1, C-1	4-B, C
	25 and 26 pounds of carbon dioxide	B-1, C-1	6-B, C
	50 pounds of carbon dioxide	B-1, C-1	10-B, C
	75 pounds of carbon dioxide	B-1, C-1	12-B, C
	100 pounds of carbon dioxide	B, C	12-B, C
Dry Chemical	4 to 6¼ pounds of dry chemical	B-2, C-2	4-B, C
	7½ pounds of dry chemical	B-2, C-1	6-B, C
	10 to 15 pounds of dry chemical	B-1, C-1	8-B, C
	20 pounds of dry chemical	B-1, C-1	16-B, C
	30 pounds of dry chemical	B-1, C-1	20-B, C
	75 to 350 pounds of dry chemical	B, C	40-B, C
Wetting Agent	10 gallons	A, B	6-A
	20 gallons	A, B	12-A
	50 gallons	A, B	30-A

NOTE 1: Carbon dioxide extinguishers with metallic horns will not carry any "C" classification.

NOTE 2: Vaporizing liquid extinguishers (carbon tetrachloride or chlorobromomethane base) are not recognized in this standard and reference to them has thus been deleted from this Table as compared to earlier editions.

NOTE 3: To convert 1955–1969 ratings to those established after June 1, 1969, see Table in Subsection A1-3.2.2.

A-4-3.1 *(Con't)*

(a) High frequency of fires in the past.

(b) Severe hazards.

(c) Susceptibility to tampering, vandalism, or malicious mischief.

(d) Possibility of, or experience with, theft of extinguishers.

(e) Locations that make extinguishers susceptible to mechanical injury.

(f) Possibility of visible or physical obstructions.

(g) Exposure to abnormal temperatures or corrosive atmospheres.

(h) Characteristics of extinguishers, such as susceptibility to leakage.

A-4-4 Maintenance. Persons responsible for performing maintenance operations come from three major groups:

(a) Trained industrial safety or maintenance personnel.

(b) Extinguisher service agencies.

(c) Individual owners (e.g., self-employed, home owner, boat owner, car owner, etc.).

Extinguishers owned by individuals are often neglected because there is no planned periodic follow-up program. It is recommended that such owners become familiar with their extinguishers so they can detect telltale warnings from inspection which may suggest the need for maintenance. Another alternative is to have the dealer from whom the extinguisher was purchased establish an annual follow-up program to perform the maintenance for the owner.

The purpose of a well-planned and well-executed maintenance program is to afford maximum probability that an extinguisher:

(a) Will operate properly between the time intervals established for maintenance examinations in the environment to which it is exposed.

(b) Will not constitute a potential hazard to persons in its vicinity or to operators or rechargers of extinguishers.

Any parts needed for replacement should be obtained from the manufacturer or his representative.

A-4-4.2 Maintenance Procedures. For convenience, the following check lists are organized into two parts. The, first is arranged by mechanical parts (components and containers) common to most

extinguishers. The second is arranged by extinguishing material and expelling means and involves a description of the problems peculiar to each agent.

Mechanical Parts.

Any parts needed for replacement should be obtained from the manufacturer.

Extinguisher Part, Check Points and Corrective Action

Shell	Corrective Action
1. Hydrostatic test date or date of manufacture	1. Retest if needed
2. Corrosion	2. Hydrotest and refinish; or discard
3. Mechanical damage (denting or abrasion)	3. Hydrotest and refinish; or discard
4. Paint condition	4. Refinish
5. Presence of repairs (welding, soldering, brazing, etc.)	5. Discard or consult manufacturer
6. Damaged threads (corroded, crossthreaded, or worn)	6. Discard or consult manufacturer
7. Broken hanger attachment, carrying handle lug	7. Discard or consult manufacturer
8. Sealing surface damage (nicks or corrosion)	8. Clean, repair, and leak test; or discard

Nameplate	Corrective Action
1. Illegible wording	1. Clean or replace
2. Corrosion or loose plate	2. Inspect shell under plate (see Shell Check Points) and reattach plate

Nozzle or Horn	Corrective Action
1. Deformed, damaged, or cracked	1. Replace
2. Blocked openings	2. Clean
3. Damaged threads (corroded, crossthreaded or worn)	3. Replace
4. Aged (brittle)	4. Replace

Hose Assembly	Corrective Action
1. Damaged (cut, cracked or worn)	1. Replace
2. Damaged couplings or swivel joint (cracked or corroded)	2. Replace
3. Damaged threads (corroded, crossthreaded, or worn)	3. Replace
4. Inner tube cut at couplings	4. Repair or replace

Restraining or Locking Device	Corrective Action
1. Damaged (bent, corroded, or binding)	1. Repair and lubricate; or replace
2. Missing	2. Replace

Gage or Pressure-Indicating Device	Corrective Action
1. Immovable, jammed, or missing pointer (tap to check)	1. Depressurize and replace gage
2. Missing, deformed, or broken crystal	2. Depressurize and replace gage
3. Illegible or faded dial	3. Depressurize and replace gage
4. Corrosion	4. Depressurize and check calibration, clean and refinish; or replace gage
5. Dented case or crystal retainer	5. Depressurize and check calibration; or replace gage
6. Immovable or corroded pressure-indicating stem (nongage type)	6. Replace head assembly, depressurize and replace shell, or complete extinguisher

