NFPA No.
10

INSTALLATION OF

PORTABLE FIRE EXTINGUISHERS 1965

Sixty Cents

NATIONAL FIRE PROTECTION ASSOCIATION
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National Fire Protection Association
International

Official NFPA Definitions

Adopted Jan. 23, 1964. Where variances to these definitions are found, efforts to eliminate such conflicts are in process.

SHALL is intended to indicate requirements.

SHOULD is intended to indicate recommendations or that which is advised but not required.

APPROVED means acceptable to the authority having jurisdiction. The National Fire Protection Association does not approve, inspect or certify any installations, [illegible] nor does it approve or evaluate testing labora- uipment npliance andards, ıse. The ıctices of equipped with ap- tisfactory

✓ Erratum — NFPA No. 10 — 1965

The Association is embarrassed by a curious and mysterious error in Appendix A, Table A-2200, of the 1965 *Standard for the Installation of Portable Fire Extinguishers* (NFPA No. 10, ASA Z112.1).

The error consists of incorrect data in Table A-2200 for virtually all the carbon dioxide extinguishers and the 4- to 6¼-pound dry chemical extinguishers concerning their "Pre-1955 UL Classification" and their "Approximate Present Classification." The mysterious part is that the proofs approved by the Association for printing were correct; how the data later became "garbled" puzzles even the printer.

We regret any inconvenience that this error may have caused. Correction sheets for the entire page (10-21) are available on request from the Association. All future copies distributed by the Association will have a new page inserted.

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nationally duction of equipment and found

a label of a [illegible] nationally recognized testing laboratory [illegible] nspection of production of labeled equipment or materials, and by whose labeling is indicated compliance with nationally recognized standards or the conduct of tests to determine suitable usage in a specified manner.

AUTHORITY HAVING JURISDICTION: The organization, office or individual responsible for "approving" equipment, an installation, or a procedure.

Units of Measurements

Units of measurements used here are U. S. standard. 1 U. S. gallon = 0.83 Imperial gallons = 3.785 liters. One foot = 0.3048 meters. One inch = 25.40 millimeters. One pound per square inch = 0.06805 atmospheres = 2.307 feet of water. One pound = 453.6 grams.

Standard for the Installation of

Portable Fire Extinguishers

NFPA No. 10-1965

1965 Edition of No. 10

This Standard was prepared by the NFPA Committee on Portable Fire Extinguishers and was adopted at the 1965 Annual Meeting of the Association held in Washington, D.C., May 17-21. It is a complete revision of that portion of the previous NFPA Standard for the Installation, Maintenance and Use of Portable Fire Extinguishers (NFPA No. 10, 1963) which concerned installation (classification, selection, distribution, testing).

Specific attention is called to a companion publication also adopted in 1965 entitled Recommended Good Practice for the Maintenance and Use of Portable Fire Extinguishers (NFPA No. 10A). NFPA No. 10A revises and replaces those portions of the 1963 and earlier NFPA Standards designated NFPA No. 10 dealing with maintenance and operation of portable fire extinguishers. Attention is called to Paragraph 1010 of this Standard for further explanation.

This Standard has been submitted to the American Standards Association and is being processed as this printing is made for approval as an "American Standard." The 1963 NFPA Standard carried the ASA designation Z112.1 — 1964, UDC 614.845.

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. Subsequently the title was changed to First Aid Fire Appliances, and in 1957 to Portable Fire Extinguishers. 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 and 1963. In 1965 the earlier standard was divided into two separate texts as noted above.

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Standard for the Installation of

Portable Fire Extinguishers

NFPA NO. 10 — 1965

ASA Z112.1 — 1965

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.

CHAPTER 1. GENERAL

1000. General Information.

1010. Purpose. This standard is prepared for the use and guidance of persons charged with selecting, purchasing, installing, approving, listing and designing portable fire extinguishing equipment.

NOTE: Two NFPA publications contain essential information about extinguishers. Each is prepared for a specific group of users as indicated below; some users may require both.

NFPA No. 10 — Standard for the Installation of Portable Fire Extinguishers

For persons charged with—

Designing, Listing, Selecting, Purchasing, Installing, Approving — Fire Extinguishers

NFPA No. 10A — Maintenance and Use of Portable Fire Extinguishers

For persons charged with—

Inspecting, Recharging, Maintaining, Testing, Operating — Fire Extinguishers

1020. Scope. The provisions of this standard apply to the installation of portable extinguishing equipment and devices. 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).

