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NFPA 303 Marinas and Boatyards 1990 Edition

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Policy Adopted by NFPA Board of Directors on December 3, 1982

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

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

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NFPA 303

Fire Protection Standard for

Marinas and Boatyards

1990 Edition

This edition of NFPA 303, *Fire Protection Standard for Marinas and Boatyards*, was prepared by the Technical Committee on Marinas and Boatyards, released by the Correlating Committee on Marine Fire Protection, and acted on by the National Fire Protection Association, Inc. at its Annual Meeting held May 21-24, 1990 in San Antonio, TX. It was issued by the Standards Council on July 20, 1990, with an effective date of August 17, 1990, and supersedes all previous editions.

The 1990 edition of this document has been approved by the American National Standards Institute.

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

Origin and Development of NFPA 303

This first NFPA standard on the subject of marinas and boatyards was adopted by the Association in 1940 on recommendation of the Committee on Boat Basins and Municipal Marinas of the then NFPA Marine Section. The following year the scope of the recommendations was enlarged to include boat service and storage yards. Minor amendments were adopted in 1952 and 1957. A revised edition was produced in 1960 by the Committee on Motor Craft and Marinas. In 1961, the Sectional Committee on Marinas and Boatyards was established to deal exclusively with these matters. A complete revision of NFPA 303 was developed and adopted in 1963, amendments to which were adopted in 1966, 1975, and 1984. The 1986 edition of NFPA 303 is a complete revision which incorporates boat condominiums and multiple berthing facilities. The electrical and fire protection requirements have been updated. A complete revision of NFPA 303 was developed and adopted in 1986. The 1990 edition of NFPA 303 contains amendments to the previous edition.

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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.

NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

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

Information on referenced publications can be found in Chapter 7 and Appendix C.

Chapter 1 Introduction

1-1 Scope. This standard applies to marinas, boatyards, yacht clubs, and marina facilities associated with condominiums, boat condominiums, and multiple berthing facilities at multiple-family residences. Single-family residences with facilities for private, noncommercial use are not intended to be covered by this standard but are encouraged to utilize it as a guideline. This standard and other standards as designated by the authority having jurisdiction may apply.

1-2 Purpose. This standard is intended to provide a minimum acceptable level of safety to life and property from fire and electrical hazards at establishments used for the construction, repair, storage, launching, berthing, or fueling of small craft and construction of boats in conjunction with the foregoing.

1-3 Foreword. Management is responsible for planning and implementing a program for fire prevention and fire protection, and its attitude toward such matters will inevitably be reflected in the attitudes and behavior of employees and boat owners.

Electrical wiring on and about piers and floats and/or connected to small craft present particular hazards from both fire and electrical safety considerations. Particular attention shall be paid to assuring an adequate and safe electrical installation in conformance with NFPA 70, *National Electrical Code®*.

Despite the most careful vigilance and effort, fire has many opportunities to strike active boat servicing establishments. Fiberglassing, woodworking, paint removing and spraying, welding and cutting, handling gasoline and other highly flammable liquids, etc., may be continuing operations, and all are extra hazardous. Further, the facilities are frequently in locations quite isolated from public protection. Hence, the selection, location, and maintenance of the proper type of fire fighting equipment is essential.

There are many hazards associated with the storage of boats, mooring of boats at piers or slips, and use of fueling facilities. These hazards require careful management attention for adequate control. Since these management practices affect customers and members of the public using their own property, the management problems require solutions different from those affecting employees.

1-4 Definitions. Additional definitions specific to certain chapters of this standard are contained within the appropriate chapter.

Approved. Acceptable to the "authority having jurisdiction."

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

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

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

Berth. The mooring space for a boat alongside a bulkhead, pier, between piles, or in a dock. (*See also Slip.*)

Boatyard. Generally, as described in Section 1-2; i.e., establishments used for the construction, repair, storage, launching, berthing, or fueling of small craft. Such establishments are usually, but not necessarily, adjacent to or at the water's edge. The term boatyard is most frequently associated with storage and repair as primary activities. (*See also Marina.*)

Building. A roofed-over structure with or without enclosed walls.

Bulkhead. A fixed pier or wall back-filled to be continuous with the land.

Combustible Liquid. A liquid having a flash point at or above 100°F (37.8°C).

Combustible Liquids shall be subdivided as follows:

Class II liquids shall include those having flash points at or above 100°F (37.8°C) and below 140°F (60°C).

Class IIIA liquids shall include those having flash points at or above 140°F (60°C) and below 200°F (93°C).

Class IIIB liquids shall include those having flash points at or above 200°F (93°C).

Covered Slip. A building that contains slips.

Covered Storage. Seasonal storage inside buildings.

Cranes. Any of several fixed or mobile devices by which a boat is lifted.

Dock. A body of water between two piers.

Dry Storage. Storage of boats on land. Dry-stored boats may be stored on trailers, cradles, individual supporting structures, racks, etc., outside or in buildings.

Flammable Liquid. A liquid having a flash point below 100°F (37.8°C) and having a vapor pressure not exceeding 40 lbs per sq in. (absolute) (2068 mm Hg) at 100°F (37.8°C) shall be known as a Class I liquid.