Shell or Cylinder Valve	Corrective Action
1. Corroded, damaged, or jammed lever, handle, spring, stem, or fastener joint	1. Depressurize, check freedom of movement, and repair; or replace
2. Damaged outlet threads (corroded, crossthreaded, or worn)	2. Depressurize and replace

Nozzle Shutoff Valve	Corrective Action
1. Corroded, damaged, jammed or binding lever, spring, stem, or fastener joint	1. Repair and lubricate; or replace
2. Plugged, deformed, or corroded nozzle tip or discharge passage	2. Clean or replace

Puncture Mechanism	Corrective Action
1. Damaged, jammed or binding puncture lever, stem or fastener joint	1. Replace
2. Dull or damaged cutting or puncture pin	2. Replace
3. Damaged threads (corroded, crossthreaded, or worn)	3. Replace

Gas Cartridge	Corrective Action
1. Corrosion	1. Replace cartridge
2. Damaged seal disc (injured, cut, or corroded)	2. Replace cartridge
3. Damaged threads (corroded, crossthreaded, or worn)	3. Replace cartridge
4. Illegible weight markings	4. Replace cartridge

Gas Cylinders	Corrective Action
1. Hydrostatic test date or date of manufacture	1. Retest if needed
2. Corrosion	2. Hydrotest and refinish or discard
3. Paint condition	3. Refinish
4. Presence of repairs (welding, soldering, brazing, etc.)	4. Discard or consult manufacturer
5. Damaged threads (corroded, crossthreaded, or worn)	5. Discard or consult manufacturer

Wheel Cap or Fill Cap	Corrective Action
1. Corroded, cracked, or broken	1. Replace
2. Damaged threads (corroded, crossthreaded, or worn)	2. Replace
3. Sealing surface damage (nicked, deformed, or corroded)	3. Clean, repair and leak test; or replace
4. Blocked vent hole or slot	4. Clean

Disposable Shell	Corrective Action
1. Corrosion	1. Depressurize and replace shell
2. Damaged seal disc (injured, cut, or corroded)	2. Depressurize and replace shell
3. Damaged threads (corroded, crossthreaded, or worn)	3. Replace shell
4. Illegible weight markings	4. Depressurize and replace shell

Carriage and Wheels	Corrective Action
1. Corroded, bent, or broken carriage	1. Repair or replace
2. Damaged wheel (buckled or broken spoke, bent rim or axle, loose tire, low pressure, jammed bearing)	2. Clean, repair, and lubricate; or replace

Carrying Handle	Corrective Action
1. Broken handle lug	1. Discard shell or valve; or consult manufacturer
2. Broken handle	2. Replace
3. Corroded, jammed, or worn fastener joint	3. Clean or replace

Seals or Tamper Indicator	Corrective Action
1. Broken or missing	1. Check under Agent and Expelling Means for specific action

Hand Pump	Corrective Action
1. Corroded, jammed, or damaged pump	1. Repair and lubricate; or replace
2. Improper adjustment of packing nut	2. Adjust

Inner Cage, Chamber Stopple, Acid Container, or Tube	Corrective Action
1. Corroded, damaged, bent, cracked, or distorted	1. Replace

Pressurizing Valve	Corrective Action
1. Leaking seals	1. Depressurize and replace valve or core

Gasket "O" Ring and Seals	Corrective Action
1. Damaged (cut, cracked, or worn)	1. Replace and lubricate
2. Missing	2. Replace and lubricate
3. Aged or weathered (compression set, brittle, cracked)	3. Replace and lubricate

Brackets	Corrective Action
1. Corroded, worn, or bent	1. Repair and refinish; or replace
2. Loose or binding fit	2. Adjust fit or replace
3. Worn, loose, corroded, or missing screw or bolt	3. Tighten or replace
4. Worn bumper, webbing or grommet	4. Replace

Gas Tube and Siphon or Pickup Tube	Corrective Action
1. Corroded, dented, cracked, or broken	1. Replace
2. Blocked tube or openings in tube	2. Clean or replace

Safety Relief Device	Corrective Action
1. Corroded or damaged	1. Depressurize and replace or consult manufacturer
2. Broken, operated, or plugged	2. Depressurize and replace or repair

Pressure Regulators	Corrective Action
1. External condition (a) Damage (b) Corrosion	1. (a) Replace regulator (b) Clean regulator or replace
2. Pressure relief—corroded, plugged, dented, leaking, broken, or missing	2. Disconnect regulator from pressure source; replace pressure relief
3. Protective bonnet relief hole — tape missing or seal wire broken or missing	3. Check regulator in accordance with manufacturer's regulator test procedures
4. Adjusting screw — lock pin missing	4. Check regulator in accordance with manufacturer's regulator test procedures

5. Gages	5.
(a) Immovable, jammed, or missing pointer	(a) Disconnect regulator from pressure source; replace gage
(b) Missing or broken crystal	(b) Replace crystal
(c) Illegible or faded dial	(c) Replace gage
(d) Corrosion	(d) Check calibration, clean and refinish, or replace gage
(e) Dented case or crystal retainer	(e) Check calibration or replace gage
6. Regulator Hose	6.
(a) Cut, cracked, abraided, or deformed exterior	(a) Hydrotest or replace hose
(b) Corroded or cracked coupling	(b) Replace hose
(c) Corroded, cross-threaded, or worn coupling threads	(c) Replace hose

Agent and Expelling Means.