NOTE: Such systems are covered by the following NFPA standards: No. 11 — Foam Extinguishing Systems; No. 12 — Carbon Dioxide Extinguishing Systems; No. 13 — Installation of Sprinkler Systems; No. 14 — Installation of Standpipe and Hose Systems; No. 15 — Water Spray Systems for Fire Protection; No. 16 — Foam-Water Sprinkler Systems and Foam-Water Spray Systems; No. 17 — Dry Chemical Extinguishing Systems.

1030. The various types of fire extinguishers are not all equally effective on all kinds of fires. Therefore, consideration shall be given to the class of fire which may occur and the nature of the processes or contents within a building.

1040. The requirements given herein are minimum. Portable fire extinguishers are designed to cope with fire of limited size and are necessary even though the property is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment (see Paragraphs 4110 and 4210).

1050. The methods of operation of the various types of portable extinguishers are generally apparent and are indicated prominently on each extinguisher.

1060. 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 situations or specific occupancies.

1200. General Requirements.

1210. 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.

1220. 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. Some extinguishers should be located near exits from an area.

1221. Extinguishers shall not be obstructed or obscured from view. In large rooms, and in certain locations where visual obstruction cannot be completely avoided, means shall be provided to indicate the location and intended use of extinguishers conspicuously.

1222. If extinguishers intended for different classes of fire are grouped, their intended use shall be marked conspicuously to insure choice of the proper extinguisher at the time of a fire.

1223. 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.

1230. 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.

1231. Extinguishers having a gross weight not exceeding 40 pounds shall be installed so that the top of the extinguisher is not more than 5 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. Where they may be used by women, consideration should be given to mounting the extinguishers at a lower height.

1232. 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 Paragraph 1221).

1233. Extinguishers installed under conditions where they are subject to severe vibration shall be installed in brackets specifically designed to cope with this vibration.

1240. Extinguishers shall be suitable for use within a temperature range of at least plus 40 to plus 120 degrees Fahrenheit.

1241. 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 plus 40 to plus 120 degrees Fahrenheit (see Section 3200 for other conditions influencing the selection of extinguishers).

CHAPTER 2. CLASSIFICATION OF FIRES AND RATING OF PORTABLE FIRE EXTINGUISHERS

2000. General.

2010. The basic types of fires are Classes A, B, C, and D as defined in the following paragraphs.

2011. CLASS A fires are fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.

2012. CLASS B fires are fires in flammable liquids, gases, and greases.

2013. 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.)

2014. CLASS D fires are fires in combustible metals, such as magnesium, titanium, zirconium, sodium, and potassium.

2015. 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.

2100. Classification and Ratings of Fire Extinguishers.

2110. Portable fire extinguishers are classified for use on certain classes of fires and rated for relative extinguishing effectiveness at a temperature of plus 70 degrees Fahrenheit by nationally recognized testing laboratories. This is based upon the preceding classification of fires and the fire-extinguishment potentials as determined by fire tests.

NOTE: 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 fires excluding deep-seated conditions.

CLASS B RATING — Two-inch depth gasoline 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.

2120. The classification consists 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.

2121. For extinguishers rated on Class B fires, the rating NUMERAL is also a proportionate indication of the square-foot area of flammable liquid fire (of appreciable depth) which a trained operator can extinguish (see Paragraph 4310).

NOTE: Appreciable depth is defined as a depth of liquid greater than 1/8 inch.

2122. For extinguishers classified for use on Class C fires, no NUMERAL is used since Class C fires are essentially either Class A or 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 and/or Class B components of the electrical hazard or containing equipment being protected (see Paragraph 4410).

2123. 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.

2124. Extinguishers which are effective on more than one Class of fire have multiple LETTER and NUMERAL-LETTER classifications and ratings.

2125. 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:16-B:C. This indicates the following:

1. It should extinguish approximately twice as much Class A fire as a 2-A (2½-gallon water) extinguisher.
2. It should extinguish approximately sixteen times as much Class B fire as a 1-B extinguisher.
3. It should extinguish approximately 16 square feet of flammable-liquid fire of appreciable depth when used by an operator trained in the use of the specific extinguisher.
4. It is suitable for use on energized electrical equipment.