Class I liquids shall be subdivided as follows:

Class IA shall include those having flash points below 73°F (22.8°C) and having a boiling point below 100°F (37.8°C).

Class IB shall include those having flash points below 73°F (22.8°C) and having a boiling point at or above 100°F (37.8°C).

Class IC shall include those having flash points at or above 73°F (22.8°C) and below 100°F (37.8°C).

Floating Piers. Piers with inherent flotation that rise and fall with tidal, river, or lake water level.

Fixed Piers. Piers on piles that are at a fixed height with respect to land.

Fueling Station or Pier. Designated area for taking on or dispensing fuel.

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

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

NOTE: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The "authority having jurisdiction" should utilize the system employed by the listing organization to identify a listed product.

Marina. Similar to boatyard but always includes berthing facilities, slips, or rack storage. It may include fueling facilities at a fueling pier. It is normally associated with active use of boats rather than with storage and repair (often called boat basin). (*See also Boatyard.*)

Marine Railway. Tracks extending at least to the water's edge with hoisting mechanism for launching and recovering boats.

Monorail. Overhead track and hoist system for moving material around the boatyard or moving and launching boats.

Mooring(s). Any place where a boat is wet stored or berthed. Locally, may be used to differentiate between permanent anchored moorings and slips.

Pier. A structure extending over the water and supported on piles (fixed) or supplied with flotation and secured by piles or anchors (floating).

Seasonal Storage. Storage of boats for extended periods when not in use; i.e., winter storage.

Shall. Indicates a mandatory requirement.

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

Slip. A berth that is directly accessible from land, arranged to permit access to each boat from a fixed or floating pier.

Stack Storage. Storage of boats in racks at least two tiers high. Boats are placed in the racks using a forklift or other mobile crane.

Standpipe System. An arrangement of piping, valves, hose connections, and allied equipment installed in a building or structure with the hose connections located in such a manner that water can be discharged in streams or spray patterns through attached hose and nozzles, for the purpose of extinguishing a fire and so protecting a building or structure and its contents in addition to protecting the occupants. This is accomplished by connections to water supply systems or by pumps, tanks, and other equipment necessary to provide an adequate supply of water to the hose connections.

Wet Storage. Boats stored afloat in a completely or partly laid-up status.

Chapter 2 Management

2-1 General. While design of the marina or boatyard can reduce certain hazards, the fact remains that proper management of the facility or boatyard is an important element for reducing the risk of fire, electrical, and other hazards that threaten life and property. The following guidelines are specifically addressed to those management functions where implementation can significantly reduce the specific and overall hazard.

2-2 Record Keeping. The marina or boatyard management shall adopt procedures to show that facility and equipment comply with the requirements of this standard and to show that maintenance and inspection functions are carried out as specified in this standard.

2-3 Cleanliness. The marina or boatyard facility shall be maintained at all times in a state of general order and cleanliness. The following list contains examples of conditions that shall be eliminated or controlled:

(a) Uncontained trash, wood scraps, sawdust, rags, etc.

(b) Used engines and engine parts, miscellaneous metal, unused machinery, and similar items placed other than in a specifically designated and fenced area.

(c) Unswept floors, particularly in shop areas.

(d) Open paint cans or other flammable or combustible liquids.

(e) Spills of oil, paint, or fuel.

(f) Unmowed grass or weeds, brush, dead or dying trees, and other debris.

2-3.1 Covered metal containers approved for the purpose shall be provided at convenient locations in shop areas used for boat construction, service, or repair for storage of oily and soiled rags and other refuse subject to spontaneous combustion. These containers shall be clearly marked as to their purpose and the contents disposed of at least daily, and in a safe manner.

2-3.2 Separate metal containers shall be provided in shop areas used for boat construction, service, or repair for storage of sawdust, wood chips, and other residue, and trash that is not readily subject to spontaneous combustion. These containers shall be emptied at least daily.

2-3.3 Shop floors shall be swept at least once a day, and with greater frequency as necessary, to prevent accumulation of easily ignited residue such as sawdust, wood chips, scraps of fiberglass reinforced plastic (FRP) materials, etc., and to prevent accumulation of metal chips and other residue that presents hazards including fire hazards.

2-3.4 Where tar paper, roofing paper, or similar floor covering is used for floor protection in shops where FRP work takes place, the floor covering shall be promptly removed and properly disposed of at the end of the specific job or on a regular schedule.

2-3.5 Covered containers shall be provided throughout the facility, including locations convenient to moored boats, for garbage and trash. These containers shall be located in areas where ignition of contents will not pose a hazard to the surroundings. Emptying and cleaning of these containers shall be performed regularly.

2-3.6 Smoking shall be prohibited and "NO SMOKING" signs shall be posted in all areas where fuels and other flammable liquids are stored or dispensed, in all boat storage areas, in battery rooms, and in other such locations as management or the authority having jurisdiction may designate.

2-4 Maintenance. A maintenance program that requires periodic inspection, testing, and operation of fire fighting equipment and systems, and that assures safe access to all parts of the facility for fire fighting personnel, shall be adopted.