Extinguisher Type and Part, Check Points and Corrective Action

Self-Generating

Soda-Acid Water	Corrective Action
1. Recharging date due	1. Empty, clean, and recharge
2. Improper fill levels in acid bottle and shell	2. Empty, clean, and recharge
3. Agent condition (check for sediment)	3. Empty, clean, and recharge

Foam	Corrective Action
1. Recharging date due	1. Empty, clean, and recharge
2. Improper fill levels in inner container and shell	2. Empty, clean, and recharge
3. Agent condition (check for sediment)	3. Empty, clean, and recharge

Self-Expelling

Carbon Dioxide	Corrective Action
1. Improper weight	1. Recharge to proper weight
2. Broken or missing tamper indicator	2. Leak test and weigh, recharge or replace indicator

Bromotrifluoromethane	Corrective Action
1. Punctured cylinder seal disc	1. Replace shell
2. Improper weight	2. Replace shell or return to manufacturer for refilling
3. Broken or missing tamper indicator	3. Examine cylinder seal disc, replace indicator

Mechanical Pump

Water and Antifreeze	Corrective Action
1. Improper fill level	1. Refill
2. Defective pump	2. Clean, repair, and lubricate, or replace
3. Water condition (dirty, cloudy, or sediment)	3. Recharge
4. Antifreeze condition (check specific gravity, or recharge record or weigh — check for sediment)	4. Recharge

---

Hand Propelled — Bucket or Scoop

Water and Antifreeze	Corrective Action
1. Improper fill level	1. Refill
2. Antifreeze — improper charge (check specific gravity or recharge record)	2. Recharge
3. Missing bucket	3. Replace

Dry Powder	Corrective Action
1. Improper fill level	1. Refill
2. Agent condition (contamination or caking)	2. Discard and replace
3. Missing scoop	3. Replace

Gas Cartridge or Cylinder

Dry Chemical Types and Dry Powder	Corrective Action
1. Improper weight or charge level	1. Refill to correct weight
2. Agent condition (contamination, caking, or wrong agent)	2. Empty and refill
3. (a) For cartridge	3. (a)
(1) Punctured seal disc	(1) Replace cartridge
(2) Improper weight	(2) Replace cartridge
(3) Broken or missing tamper indicator	(3) Examine seal disc, replace indicator
(b) For gas cylinder with gage	(b)
(1) Low pressure	(1) Replace cylinder
(2) Broken or missing tamper indicator	(2) Leak test — replace indicator
(c) For gas cylinder without gage	(c)
(1) Low pressure (attach gage and measure pressure)	(1) Leak test. If normal, leak test and repair indicator. If low — replace cylinder.
(2) Broken or missing tamper indicator	(2) Measure pressure — leak test — replace indicator

Water, Antifreeze, and Loaded Stream	Corrective Action
1. Improper fill level	1. Refill to correct level
2. (a) Agent condition	2. (a)
(1) Dirty, cloudy, or sediment	(1) Empty and refill
(2) If antifreeze or loaded stream — improper charge (check specific gravity, recharge record or weigh)	(2) Recharge
3. Punctured cartridge seal disc	3. Replace cartridge
4. Improper cartridge weight	4. Replace
5. Broken or missing indicator	5. Examine seal disc — replace indicator

Wet Water	Corrective Action
1. Improper fill level	1. Refill
2. Agent condition (sediment and incorrect surface tension) See NFPA No. 18 — Wetting Agents.	2. Empty and refill
3. Improper cartridge weight	3. Replace
4. Broken or missing tamper indicator.	4. Leak test cartridge — weigh — replace indicator

Stored Pressure

Dry Chemical Types	Corrective Action
1. Refillable	1.
(a) Improper extinguisher weight	(a) Refill to correct weight
(b) Improper gage pressure	(b) Repressurize and leak test
(c) Broken or missing tamper indicator	(c) Leak test and replace indicator
2. Disposable shell with pressure indicator	2.
(a) Punctured seal disc	(a) Replace shell
(b) Low pressure	(b) Depressurize; replace shell
(c) Broken or missing tamper indicator	(c) Check pressure — check seal disc — replace indicator
3. Disposable shell without pressure indicator	3.
(a) Punctured seal disc	(a) Replace shell
(b) Low weight	(b) Depressurize; replace shell
(c) Broken or missing tamper indicator	(c) Check seal disc — replace indicator
4. Disposable extinguisher with pressure indicator	4.
(a) Low pressure	(a) Depressurize and discard extinguisher
(b) Broken or missing tamper indicator	(b) Leak test — check pressure — replace indicator