2200. Extinguishers Listed Prior to 1955.

2210. Extinguishers listed in accordance with rating procedures given in the 1955 and earlier editions of this standard are assigned minimum equivalent ratings, as shown in Appendix A of this standard. (See Paragraphs 4500, A-2200 and Table A-2200).

CHAPTER 3. SELECTION OF EXTINGUISHERS

3000. General Recommendations.

See Paragraph A-3000 and Table A-3000, Appendix A

3010. The selection of extinguishers for a given situation will depend upon 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. In making this selection, Chapter 2 is to be used in determining the classification of the fire and the rating or relative fire extinguishing effectiveness of the extinguishers. The number of extinguishers required is determined by using Chapter 4 (see also Table A3000 in the Appendix, and NFPA No. 10A, Maintenance and Use of Portable Extinguishers).

3020. It should be borne in mind that some extinguishers will be suitable for only one class of hazard or condition while others are suitable for more than one.

3100. Selection By Hazard.

3101. Extinguishers shall be selected for the specific class or classes of hazards to be protected in accordance with the following paragraphs.

3110. Extinguishers for protecting Class A hazards shall be selected from among the following: foam, loaded stream, multipurpose dry chemical and water types.

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 Paragraph 4110.

3120. Extinguishers for protection of Class B hazards shall be selected from the following: bromotrifluoromethane, carbon dioxide, dry chemical, foam, loaded stream, multipurpose dry chemical, and vaporizing liquid.

NOTE 1: Certain sizes of loaded-stream extinguishers are not classified for use on these types of fires.

NOTE 2: Extinguishers with ratings less than 1-B shall not be considered in determining suitability (see Paragraph 4110).

3130. Extinguishers for protection of Class C hazards shall be selected from the following: bromotrifluoromethane, carbon dioxide, dry chemical, multipurpose dry chemical, and vaporizing liquid.

NOTE: 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.

3140. Extinguishers and extinguishing agents for the protection of Class D hazards shall be of types approved for use on the specific combustible-metal hazard. (See Paragraph A-3140, Appendix A).

3141. 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 commercially available metal fire extinguishing agents are discussed in Section 15, Chapter VII of the NFPA Fire Protection Handbook (12th Edition).

3142. 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.

3143. Reference should be made to the manufacturer's recommendations for use and special technique for extinguishing fires in various combustible metals. (See NFPA No. 10A — Maintenance and Use of Portable Fire Extinguishers.)

3150. The selection of extinguishers for other types of hazards may require special extinguishers, extinguishing agents, or techniques (see Paragraph 2015).

3200. Other Conditions of Selection.

3210. Temperature — In the selection of an extinguisher, the ambient temperature to which it will be exposed shall be considered (see Paragraphs 1240 and 1241 and A-3210 in Appendix A).

3220. Gross Weight — In the selection of an extinguisher, the physical ability of the user should be contemplated. For instance, when the probable user of the extinguisher is a woman, the lightest weight extinguisher consistent with the needs of the hazard should be selected.

3230. 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.

3240. Agent Reaction — The possibility of adverse reactions, contamination, or other effects of an extinguishing agent on manufacturing processes and/or equipment should be considered in the selection of an extinguisher.

3250. 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 the terrain. For indoor locations, the size of doorways and passages should be large enough to permit ready passage of the extinguisher.

3260. Vibration — When extinguishers are located on vehicles or in areas where they are subjected to vibration, consideration should be given to the use of special brackets designed to cope with the effects of vibration.

3270. 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.

3280. Miscellaneous — Many other factors should be considered in the selection of an extinguisher, such as inspecting, recharging, maintaining, testing, and operating (see NFPA No. 10A).

3290. Other NFPA standards covering specific situations make special recommendations covering the selection of portable extinguishers (see Paragraph 1060).

3300. Health and Safety Considerations.

3301. 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.

3302. 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. (See NFPA No. 10A.)

3310. Vaporizing liquid extinguishers contain an extinguishing agent which releases toxic vapors at ordinary temperatures and

which produces toxic decomposition products when used on a fire. Thus, toxicity hazards exist in both maintenance and use of these extinguishers.

CAUTION: DO NOT USE EXTINGUISHERS OF THIS TYPE IN SMALL ROOMS, CLOSETS, MOTOR VEHICLES, OR OTHER CONFINED SPACES.