2-4.1 All fire fighting equipment and systems shall be inspected and tested at regular intervals. As part of this requirement, fire extinguishers shall be inspected at least annually and provided with a tag showing the last date of inspection and shall be emptied at the end of their service period, preferably as part of a training exercise (*see Section 2-5*). Similarly, hoses shall be unrolled, inspected, and tested (in accordance with the manufacturer's instructions) at least once a year.

2-4.2 Walkways, piers, access roads, and other parts of the facilities shall be maintained free of obstructions at all times so as to provide safe and reasonable access to all parts of the facility by fire fighting personnel and equipment.

2-5 Employee Training. The initial minutes are the most vital in fighting a fire. In order to assure effective application of the available fire fighting equipment, it is essential that employees of the facility be trained in their use. This can only be achieved through regular training and practice. The interest taken by management through active leadership of and participation in the training of their personnel in fire protection duties will have the effect of bringing and keeping all employees up to a high standard of responsibility relative to both fire prevention and fire protection.

2-5.1 Practice drills shall be held at frequent intervals, preferably once a month and at a minimum of twice a year.

2-5.2 All employees shall be given instruction in the procedures for response to a fire alarm, in reporting a fire to the proper authorities (and to designated facility employees), and in such matters as location of fire hydrants.

2-5.3 Selected employees shall be given training in the use of fire fighting equipment such as portable pumps, standpipe systems, wheel mounted extinguishers, auxiliary water sources, etc.

2-5.4 All employees, including office personnel, shall be given training in the use of portable fire extinguishers and hoses in the fighting of fires.

2-6 Fire Department Liaison. The local fire department shall be encouraged to visit the facility annually to become acquainted with every part of the plant and to conduct employee training sessions. Management shall assist the fire department in prefire planning for:

(a) Entries and access routes for equipment within the premises.

(b) Location, construction, use, and accessibility of all buildings and all their subdivisions including basements, storage lockers, etc.

(c) Location and extent of outside working areas.

(d) Location and means of access to both dry and wet boat-storage areas.

(e) Type and capacity of water lines on piers and walkways, including all points where connection of hydrant or pumper supplies can be effected.

(f) Types and capacities of facility equipment, including work or tow boats, portable pumps, pier-mounted hose cabinets, all portable fire extinguishers, etc.

(g) Voltages and capacities of electrical systems, and location of electrical disconnecting means.

2-7 Watch Service. A watch service has been shown to be one of the most important means for early detection of a fire during hours when marina or boatyard personnel are not working, and is required under certain circumstances in 5-2.3(d).

2-7.1 If a watch person is employed, he/she shall be physically active, have good eyesight and hearing, and have a good record of health and sobriety. It is particularly important that the watch person have a reasonable familiarity with boats.

2-7.2 A watch person's route shall be laid out to include every important and potentially hazardous area within the premises. These areas shall be incorporated in a recognized watch person's recording system such as a portable watch clock or a computerized reporting system. The watch person's first round shall consist of a complete inspection immediately at the close of the working day. Subsequent rounds shall be scheduled so that the interval between visiting each area shall not exceed one hour.

2-8 Boat Owners and Guests. A high percentage of fire, electrical, and other safety violations in marinas and boatyards are directly attributable to the boat owners and guests, whether aboard their boats or working on boats in storage. Management control is possible only if firm rules and regulations are published and provided to permanent or transient owners and guests. The individual chapters of this standard include minimum procedures for the management of this aspect of the marina's or boatyard's operation.

Chapter 3 Electrical Wiring and Equipment

3-1 General. Electrical systems and electrical equipment in the marina and boatyard require special consideration because of the existence of some, or all, of the following conditions in these locations:

(a) locations are wet or continuously damp, and are exposed to rain, wind-driven spray, and atmospheric moisture;

(b) locations are exposed to excessively high or low temperatures;

(c) locations are subject to flooding by abnormally high water;

(d) locations in which flammable or combustible liquids or gases are stored, dispensed, or used;

(e) locations in which electrical equipment and facilities are used by persons not under the control of the management, many of whom are unfamiliar with the possible hazards associated with such use, and the means to avoid them. Those persons need to be protected from electrical hazards when they are on the land, on boats, in storage or repair facilities in the water, or going from one to the other.

(f) locations where boats are moved to and from the water, and to and from storage or repair stations;

(g) locations are subject to movement including mechanical shock and vibration, e.g., floating pier.

3-2 National Electrical Code. NFPA 70, *National Electrical Code*, provides basic provisions to be observed in the design, selection, and installation of electrical wiring and equipment. The recommendations set forth herein supplement and relate the requirements of NFPA 70, *National Electrical Code*, to the specific conditions and combinations of conditions found in marinas and boatyards.

3-3 Listed or Labeled. All electrical materials, devices, appliances, fittings, and other equipment shall be listed or labeled by a qualified testing agency and shall be connected in an approved manner when installed.

3-4 Wet Location. In addition to the areas defined in Article 100 of NFPA 70, *National Electrical Code*, a wet location is considered to be all interior and exterior areas that are located at or below the electrical datum plane, which is defined as follows:

(a) In land areas subject to tidal fluctuation, the electrical datum plane is a horizontal plane 2 ft (0.606 m) above the highest tide level for the area occuring under normal circumstances, i.e., highest high tide.