Bromochlorodifluoromethane	Corrective Action
1. Broken or missing tamper indicator	1. Weigh, leak test, and replace indicator
2. Improper gage pressure	2. Weigh, repressurize and leak test
3. Improper weight	3. Leak test and refill to correct weight

Water, Antifreeze, and Loaded Stream	Corrective Action
1. Improper fill level (by weight or observation)	1. Refill to correct level
2. Agent condition if antifreeze or loaded stream. Improper charge (check recharge record or weigh)	2. Empty and refill
3. Improper gage pressure	3. Repressurize and leak test
4. Broken or missing tamper indicator	4. Leak test — replace indicator

A-4-4.3 Record Keeping. In addition to the required tag or label (*Subsection 4–4.3*), a permanent file record should be kept for each extinguisher. This file record should include the following information as applicable:

(a) The maintenance date and the name of person or agency performing the maintenance.

(b) The date when last recharged and the name of person or agency performing the recharge.

(c) The hydrostatic retest date and the name of person or agency performing the hydrostatic test.

(d) Description of dents remaining after passing a hydrostatic test.

(e) The date of the 6-year maintenance for stored pressure dry chemical types (*see Subsection 4–4.1.1*).

A-4-5.3.1 Recharge Materials. On properties where extinguishers are maintained by the occupant, a supply of recharging materials should be kept on hand. These materials should meet the requirements of Subsection 4–5.3.1.

The intent of this provision is to maintain the efficiency of each extinguisher as produced by the manufacturer and as labeled by one or more of the nationally recognized fire testing laboratories. For example, the extinguishing agent and the additives used in the various types of dry chemical extinguishers vary in chemical composition and in particle size and, thus, in flow charcteristics. Each extinguisher is designed to secure maximum efficiency with the particular formulation used. Changing the agent from that specified on the extinguisher nameplate may effect flow rates, nozzle discharge characteristics, the quantity of available agent (as influenced by density), and would void the label of the testing laboratory.

Mixing multipurpose dry chemicals with sodium bicarbonate-based or potassium bicarbonate-based formulations may result in a chemical reaction capable of developing sufficient pressures to rupture an extinguisher. Substituting a different formulation for the one originally employed could cause malfunctioning of the extinguisher or result in substandard performance.

Certain recharging materials deteriorate with age, exposure to excessive temperature, and exposure to moisture. Storage of recharge materials for long periods of time should be avoided.

Dry powder used for combustible metal fires (Class D) must not become damp as the powder will not be free flowing. In addition, when dry powder contains sufficient moisture, a hazardous reaction may result when applied to a metal fire.

A-4-5.3.4 Moisture within a non-water type extinguisher creates both a serious corrosion hazard to the extinguisher shell and a probable inoperative extinguisher. Moisture may enter at the following times:

(1) After a hydrostatic test.
(2) When recharging is being performed.
(3) By entering a cylinder when the valve has been removed.

A-4-5.3.5 Dry Ice Converters. In general, carbon dioxide obtained by converting dry ice to liquid will not be satisfactory unless it is properly processed to remove excess water and oil. If dry ice converters are used, the following required steps must be taken:

(a) Employ moisture absorbent cartridges containing silica gel or activated alumina of adequate capacity. These cartridges need to be periodically reactivated by heating at 300°F for two hours in an open vented condition in order to keep them in an absorbent condition. At temperatures below 32°F the cartridges act as a filter and above 32°F they absorb moisture directly. Various tell-tale compositions are available which, by means of color, indicate the degree of absorptivity still available in the gel.

(b) An extra operation is required to minimize the water within the converter. This operation consists of blowing off a short burst of liquid carbon dioxide from the bottom of the converter in order to blow off free water. This operation can only be performed above 32°F. With the converter contents colder than 32°F blowing off is ineffectual.

The preferred source of carbon dioxide for recharging extinguishers is from a low pressure (300 psi at 0° F) supply, either directly or via dry cylinders used as an intermediary means.

A-4-5.3.6 Leak Tests. The leak test required for stored pressure and self-expelling types must be sufficiently sensitive to insure that the extinguisher will remain operable for at least one year. Any tamper indicators or seals must be replaced after recharging.

A-5-5.3 Test Equipment for Non-Compressed Gas Types.