3320. Bromotrifluoromethane extinguishers contain an extinguishing agent (FE1301) which is not toxic in its normal state. However, when applied to a fire, decomposition products may be formed. 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.

3330. 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.

3340. Water-type, loaded stream, and foam extinguishers, and carbon dioxide extinguishers with metal horns, present a shock hazard if used on fires in energized electrical equipment.

3350. 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.

3360. 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.*)

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

CHAPTER 4. DISTRIBUTION OF PORTABLE FIRE EXTINGUISHERS

4000. General Recommendations.

4010. The number of fire extinguishers needed to protect a property shall be determined as outlined herein, considering the area and arrangement of the building or occupancy, the severity of the hazard, the anticipated classes of fires, and the distances to be traveled to reach extinguishers. In addition, the 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. Whenever possible the individual property should be surveyed for actual protecton requirements.

NOTE: 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 patient's 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.

4020. Fire extinguishers shall be provided for the protection of both the building structure, if combustible, and the occupancy hazards contained therein.

4021. Required building protection shall be provided by fire extinguishers suitable for Class A fires.

4022. Occupancy hazard protection shall be provided by fire extinguishers suitable for such Class A, B, C, or D fire potentials as may be present.

4023. Extinguishers provided for building protection may be considered also for the protection of occupancies having a Class A fire potential.

4024. Combustible buildings having an occupancy hazard subject to Class B, and/or Class C fires, shall have a standard complement of Class A fire extinguishers for building protection, plus additional Class B and/or Class C extinguishers. Where fire extinguishers have more than one letter classification (such as 2-A:16-B:C), they may be considered to satisfy the requirements of each letter class.

4030. 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.

4031. 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.

4032. 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.

4033. EXTRA HAZARD — 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 combustibles, and processes such as flammable liquid handling, painting, dipping, etc.

4100. Fire Extinguisher Size and Placement for Class A Hazards.

4110. Minimal sizes of fire extinguishers for the listed grades of hazard shall be provided on the basis of Table 4110. Extinguishers shall be located so that the maximum travel distances shall not exceed those specified in Table 4110.

Table 4110

Type of Hazard	Basic Minimum Extinguisher Rating for Areas Specified	Areas to be Protected per Extinguisher	Maximum Travel Distances to Extinguishers
Light	1-A	3000 sq ft	75 ft
Ordinary	2-A	3000 sq ft	75 ft
Extra	3-A	3000 sq ft	75 ft

4120. The protection requirements specified in Table 4110 may be fulfilled by several extinguishers of lower ratings for ordinary or extra-hazard occupancies, subject to approval by the authority having jurisdiction. Consideration should be given to the number of persons available to operate the extinguishers, the degree of training provided, and the possibility of use by women.

4130. Where the floor area of a building is less than that specified in Table 4110, at least one extinguisher of the minimum size recommended shall be provided.

4140. The protection requirements may be fulfilled with extinguishers of high rating provided the travel distance to such larger extinguishers shall not exceed 75 feet.

4200. Fire Extinguisher Size and Placement for Class B Hazards.

4210. Minimal sizes of fire extinguishers for the listed grades of hazard shall be provided on the basis of Table 4210. Extinguishers shall be located so that the maximum travel distances shall not exceed those specified in Table 4210.

Table 4210

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

4211. Two or more extinguishers of lower rating, except for foam extinguishers, shall not be used to fulfill the protection requirements of Table 4210. Up to three foam extinguishers may be used to fulfill these requirements.

4220. The protection requirements may be fulfilled with extinguishers of higher ratings provided the travel distance to such larger extinguishers shall not exceed 50 feet.

4300. Fire Extinguisher Size and Placement for Class B Fires in Flammable Liquids of Appreciable Depth.

4310. For flammable liquid fires of appreciable depth, (Class B), such as in dip or quench tanks, Class B fire extinguishers shall be provided on the basis of one numerical unit of Class B extinguishing potential per square foot of flammable liquid surface of the largest tank hazard within the area.

4311. Two or more extinguishers of lower ratings, except for foam extinguishers, shall not be used in lieu of the extinguisher required for the largest tank. Up to three foam extinguishers may be used to fulfill these requirements.

4312. Where approved automatic fire protection devices or systems have been installed for a flammable liquid hazard, additional portable Class B fire extinguishers, as required in Paragraph 4310, may be waived.