(b) In land areas not subject to tidal fluctuation, the electrical datum plane is a horizontal plane 2 ft (0.606 m) above the highest water level for the area occurring under normal circumstances.

(c) The electrical datum plane for floating piers and landing stages that are (a) installed to permit rise and fall response to water level, without lateral movement, and (b) that are so equipped that they may rise to the datum plane established for 3-4(a) or 3-4(b) is a horizontal plane 30 in. (0.762 m) above the water level at the floating pier or landing stage and a minimum of 12 in. (0.305 m) above the level of the deck.

3-4.1 A bench mark indicating the electrical datum plane of the land area shall be permanently located on shore in the marina or boatyard.

3-4.2 The electrical datum plane for practical reasons is not based on water levels occurring during unusual circumstances caused by exceptional weather conditions such as hurricanes or floods or the like. During such circumstances it is expected that operation of the marina or boatyard would be discontinued and the electrical services would be disconnected from the public utility.

3-5 Power Supply.

3-5.1 Poles or structures used to support primary service feeders shall be used for that purpose only.

3-5.2 In multiphase power supply facilities, particular care shall be taken to balance phase loads to the extent possible.

3-5.3 Primary power, when introduced in excess of 250 volts phase to phase, shall be transformed to reduce the marina or boatyard system to be not in excess of 250 volts phase to phase.

Exception No. 1: 600 volts maximum may be used for a yard's distribution system where approved by the authority having jurisdiction.

Exception No. 2: 600 volts maximum may be carried to piers where design considerations require more than 250 volts maximum due to load requirements where approved by the authority having jurisdiction, provided that transformers are in locked vaults of design appropriate for the environment and all cable connections are in accordance with the National Electrical Code (NFPA 70).

3-5.4 Transformers shall be installed, where located within the marina or boatyard property area, in compliance with the requirements of Article 450, NFPA 70, *National Electrical Code*, with the additional requirement that transformers shall not be located in a wet location as herein described.

3-5.5 Transformers may be installed in locations exposed to weather and unprotected if they are specifically approved for that use.

3-5.6 Service equipment, including service disconnecting equipment, meters, and associated equipment, and the main switchboard or panel, shall not be installed in wet locations, and shall be protected against access by unauthorized persons. In other respects the service installation shall be in compliance with the requirements of Article 230, NFPA 70, *National Electrical Code*.

Exception: Equipment may be installed in locations exposed to weather and unprotected if they are specifically approved for that use.

3-5.7 Where auxiliary emergency standby power supply equipment with an output rating in excess of 5 kW is provided and is driven by an internal combustion engine, the emergency electric system shall be arranged as required by Article 700, NFPA 70, *National Electrical Code* and NFPA 110, *Emergency and Standby Power Systems*, and shall also be arranged as follows:

(a) The engine and generator shall be housed in a well-ventilated, fire-resistive enclosure that shall not be located in a wet location and that shall contain only the auxiliary power unit and the necessary controls for the engine. Interior areas of the enclosure shall be lighted by a fixture connected to the normal power supply. An approved battery-powered emergency lighting fixture conforming to the requirements of Section 700-12, NFPA 70, *National Electrical Code*, shall be permanently installed in the enclosure, arranged to illuminate the engine control equipment. The fuel supply tank, or tanks, for the auxiliary power equipment shall be located outside of the structure and shall fully comply with the requirements of this standard related to the storage and handling of flammable liquid fuels.

(b) The requirements for automatic starting of the emergency generator as included in Section 700-12, NFPA 70, *National Electrical Code*, may be waived if the starting battery for the prime mover is maintained on a reliable trickle-charge and is tested by actually starting the prime mover at monthly intervals, as required by Section 700-4, NFPA 70, *National Electrical Code*.

3-5.8 The transfer switch for use in connecting an auxiliary emergency generator to the selected load circuits shall be a manually operated double throw switch, with wiring arranged to disconnect the selected circuits from the normal power source before the auxiliary source is connected to these circuits, and shall be of proper rating to make and break the full load current for all the selected circuits. The transfer switch shall be mounted on the exterior of the structure containing the auxiliary power generating equipment, within a metal enclosure having a gasketed cover and an external operating handle arranged to be locked in either position. Wiring connections to the transfer switch shall be made through full weight rigid metal conduit threaded into the enclosure, which shall be adequately grounded. The transfer switch installation shall otherwise comply with the requirements of NFPA 70, *National Electrical Code* (Section 373-2).

3-6 Grounding.

3-6.1 Effective grounding of all noncurrent-carrying metal parts of the electrical system, and provision of suitable equipment-grounding facilities at all outlets provided for the connection of portable equipment and all outlets provided for the connection of shore power to vessels afloat, are of utmost importance in marinas, boatyards, boat basins, and similar establishments. The means and methods of providing an effective ground to the noncurrent-carrying metal parts of the electrical system and for equipment and portable appliances connected thereto shall comply with the requirements of NFPA 70, *National Electrical Code* (Article 250).