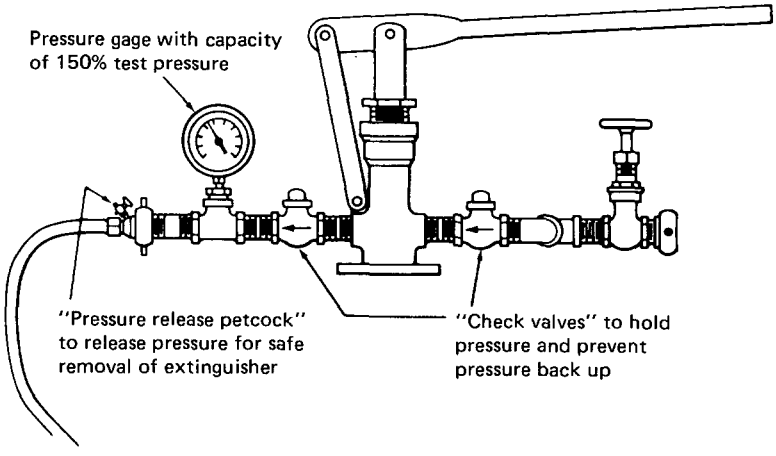


Figure A-5-5.3a. Hydrostatic Hand Pump.

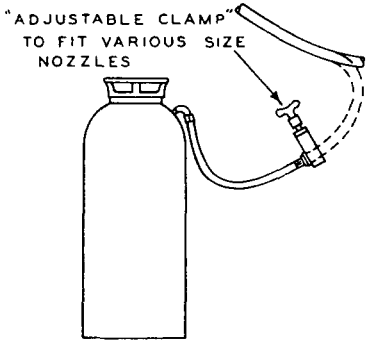


Figure A-5-5.3b. Hydrostatic Testing of Extinguisher Through Hose.

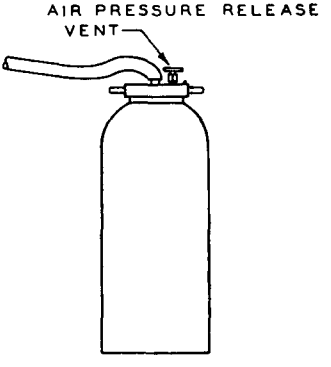


Figure A-5-5.3c. Hydrostatic Testing of Extinguisher with Test Bonnet.

FOR THE FOLLOWING TYPES:

Soda-Acid.
Foam.
Inverting Type Cartridge-Operated Water and/or Anti-Freeze.
Inverting Type Cartridge-Operated Loaded Stream.
Wetting agent.

FOR THE FOLLOWING TYPES:

Stored Pressure Water and/or Anti-Freeze.
Stored Pressure Loaded Stream.
Non-inverting Type Cartridge-Operated Water and/or Anti-Freeze.
Non-inverting Type Cartridge-Operated Loaded Stream.
Dry Chemical.
Dry Powder.
Halon 1211.

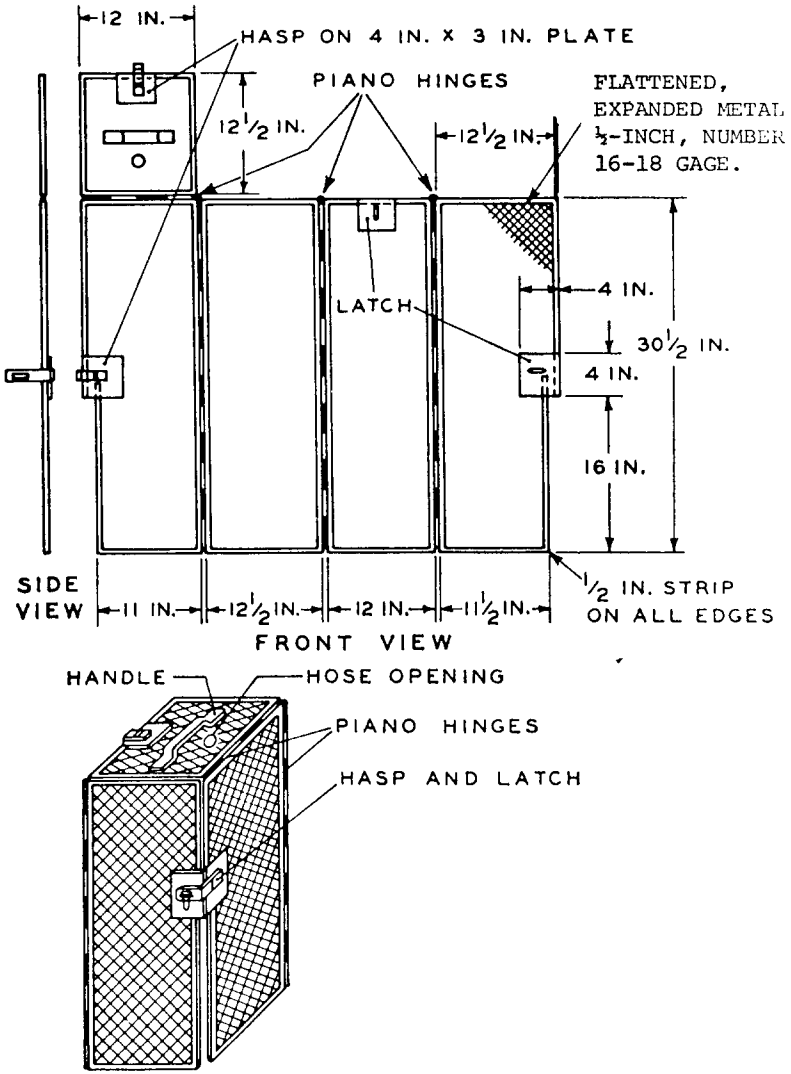


Figure A-5-5.3d.. This illustrates a low-pressure, portable hydrostatic test cage useful to protect service personnel during such operations. It is used for hydrostatic tests of extinguishers of the type described in Section 5-5. It is not used for hydrostatic testing of compressed gas cylinders (see 5-2.4). The cage should not be anchored to the floor during test operations. Such cages can be made by any metal fabricator.