4320. 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 be individually protected if the specified travel distances in Paragraphs 4210 and 4220 are exceeded. Likewise, extinguishers in the prox-

imity of a hazard shall be carefully located so as to be accessible in the presence of a fire without undue danger to the operator.

4400. Fire Extinguisher Size and Placement for Class C Hazards.

4410. 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.

4500. Distribution of Extinguishers Listed Prior to 1955.

4510. 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 present minimum equivalent ratings should be used as given in Table A-2200 of Appendix A.

CHAPTER 5. INSPECTION, MAINTENANCE, AND HYDROSTATIC TESTS

5000. This chapter is concerned with the rules governing inspection, maintenance, and testing of extinguishers; proper maintenance being of prime importance in insuring operation at the time of a fire. The owner or occupant of a property in which extinguishers are located shall be responsible for such inspection, maintenance, and testing.

5001. For details of conducting needed inspections, proper maintenance operations, and required tests, see NFPA No. 10A — Maintenance and Use of Portable Fire Extinguishers.

5100. Inspection.

5110. Extinguishers shall be inspected monthly, or at more frequent intervals when circumstances require, to ensure they are in their designated places, to ensure they have not been actuated or tampered with, and to detect any obvious physical damage, corrosion, or other impairments.

5120. Any extinguishers showing defects shall be given a complete maintenance check.

5200. Maintenance.

5210. At regular intervals, not more than one year apart, or when specifically indicated by an inspection, extinguishers shall be thoroughly examined and/or recharged or repaired to insure operability and safety, or replaced as needed.

5220. On properties where extinguishers are maintained by the occupant, a supply of recharging materials should be kept on hand. These materials shall be those furnished by the manufacturer of the extinguisher which is to be recharged, i.e., recharges of one manufacturer shall not be used in extinguishers manufactured by another company.

NOTE: Certain recharging materials deteriorate with age, exposure to excessive temperature, and/or moisture. Thus, the storage of such recharging materials for long periods of time should be avoided.

5221. Extinguishers removed from the premises to be recharged shall be replaced by spare extinguishers during the period they are gone.

5222. Pails or drums of powder-extinguishing agents for scoop or shovel application to metal fires shall be kept full at all times. Particular care should be taken to keep the powder dry.

NOTE: Damp and wet extinguishing powder will not be free flowing and, if it contains sufficient moisture, can result in hazardous reaction if applied to a metal fire.

5230. Each extinguisher shall have a durable tag securely attached to show the maintenance or recharge date and the initials or signature of the person who performs this service.

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

5300. Hydrostatic Tests.

5310. The methods of conducting hydrostatic tests are described in NFPA No. 10A — Maintenance and Use of Portable Fire Extinguishers.

5311. IF, AT ANY TIME, AN EXTINGUISHER SHOWS EVIDENCE OF CORROSION OR MECHANICAL INJURY, IT SHALL BE SUBJECTED TO A HYDROSTATIC PRESSURE TEST, OR REPLACED.

5320. At regular intervals, extinguishers shall be hydrostatically tested as required in the following paragraphs, except where shorter intervals are specified on the extinguisher nameplate.

5321. Hydrostatic Test Interval for Extinguishers.

Extinguisher Type	Test Interval, Year
Soda-Acid	5
Cartridge-Operated Water and/or Antifreeze	5
Storage-Pressure Water and/or Antifreeze	5
Wetting Agent	5
Foam	5
Loaded Stream	5
Stored-Pressure Vaporizing Liquid	5
Dry Chemical Extinguishers with Stainless Steel, Aluminum Shells	5
Dry Chemical Extinguishers with Brass, Mild-Steel Shells	12
Carbon Dioxide Extinguishers	12
Bromotrifluoromethane	12
Dry Powder Extinguishers for Metal Fires	12

NOTE: Cylinders under jurisdiction of the Interstate Commerce Commission or the Board of Transport Commissioners may require hydrostatic testing at more frequent periods.

5322. Nitrogen cylinders (or other cylinders used for inert-gas storage), such as found on wheeled extinguishers, shall be tested at a 12-year interval.

NOTE: Cylinders under jurisdiction of the Interstate Commerce Commission or the Board of Transport Commissioners may require hydrostatic testing at more frequent periods.