3-6.2 There shall be installed a common grounding conductor of not less than No. 12 AWG, arranged in accordance with the requirements of NFPA 70, *National Electrical Code* (Article 250), properly attached to the interior of all metallic boxes, housings, and enclosures and properly connected to the grounding facility of all receptacles. Metal inserts and metal attachments that are externally and internally exposed on nonmetallic boxes and enclosures shall be connected to the common ground. Said grounding conductor shall terminate at the distribution panel ground and shall specifically conform to the requirements of NFPA 70, *National Electrical Code* (Section 555-7).

3-6.3 The partial or complete burial of a metal enclosure in earth shall not be accepted as a substitute for the grounding requirements as provided herein with respect to such enclosure.

3-6.4 Metal poles, lighting standards, and other metal supports that carry or enclose electrical wiring shall be grounded.

3-7 Dry Locations. The entire electrical system installed in a dry location shall comply with the requirements of NFPA 70, *National Electrical Code*.

3-8 Damp Locations. The entire electrical system installed in a damp location shall be composed of materials suitable for the purpose as defined in Article 100, NFPA 70, *National Electrical Code*.

3-9 Wet Locations. The entire electrical system in a wet location as defined for marinas and boatyards in Section 3-4 shall be composed of materials suitable for wet locations as defined in Article 100, NFPA 70, *National Electrical Code*.

3-10 Hazardous Locations. The entire electrical system installed in a hazardous (classified) location shall comply with the requirements given in Article 500, NFPA 70, *National Electrical Code*, and in addition, where required by the conditions, to the requirements of this standard related to damp and wet locations.

3-11 Electrical Installation. Wiring and electrical equipment installed on piers, wharves, docks, or similar locations shall specifically conform to the requirements of Article 555, NFPA 70, *National Electrical Code*.

3-12 Wiring Methods and Materials (Damp and Wet Locations).

3-12.1 The wiring method shall specifically conform with Section 555-6, NFPA 70, *National Electrical Code*.

3-12.2 Electrical wiring shall be installed underground to avoid possible contact with masts and other parts of boats being moved in the yard. Underground electrical installations shall comply with the requirements of Sections 230-30, 230-31, 230-48, and 230-49, NFPA 70, *National Electrical Code*.

Exception No. 1: Where underground wiring is not practical.

Exception No. 2: Where temporary wiring is appropriate as permitted by Article 305, NFPA 70, National Electrical Code.

3-12.3 If electrical wiring is not installed underground, the wiring within yard areas shall be routed to:

(a) Avoid wiring within or across any portion of the yard that may be used for moving vessels.

(b) Avoid wiring closer than 20 ft (6.1 m) from the outer edge or any portion of the yard that may be used for moving vessels or stepping or unstepping masts.

(c) Clearance for wiring in other portions of the yard, not inclusive of the areas described in (a) and (b) above, shall be:

1. Not less than 18 ft (5.49 m) above grade in open areas, and

2. Not less than 8 ft (2.44 m) above highest point of roof when above buildings.

(d) Proper warning signs to warn operators of the wire clearance to be encountered shall be located so as to be clearly visible.

3-12.4 Wiring installed over and under navigable water shall be subject to approval by the authority having jurisdiction. Proper warning signs to warn operators and boaters of the wire clearance to be encountered shall be placed in suitable locations.

3-12.5 Where flexibility is necessary in accordance with Exception No. 1 of 3-12.2, as on piers composed of floating sections, the feeder conductors, if installed in a wet location, shall be listed marina- and boatyard-cable rated not less than 75°C, 600 volts, of the required ampacity and shall include a common grounding conductor with an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals. The cable shall be securely fastened by nonmetallic clips to structural members of the pier other than the deck planking.

(a) Where flexible cable passes through structural members it shall be protected against chafing by a permanently installed oversized sleeve of nonmetallic material.

(b) There shall be an approved junction box of corrosion-resistant construction with permanently installed terminal blocks on each pier section to which the feeder and feeder extensions are to be connected. Metal junction boxes and their covers, and metal screws and parts that are exposed externally to the boxes, shall be of corrosion-resisting materials, or protected by material resistant to corrosion.

3-13 Circuit Breakers, Switches, Panels, and Power Outlets (Damp and Wet Locations).

3-13.1 Overcurrent protection as required by NFPA 70, *National Electrical Code*, shall be provided by the use of circuit breakers to avoid the difficulty of fuse replacement in gasketed enclosures.

Exception: Fuses rated not in excess of five amperes may be located in a panel enclosure for protection of a circuit to a single lighting fixture that is installed as part of a power outlet on a pier.

3-13.2 Circuit breakers installed in gasketed enclosures that are located where exposed to the direct rays of the sun shall be of the fully magnetic type with no thermal elements.

3-13.3 Circuit breakers and switches installed in gasketed enclosures shall be arranged to permit required manual operation without exposing the interior of the enclosure. All such enclosures shall be arranged with a weep hole to discharge condensation.

3-13.4 Circuit breakers, switches, panels, and power outlets shall not be installed in wet locations.

Exception: Circuit breakers, switches, panels, and power outlets may be installed in locations exposed to weather and unprotected if they are specifically approved for that use.