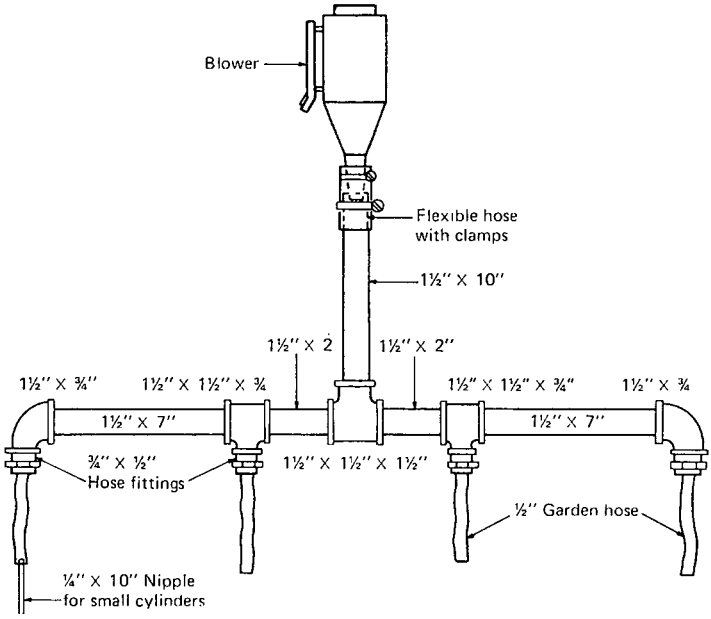


Figure A-5-5.3.2. Cylinder Drying Device.

A-5-6.2 Testing Procedures for Non-Compressed Gas Types.

(a) All valves and internal parts must be removed and the extinguisher emptied.

Exception: On some dry chemical and dry powder extinguishers (cartridge operated), the manufacturer recommends that certain internal parts not be removed.

(b) All dry chemical and dry powder types of extinguishers must have all traces of extinguishing materials removed from inside the shell before filling with water.

(c) On all dry chemical and dry powder extinguishers having an externally mounted gas cartridge for creating discharge pressure, the cartridge (and some cartridge receivers) must be removed and a suitable plug inserted into the shell opening at the point of removal.

(d) On wheeled extinguishers of the soda acid, stored-pressure water, loaded stream, cartridge-operated, or foam types, the discharge nozzle must be removed and the complete remaining assembly, including the hose, then tested.

(e) On all wheeled dry chemical, dry powder, and carbon dioxide extinguishers equipped with a shutoff nozzle at the outlet end of the hose, the hose (complete with couplings but without the discharge nozzle) must be removed and tested separately.

NOTE: To conduct maintenance or a hydrostatic test on wheeled extinguishers equipped with a regulator(s), disconnect the regulator or low pressure hose from the agent container. Test the regulator in accordance with procedures stated in A-4-4.2 of the Maintenance Check List.

(f) On all wheeled stored pressure dry chemical extinguishers, the head assembly is to be removed and be replaced with a suitable test bonnet.

(g) The hose of the hydrostatic test pump is then attached by the flexible connection to the discharge nozzle, hose assembly, test bonnet, or test fitting, as is applicable. In the case of wheeled dry chemical and dry powder extinguishers, procedures and fittings should be those recommended by the manufacturer.

(h) The extinguisher is then placed in the protective test cage or barrier or, in the case of wheeled units, placed behind the protective shield before applying the test pressure.

(i) The water supply to the test pump is to be turned on and the extinguisher then filled to the top of its collar.

(j) For extinguishers tested with their cap in place (*see Figure A–5–5.3b*), the cap must be tightened SLOWLY while the water supply remains open. When all of the entrapped air within the shell has been bled off and after water emerges, the cap must be tightened fully.

(k) For extinguishers tested with a test bonnet or fitting (*see Figure A–5–5.3c*), the bonnet or fitting must be tightened FULLY while the water supply remains open. When all of the entrapped air within the shell has been bled off and after water emerges, the vent must be closed tightly.

(l) Pressure is then applied at a rate-of-pressure rise so the test pressure is reached within one minute. This test pressure is maintained for another full minute. Observations are made at this time to note any distortion or leakage of the extinguisher shell.

(m) If no distortion or leakage is noted and if the test pressure has not dropped, the pressure on the extinguisher shell may be released. The extinguisher is then considered to have passed the hydrostatic test.

(n) All traces of water and moisture must be removed from all dry chemical, dry powder, and Halon extinguishers by use of a cylinder dryer (*see Figure A–5–5.3.2*). If a heated air stream is used, the temperature within the shell must not exceed 150 degrees Fahrenheit.