5323. On those extinguishers which are equipped with shutoff valves at the outlet end of the hose (except carbon dioxide), a hydrostatic test shall be performed on the hose and couplings (excluding nozzles) at a test pressure of 300 psi and a test interval equivalent to the unit on which the hose is installed.

5324. Carbon dioxide hose shall be tested at a pressure of 1250 psi.

5325. Hydrostatic tests are not required on fire pails, pump-type water and/or antifreeze extinguishers, pump-type vaporizing-liquid extinguishers, and factory-sealed disposable (nonrefillable) containers. If such an extinguisher or water pail shows evidence of corrosion or mechanical injury, it may be unsafe or unsuitable for further use and shall be replaced with a new unit.

5326. The hydrostatic test date shall be recorded on a record tag of metal or equally durable material, or a suitable metallized decal which shall be affixed (by a heatless process) to the shell of an extinguisher which favorably passes the hydrostatic test. The record tag shall contain the following information: Date of test, test pressure, name or initials of person or agency making the test.

NOTE: The hydrostatic test date should not be stamped with a hammer and metal stamps on the extinguisher shell because the shell may be weakened by such stamping operation. On certain cylinders, it is permissible to stamp the hydrostatic test date as set forth in the Interstate Commerce Commission or the Board of Transport Commissioners' regulations.

5327. For extinguishers subjected to an original factory test pressure of 350 psi or greater, the test pressure shall be 75 per cent of the factory test pressure (as noted on the extinguisher name plate), but in no case less than 300 psi. For extinguishers subjected to an original factory test pressure of less than 350 psi, the test pressure shall be 75 per cent of the factory test pressure. Pressure shall be applied at a rate of rise to reach the test pressure in approximately 1 minute, and the pressure shall be held for 1 minute, after which it shall be released.

5328. Carbon dioxide extinguishers, nitrogen cylinders, and other cylinders or cartridges used for the storage of inert, compressed gases shall be hydrostatically tested in accordance with the requirements of the Interstate Commerce Commission or the Board of Transport Commissioners.

NOTE: Such apparatus and procedures are set forth in the regulations of the Interstate Commerce Commission, Code of Federal Regulations, Title 49, Parts 71 to 90, and are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20025, at a cost of $6.25.

In Canada the corresponding information is set forth in the "Board of Transport Commissioners of Canada Regulations Governing the Transportation of Dangerous Articles by Rail," available from the Queen's Printer, Ottawa, Ontario, at a cost of $6.00.

5329. Extinguisher shells, cartridges, or cylinders which show leakage or permanent distortion in excess of specified limits, or which rupture, shall be removed from service.

APPENDIX A

A-2200. The method of classifying extinguishers used in the 1955 and earlier editions of NFPA No. 10 differs from the method presently used. Columns 3 and 4 of Table A-2200 enable approximate evaluation of older extinguishers in terms of the present method of classification.

(a). Under the present method 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 4-B:C, 6-B:C, or 8-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 to the new method of classification is not possible.

(b). Whenever fire extinguishers are found with the present classification on the label, Table A-2200 should not be used. The classification is usable directly in the application of Chapter 4, Distribution of Units, of this standard.

(c). Whenever fire extinguishers are found with the old classification on the label, use this table for approximate conversion and use the resulting classification value in applying Chapter 4 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 present method is "4-B, C" and this is used in applying the requirements of Chapter 4.

Table A-2200

Conversion of Extinguisher Classification

Extinguishing Agent	Extinguisher Type and Size	Pre-1955 UL Classification	Approximate Present Classification
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.

Extinguishing Agent	Extinguisher Type and Size	Pre-1955 UL Classification	Approximate Present Classification
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	4A, 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
Vaporizing Liquid (Carbon Tetrachloride Base)	1, 1¼, 1½ quart (pump)	B-2, C-2	½-B, C†
	1, 1½, 2, 2½ quart (pressure)	B-2, C-2	½-B, C†
	1, 3½ gallon (pressure)	B-2, C-1	1-B, C
Vaporizing Liquid (Chlorobromomethane)	1 and 1½ quart (pressure)	B-2, C-1	1-B, C
	1 gallon (pressure)	B-2, C-1	2-B, C
Carbon Dioxide	6 or less pounds of carbon dioxide	B-2, C-1	2-B, C
	7½ pounds of carbon dioxide		
	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	1-B, C	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-1, C-1	12-B, C
		B, C	4-B, C
Dry Chemical	4 to 6¼ pounds of dry chemical	B-2, C-2	B-2, C-2
	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: Carbon dioxide extinguishers with metallic horns will not carry any "C" classification.