3-14 Power Outlet. An enclosed assembly which may include receptacles, circuit breakers, fused switches, fuses and watt-hour meter, and mounting means approved for marine use.

3-15 Receptacles.

3-15.1 Receptacles intended to supply shore power to boats shall be housed in power outlets approved for marine use.

3-15.2 Receptacles that provide shore power for boats shall be rated not less than 20 amperes and shall be single and of the locking and grounding type conforming to ANSI C73 (including supplement C73a-1980), *Dimensions of Attachment Plugs and Receptacles*. Common configurations of plugs and connectors from ANSI C73 as used in marinas and boatyards are shown in Figure 1, Appendix B.

3-15.3 Each single receptacle that supplies shore power for boats shall be supplied by an individual branch circuit of the voltage class and rating corresponding to the rating of the receptacle.

3-15.4 Fifteen- and 20-ampere outdoor receptacles, other than those supplying shore power to boats, shall be protected by ground-fault circuit interrupters. They may be housed in power outlets with the receptacles that provide shore power to boats, provided a marking clearly indicates that they are not to be used to supply power to boats.

3-15.5* Portable tools connected to such receptacle outlets shall be double insulated.

3-16 Disconnects.

3-16.1 A readily accessible disconnecting means shall be provided by which each boat can be isolated from its supply circuit.

3-16.2 Disconnecting Means. The necessary equipment consisting of a circuit breaker or switch or both shall be located near the shore power connection and is intended to constitute the means of cutoff of the supply to the boat.

3-16.3 If receptacles are used as the disconnecting means, no more than three shall be used to disconnect a single boat. Receptacles used with plugs as disconnecting means shall be accessible and capable of interrupting their rated current without hazard to the operator.

3-16.4 When the use of adapter cord sets is necessary to mate receptacles intended to supply shore power to the boat with the power inlet on the boat, only unmodified manufactured devices shall be used and all devices shall be individually inspected. The use of adapters or adapter cord sets that have been altered to defeat the intended blade and slot configuration of devices used in bringing shore power to marine vessels shall be prohibited. (*Shore power cable sets shall be in accordance with NFPA 302, Fire Protection Standard for Pleasure and Commercial Motor Craft.*)

3-17 Lighting Fixtures.

3-17.1 Lighting fixtures shall conform to the requirements of NFPA 70, *National Electrical Code* (Sections 410-4, 410-5, and 410-6), and additionally shall be located to prevent damage by contact with stored or moving material.

3-17.2 Switches for control of individual lighting fixtures, where located exposed to the weather or splash, shall be of a type approved for that location.

3-18 Electrical Equipment Enclosures.

3-18.1 Electrical equipment enclosures installed on piers above deck level shall be securely and substantially supported by structural members, independent of any conduit connected to them. If enclosures are not attached to mounting surfaces by means of external ears or lugs, the internal screw heads shall rest on gaskets to prevent seepage of water through mounting holes.

3-18.2 Electric equipment enclosures on piers shall be located so as not to interfere with mooring lines.

3-19 Feeders and Branch Circuits on Piers.

3-19.1 The load for each ungrounded feeder and service conductor supplying receptacles for the connection of power to boats shall be calculated in accordance with Article 555 of NFPA 70, *National Electrical Code*.

General lighting and other loads shall be calculated, and the voltage drop based on the total load calculated as above shall be as required by Section 215-1, NFPA 70, *National Electrical Code*.

3-19.2 Feeder circuits extending from the main service equipment, which are intended for use in providing shore power to one or more boats, shall be of the 3-wire, grounded neutral, single-phase type of 110/220, 115/230, 120/240 volts, or 120/208 volts 3-phase Y, according to availability from the local public power source. The minimum feeder conductor size shall be No. 10 AWG; the minimum service conductor size shall be No. 8 AWG.

3-19.3 Where feeder circuits extend on a pier to serve a group of shore power receptacles, the connecting wiring leading to individual devices that contain one or more such receptacles shall be considered feeder taps, coming under Exception No. 2, Section 240-1, NFPA 70, *National Electrical Code*. The branch circuits connecting the receptacles to the feeder tap shall be equipped with circuit breakers for overcurrent protection, located at the receptacle, with not more than one receptacle connected beyond the required circuit breaker. Rigid metallic or nonmetallic conduit shall be installed to protect wiring above the decks of piers and landing stages and below the enclosure that it serves. The conduit shall be connected to the enclosure by full standard threads. The use of special fittings of nonmetallic material to provide a threaded connection into enclosures on rigid nonmetallic conduit, employing joint design as recommended by the conduit manufacturer for attachment of the fitting to the conduit, will be acceptable provided the equipment and method of attachment are approved and the assembly meets the requirements of installation in a damp location.

3-19.4 The disconnects for feeder circuits and branch circuits exceeding from the main service equipment shall be readily accessible and clearly marked.

3-20 Hazardous (Classified) Locations.

3-20.1 Only qualified persons, as defined in Article 100, NFPA 70, *National Electrical Code*, shall be permitted to use, handle, install, or repair electrical systems or facilities within any area classified as "Hazardous."