(o) Any extinguisher shell that fails this hydrostatic test must be destroyed.

A-5-6.3 Testing Procedures — Hose Assemblies.

(a) The discharge nozzle must be removed from the hose assembly without removal of any hose couplings.

(b) For dry chemical and dry powder types, all traces of dry chemical or dry powder must be removed.

(c) The hose assembly is then placed into a protective device, whose design will permit visual observation of the test.

(d) The hose must be completely filled with water before testing.

(e) Pressure then is applied at a rate-of-pressure rise to reach the test pressure within one minute. The test pressure is to be maintained for one full minute. Observations are then made to note any distortion or leakage.

(f) If no distortion or leakage is noted, or the test pressure has not dropped, or the couplings have not moved, the pressure is then to be released. The hose assembly is then considered to have passed the hydrostatic test.

(g) Hose assemblies passing the test must then be completely dried internally. If heat is used for drying, the temperature must not exceed 150 degrees Fahrenheit.

(h) Hose assemblies failing a hydrostatic test must be detroyed.

A-5-6.4.2 Hydrostatic Test Label. Figure A-5-6.4.2 is a guide as to the design of a hydrostatic test label.

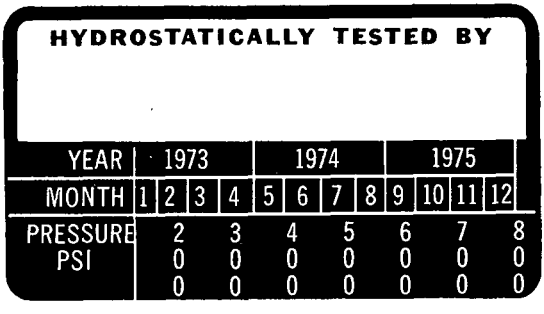


Figure A-5-6.4.2

APPENDIX B

Recommended Markings to Indicate Extinguisher Suitability

B-1 The following recommendations are given as a guide in marking extinguishers, and/or extinguisher locations, to indicate the suitability of the extinguisher for a particular class of fire (see Subsection 1-3.2).

B-1-1 Markings should be applied by decalcomanias, painting or similar methods having at least equivalent legibility and durability.

B-1-2 Where markings are applied to the extinguisher, they should be located on the front of the shell above or below the extinguisher nameplate. Markings should be of a size and form to give easy legibility at a distance of 3 feet.

B-1-3 Where markings are applied to wall panels, etc., in the vicinity of extinguishers, they should be of a size and form to give easy legibility at a distance of 25 feet.

Table B-1-3

1. Extinguishers suitable for "Class A" fires should be identified by a triangle containing the letter "A". If colored, the triangle shall be colored green.*

2. Extinguishers suitable for "Class B" fires should be identified by a square containing the letter "B". If colored, the square shall be colored red.*

3. Extinguishers suitable for "Class C" fires should be identified by a circle containing the letter "C". If colored, the circle shall be colored blue.*

4. Extinguishers suitable for fires involving metals should be identified by a five-pointed star containing the letter "D". If colored, the star shall be colored yellow.*

*NOTE: Recommended colors as described in the Federal Color Standard Number 595† are:

Green — No. 14260
Red — No. 11105
Blue — No. 15102
Yellow — No. 13655

Extinguishers suitable for more than one class of fire may be identified by multiple symbols as described previously.

---

†Available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20401.

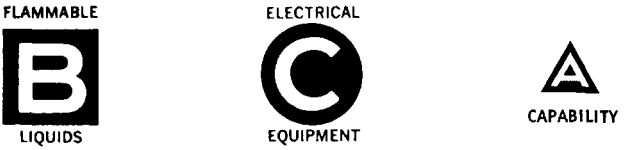
B-1-4

TYPICAL EXTINGUISHER MARKINGS

1. Water

2. Carbon Dioxide, Dry Chemical Bromochlorodifluoromethane and Bromotrifluoromethane

3. Multipurpose Dry Chemical



4. Multipurpose Dry Chemical (Insufficient Agent for "A" Rating)

5. Dry Powder

APPENDIX C

Description of Types of Extinguishers

C-1 General Information.

C-1-1 Many of the extinguishers described in this Appendix are of the stored-pressure or cartridge-operated type. Since the operating characteristics of these two types are similar, regardless of agent used, they are described generally in the following paragraphs.

C-1-2 In stored-pressure models, the expellent gas and extinguishing agent are stored in a single chamber and the discharge is controlled by a shutoff valve or nozzle.

C-1-3 In cartridge-operated models, the expellent gas is stored in a separate cartridge or may be stored in an expellent-gas cylinder (wheeled models), located within or adjacent to the shell containing the extinguishing agent. These extinguishers are actuated by releasing the expellent gas which expels the agent. In most models, the discharge may subsequently be controlled by a shutoff valve or nozzle.

C-2 Dry Chemical Extinguishers.

C-2-1 Dry chemical extinguishers for Class B and C fires.