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

A-3000. The folowing appendix material (Table A-3000) summarizes the characteristics of extinguishers and may be used as an aid in selecting extinguishers in accordance with Chapter 3. 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.

Table A-3000

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	Present UL and ULC Classification
Water	Cartridge and stored pressure	1¼ gal	30-40 ft	30 sec	5 yr	Yes	1-A
	Cartridge and 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 (Anti-freeze-	Cartridge and stored pressure	1¼, 1½ gal	30-40 ft	30 sec	5 yr	No	1-A
Calcium	Cartridge and stored pressure	2½ gal	30-40 ft	1 min	5 yr	No	2-A
Chloride)	Cartridge and stored pressure	33 gal (wheeled)	50 ft	3 min	5 yr	No	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

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	Present UL and ULC Classification
Water (Wetting Agent)	Cartridge and stored pressure	10 gal (wheeled)	35 ft	1 min	5 yr	Yes	6-A
	Cartridge and stored pressure	20 gal (wheeled)	35 ft	1 ½ min	5 yr	Yes	10-A
	Cartridge and stored pressure	45 gal (wheeled)	35 ft	2 min	5 yr	Yes	25-A
	Cartridge and stored pressure	50 gal (wheeled)	35 ft	3 min	5 yr	Yes	30-A
Loaded Stream	Cartridge and stored pressure	1 gal	30-40 ft	30 sec	5 yr	No	1-A
	Cartridge and stored pressure	1 ¾ gal	30-40 ft	45 sec	5 yr	No	2-A:1/2-B†
	Cartridge and stored pressure	2 ½ gal	30-40 ft	1 min	5 yr	No	2 to 3-A:1-B to 2-B
	Cartridge and stored pressure	17 gal (wheeled)	50 ft	3 min	5 yr	No	10-A
	Cartridge and stored pressure	33 gal (wheeled)	50 ft	3 min	5 yr	No	20-A
Foam	Chemically generated expellent	1 ¼, 1 ½ gal	30-40 ft	40 sec	5 yr	Yes	1-A:2-B
	Chemically generated expellent	2 ½ gal	30-40 ft	1 ½ 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

Table A-3000 Continued

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	Present UL and ULC Classification
Carbon Dioxide††	Self expellent	2 to 5 lb	3 to 8 ft	8 to 30 sec	12 yr	No	1-B:C
	Self expellent	2 to 15 lb	3 to 8 ft	8 to 30 sec	12 yr	No	2 to 4-B:C
	Self expellent	10 to 26 lb	3 to 8 ft	10 to 30 sec	12 yr	No	6 to 12-B:C
	Self expellent	50 to 100 lb (wheeled)	3 to 10 ft	10 to 30 sec	12 yr	No	10 to 40-B:C
Dry Chemical (Sodium bicarbonate)	Cartridge and stored pressure	1 lb	5 to 8 ft	8 to 10 sec	5 or 12 yrs	No	1-B:C
	Cartridge and stored pressure	1 ½ to 2 lb	5 to 8 ft	8 to 12 sec	5 or 12 yrs	No	2-B:C
	Cartridge and stored pressure	2 ½ to 10 lb	5 to 20 ft	8 to 20 sec	5 or 12 yrs	No	4-B to 16-B:C
	Cartridge and stored pressure	12 to 30 lb	5 to 20 ft	10 to 25 sec	5 or 12 yrs	No	12-B to 20-B:C
	Nitrogen cylinder or stored pressure	75 to 350 lb (wheeled)	15 to 45 ft	20 to 105 sec	12 yrs	No	40-B to 80-B:C