3-20.2 Only the electrical equipment and wiring necessary for the handling and dispensing of the fuels shall be installed within the hazardous area at any outdoor storage or dispensing station. Lighting fixtures for such locations, and the switches controlling them, shall be located beyond the hazardous area unless of a type approved for the location.

3-20.3 The grounding wire of the electrical system, or other approved grounding connection, shall be arranged to provide adequate grounding protection to the metal nozzle of all fuel dispensing equipment.

3-20.4 When electrical equipment is installed in a location that is classified as both "Hazardous" and "Damp," the construction shall include approved methods of meeting the requirements of both locations.

3-21 Tests.

3-21.1 Upon completion, the electrical system shall be subjected to an insulation test in the presence of the representative of the authority having jurisdiction. Such tests shall meet the requirements of Section 110-7, NFPA 70, *National Electrical Code*.

3-21.2 On all receptacles that are intended to provide shore power to boats, a polarity test shall be made and immediate correction of improper polarity performed in the presence of the inspector. Standard polarity connections are as detailed in Section 200-10, NFPA 70, *National Electrical Code*.

3-22 Marine Hoists, Railways, Cranes, and Monorails.

3-22.1 Motors and controls for marine hoists and railways shall not be located in a wet location as defined in Section 3-4.

3-22.2 Where it is necessary to provide electric power to a mobile crane or hoist in the yard, and a trailing cable is involved, it shall consist of listed portable power cables with ground conductors rated for the conditions of use and provided with a jacket of distinctive color for safety.

3-23 Maintenance of Electrical Wiring and Equipment.

3-23.1 An inspection of all electrical wiring, ground connections, conduit, hangars, supports, connections, outlets, appliances, devices, and portable cables installed or used in a marina, boatyard, boat basin, or similar establishment shall be made at regular intervals to assure a complete inspection at least annually. All corroded, worn, broken, or improper materials shall be replaced or repaired immediately. The use of tape to repair broken or cracked insulation of jackets on flexible cables or cords shall be prohibited. Splicing of flexible cord or cable shall be prohibited. The inspection shall take particular notice of the following conditions, and corrective action shall be taken as appropriate:

(a) Areas being used for purposes not originally contemplated and that introduce hazards greater than those for which the electrical system was designed.

(b) Locked or otherwise restricted areas or equipment being left open.

(c) The use of grounding-type portable electrical equipment that is not properly and adequately grounded.

(d) Special attention to be given to shore power cable sets used by vessels for connection to shore power outlets. Shore power cable sets shall not be permitted to lie on or across pier walkways or to trail into the water.

(e) Flexible cords being used for purposes not in accordance with NFPA 70, *National Electrical Code*, for example, used for permanent wiring.

(f) Damaged or inoperative switches, lighting fixtures, and receptacle outlets.

(g) Overloading of electrical circuits.

(h) The introduction of unsuitable appliances into a hazardous area.

Chapter 4 Fire Protection

4-1 General. Due to the unusually high concentration of combustibles and the presence of ordinary combustibles (Class A), flammable liquids (Class B), and electrical (Class C) fire hazards within virtually every area of the facilities covered by this standard, the placement and maintenance of both fixed and portable fire extinguishment equipment are extremely important.

4-2 Planning. Careful planning in the placement of fire extinguishment equipment shall be made in cooperation with the authority having jurisdiction and the local responding fire departments at least annually in order to accommodate changing conditions and personnel responsible for the fire control in the facility.

4-3 Portable Fire Extinguishers.

4-3.1 Placement of portable fire extinguishers shall be in accordance with Chapter 3, NFPA 10, *Standard for Portable Fire Extinguishers*, in all structures.

4-3.2 Placement of portable fire extinguishers on piers and along bulkheads to which vessels are moored or may be moored shall be as follows.

4-3.2.1 Extinguishers listed for Class A, B, and C fires shall be installed at each end of a pier and bulkhead that exceeds 25 ft (7.6 m) in length, and on piers exceeding 50 ft (15.2 m) in length, such that not more than 50 ft (15.2 m) separates extinguishers.

4-3.2.2 All extinguishers installed on piers shall meet the rating requirements set forth in Chapter 3 of NFPA 10, *Portable Fire Extinguishers*, for ordinary (moderate) hazard type.

4-3.3 In vessel storage yards, portable fire extinguishers shall be installed in aisleways such that no more than 50 ft (15.2 m) need be traveled to reach an extinguisher [100 ft (30.4 m) maximum separation]. The first extinguisher shall be installed at the entrance to each aisleway exceeding 25 ft (7.6 m) in length.

4-3.4 Portable fire extinguishers that meet the minimum requirements of Chapter 3, NFPA 10, *Standard for Portable Fire Extinguishers*, for extra (high) hazard type shall be installed on two sides of a fuel dispensing area. On piers or bulkheads where long fueling hoses are installed for fueling vessels, additional extinguishers installed on the pier shall meet the requirements of Chapter 3, NFPA 10, *Standard for Portable Fire Extinguishers*, for extra (high) hazard type and 4-3.2.1 of this standard.

4-3.5 All portable fire extinguishers shall be maintained in accordance with Chapters 4 and 5, NFPA 10, *Standard for Portable Fire Extinguishers*, and shall be clearly visible and marked.