C-2-1.1 Hand extinguishers of this type are usually available in capacities from 1 to 30 pounds of dry chemical with fire-extinguishing ratings of 1-B:C to 120-B:C. Wheeled dry-chemical extinguishers are usually available in capacities from 50 to 350 pounds of dry chemical having fire-extinguishing ratings from 40-B:C to 480-B:C. The fire-extinguishing agent used is a specially treated material in a finely divided form (sodium-bicarbonate base, potassium-bicarbonate base, potassium-chloride base types, or potassium-bicarbonate urea base types) with components for producing free flow and water repellency. Some formulations are specially treated to be relatively compatible for use with air foam (mechanical foam).

C-2-1.2 These extinguishers may be of the cartridge-operated, stored-pressure, or disposable nonrefillable types. In the last, the agent and expellent gas are confined in a single, nonreusable, factory-filled container. The agent discharge is controlled by a shutoff valve.

C-2-2 Dry chemical extinguishers for Class A, B, and C fires (multipurpose).

C-2-2.1 Hand extinguishers of this type are usually available in capacities from 4 to 30 pounds with fire-extinguishment ratings of 1 to 20-A and 10 to 80-B:C. Wheeled multipurpose extinguishers are usually available in capacities from 50 to 300 pounds with fire-extinguishment ratings of 20 to 40-A and 60 to 240-B:C. The fire extinguishing agents used are specially treated materials in a finely divided form (primarily ammonium-phosphate base) with components for producing free flow and water repellency. Agents used in the extinguishers described in this paragraph differ from those described in C–2–1.1. These extinguishers may be of the cartridge-operated or stored-pressure types.

C-2-2.2 Certain smaller extinguishers, which are charged with multipurpose (primarily ammonium-phosphate base) dry chemical, are rated on Class B and C fires, but have insufficient effectiveness to earn the minimum 1-A rating even though they have some value in extinguishing small Class A fires.

C-3 Fire Pails, Drums with Pails, and Bucket Tanks.

C-3-1 Small water supplies applied with fire pails are of limited fire-extinguishing value. The following combinations are considered as possessing two units of extinguishing potential (2-A) for Class A fires.

C-3-1.1 Five 12-quart water-filled standard fire pails.

C-3-1.2 Six 10-quart water-filled standard fire pails.

C-3-1.3 Drum, cask, or barrel of approximately 55-gallon capacity, with at least three standard fire pails attached.

C-3-1.4 Bucket tanks of 25- to 55-gallon capacity, with standard fire pails (either C-3-1.1 or C-3-1.2 above) immersed therein.

C-3-2 Standard fire pails shall be made of galvanized steel of at least No. 24 USS gage, with a flat bottom welded in place or otherwise suitably reinforced, furnished with stamped ears welded in place and with strong wire bail and loose-fitting metal cover to exclude debris and retard evaporation.

C-3-2.1 Casks, drums, or barrels should preferably be of metal of No. 24 USS gage thickness or better, and should have covers. Fire pails may be hung on sides of the containers or immersed

therein. Pails, casks, drums, or bucket tanks should be painted bright red with the word "FIRE" stenciled in large letters on their outside with black or other contrasting colored paint. If antifreezing solution is used, the surfaces of pails, drums, or bucket tanks should be coated with red lead or oil, followed by a coat of asphalt-base paint — casks should be heavily coated with pitch. (See C-3-2.2.)

C-3-2.2 When located where continued temperatures below 40° F may be encountered, containers should be filled with an antifreeze solution consisting of 75 to 80 percent calcium chloride (free from magnesium chloride) dissolved in water. Table C-3-2.2 shows approximately the temperature at which the solutions will freeze.

Table C-3-2.2

To Make 10 Gallons Antifreeze Solution*

Approximate Freezing Temperature, Degrees F	Water, Gallons	Calcium Chloride, Pounds	Specific Gravity	Degrees Baume
10	9	20	1.139	17.7
0	8½	25	1.175	21.6
−10	8	29½	1.205	24.7
−20	8	33½	1.228	26.9
−30	8	36½	1.246	28.6
−40	8	40	1.263	30.2

*This solution should not be used in extinguishers. Only solutions supplied by the manufacturers should be used in stored-pressure and cartridge-operated water extinguishers and in pump-tank extinguishers where an antifreeze solution is desired (see C-8-2.1 and C-8-3.1).

C-4 Foam Extinguishers.

C-4-1 Hand extinguishers of this type in liquid capacities of 1¼ to 5 gallons have fire extinguishment ratings of 1-A:2-B to 4-A:6-B. Wheeled foam extinguishers have been made in liquid capacities of 17 and 33 gallons (trade designations, 20 and 40 gallons) having fire extinguishment ratings from 10-A:12-B to 20-A:40-B. The chemicals used are sodium bicarbonate with a foam-stabilizing agent dissolved in water in the outer compartment of the extinguisher and aluminum sulphate dissolved in water in the inner compartment. Intermixing of these agents causes foam to be produced and expelled through the discharge hose and nozzle of the extinguisher.