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	Present UL and ULC Classification
Dry Chemical (Potassium Bicarbonate)	Cartridge and stored pressure	2½ to 4½ lb	5 to 8 ft	8 to 10 sec	5 or 12 yrs	No	8-16-B:C
	Cartridge and stored pressure	9 to 30 lb	5 to 20 ft	8 to 25 sec	5 or 12 yrs	No	20-B:C
	Nitrogen cylinder and stored pressure	125 to 300 lb (wheeled)	15 to 45 ft	30 to 60 sec	12 yrs	No	160-B to 240-B:C
Dry Chemical (Multipurpose)	Cartridge and stored pressure	2½ to 5 lb†††	5 to 12 ft	8 to 12 sec	5 or 12 yrs	No	4-12-B:C
	Cartridge and stored pressure	8½ to 25 lb	5 to 20 ft	10 to 25 sec	5 or 12 yrs	No	1-A:12-B:C to
	Nitrogen cylinder and stored pressure	125 to 300 lb (wheeled)	15 to 45 ft	30 to 60 sec	12 yrs	No	4-A:20-B:C 20-A:80-B:C to 40-A:160-B:C
Dry Chemical (Foam Compatible)	Cartridge and stored pressure	2½ to 5 lb	5 to 20 ft	8 to 10 sec	5 or 12 yrs	No	4-8-B:C
	Cartridge and stored pressure	10 lb	5 to 20 ft	10 to 25 sec	5 or 12 yrs	No	12 to 16-B:C
	Cartridge and stored pressure	20 to 30 lb	5 to 20 ft	10 to 25 sec	5 or 12 yrs	No	20-B:C
	Nitrogen cylinder and stored pressure	150 to 350 lb (wheeled)	15 to 45 ft	20 to 150 sec	12 yrs	No	80 to 120-B:C

Table A-3000 Continued

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	Present UL and ULC Classification
Vaporizing Liquid (Carbon Tetrachloride Base)	Pump and stored pressure	1 qt to 1 gal	20 to 30 ft	45 to 150 sec	5 yrs	No	½ to 2-B:C†
	Pump and stored pressure	1½ to 3½ gal	20 to 30 ft	45 to 150 sec	5 yrs	No	6-B:C
Vaporizing Liquid (Chlorobromomethane base)	Pump and stored pressure	1 qt to 1 gal	20 to 30 ft	45 to 150 sec	5 yrs	No	1 to 8-B:C
	Pump and stored pressure	1½ to 3½ gal	20 to 30 ft	45 to 150 sec	5 yrs	No	12-B:C
Bromotrifluoromethane	Self expelling	2½ lb	4 to 6 ft	8 to 10 sec	12 yrs	No	4-B:C

† — Extinguishers with fractional ratings do not meet the requirements of this standard.

†† — Carbon-dioxide extinguishers with metallic horns do not carry a "C" classification.

††† — Small multipurpose dry-chemical extinguishers do not carry an "A" classification.

A-3140. 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 or 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 VII of the NFPA Fire Protection Handbook (12th Edition).

Calcium Chloride Antifreeze Solutions for Fire Pails, Drums, and Bucket Tanks

A-3210. When located where continued temperatures below 40°F may be encountered, containers should be filled with an antifreeze solution consisting of 75 to 80 per cent calcium chloride (free from magnesium chloride) dissolved in water. Table A-3210 shows approximately the temperature at which the solutions will freeze.

Table A-3210

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

NOTE: Calcium chloride solutions mixed in accordance with the above table should not be used in extinguishers as they constitute a severe corrosion problem.

APPENDIX B

Recommended Markings to Indicate Extinguisher Suitability

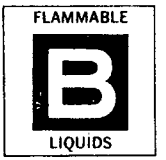
The following recommendations are given as a guide in marking extinguishers, and/or extinguisher locations, to indicate the suitability of the extinguisher for a particular class of fire (see Paragraph 2100).

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

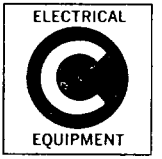
Where markings are applied to the extinguisher, they should be located on the front of the shell above or below the extinguisher nameplate. Markings should be of a size and form to give easy legibility at a distance of 3 feet.

Where marking 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.

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.*

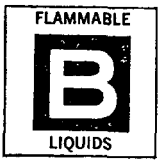
*NOTE: Recommended colors as described in the Federal Color Standard Number 595† are:

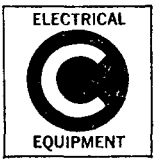
Green	— No. 14260
Red	— No. 11105
Blue	— No. 15102
Yellow	— No. 13655

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

Typical Markings

1. Soda-Acid Extinguisher





2. Carbon Dioxide Extinguisher

†Available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., Price: $2.25 per copy.