In storage yards where visibility is hampered by tall storage, flags or signs shall be installed designating the location of portable fire extinguishers visible from within all aisleways.

4-4 Fixed Fire Extinguishment Systems.

4-4.1 Combustible buildings and noncombustible buildings that contain combustible materials in sufficient quantity that, in the opinion of the authority having jurisdiction, are considered equal in hazard to combustible buildings, built on a pier over water in excess of 500 sq ft (46.45 m^2) in total area shall be protected by a fixed automatic sprinkler system installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems.*

Exception No. 1: Covered slips.

Exception No. 2: In existing facilities, considering water supply availability and adequacy, and size of facility, where clearly impractical for economic or physical reasons.

4-4.2* Marina and boatyard buildings in excess of 5,000 sq ft (464.5 m^2) in total area shall be protected by a fixed automatic sprinkler system installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems.* (*See Section 5-2 for requirements for rack storage buildings.*)

Exception: In existing facilities, considering water supply availablity and adequacy, and size of facility, where clearly impractical for economic or physical reasons.

4-4.3 Combustible piers and substructures in excess of 25 ft (7.6 m) in width or in excess of 5,000 sq ft (464.5 m^2) in area, or within 30 ft (11.4 m) of other structures or superstructures required to be so protected shall be protected, in accordance with Section 3-3, NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves.*

Exception No. 1: In the case of fixed piers, where the vertical distance does not exceed 36 in. (0.91 m) from the surface of mean high water level to the underside of the pier surface. In the case of floating piers, where the vertical distance does not exceed 36 in. (0.91 m) from the surface of the water to the underside of the pier surface.

Exception No. 2: In existing facilities, considering water supply availability and adequacy, and size of facility, where clearly impractical for economic or physical reasons.

4-5 Fire Standpipe Systems.

4-5.1 Standpipe systems, where installed, shall be in accordance with NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.*

Exception: Hose racks, hoses, and standpipe cabinets shall not be required on piers and bulkheads.

4-5.2 Buildings and buildings on piers shall be provided with standpipe systems.

4-5.3 Class I standpipe systems shall be provided except that supply piping shall be sized in accordance with Class II requirements for piers and bulkheads where the hose lay distance from the fire apparatus exceeds 150 ft (45.8 m).

4-5.4 Nonautomatic dry standpipes are permitted.

4-5.5 Flexible connections are permitted on floating piers subject to approval by the authority having jurisdiction.

4-5.6 Listed nonferrous piping are permitted to be used if shielded, buried, or under water.

4-6 Hydrants and Water Supplies. Hydrants and water supplies for fire protection in marinas and boatyards shall be provided in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*; NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*; and NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances.*

4-7* Maintenance. Portable fire extinguishers, automatic sprinkler systems, standpipe systems, and water supply facilities shall be maintained in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*; NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*; NFPA 20, *Standard for the Installation of Centrifugal Fire Pumps*; and NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances.*

4-8* Exposure Protection. The hazards of fire exposure and appropriate protection methods shall be evaluated.

4-9 Transmittal of Fire Emergency. All marinas and boatyards shall have a means to rapidly notify the fire department in the event of an emergency. If a telephone is used for this purpose, it shall be available for use at all times and shall not require the use of a coin.

The street address of the facility and the emergency telephone number(s) shall be prominently displayed on a sign at the telephone.

NOTE: EMS and police numbers should be displayed in addition to fire department numbers unless 9-1-1 (E-9-1-1) is in use.

4-10 Fire Detectors.

4-10.1 Fire detection devices and installation shall be in accordance with NFPA 72E, *Standard on Automatic Fire Detectors.*

4-10.2 Smoke-sensing fire detectors shall be installed in the following interior or covered locations unless protected by a fixed automatic sprinkler system installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*:

(a) Rooms containing combustible storage or goods.

(b) Rooms containing flammable liquid storage or use.

(c) Rooms containing battery storage or maintenance.

(d) Rooms containing paint and solvent storage or use.

(e) Enclosed or covered storage of vessels.

(f) Areas used for enclosed or covered maintenance of vessels.

(g) Areas used for public assembly, dining, or lodging.

(h) Kitchens and food prep areas.

(i) Dust bins and collectors.

(j) Inside trash storage areas.

(k) Rooms used for janitor supplies or linen storage.

(l) Laundry rooms.

(m) Furnace rooms.

Chapter 5 Berthing and Storage

5-1 Wet Storage and Berthing.

5-1.1 Each berth shall be arranged such that a boat occupying the berth can be readily removed in an emergency without the necessity of moving other boats.

5-1.2 Ready access to all piers, floats, and wharves shall be provided for municipal fire fighting equipment.

5-1.3* Electrical lighting shall be provided to assure adequate illumination of all exterior areas, piers, and floats, but positioned so as not to interfere with navigation or aids to navigation.

5-1.4 Only permanently installed, listed electrical equipment shall be operated unattended.

5-2 Dry Storage.

5-2.1 General.

(a) The use of portable heaters in a boat storage area shall be prohibited except where necessary to accomplish repairs, in which case they shall be used only when personnel are in attendance. No open flame heaters of any sort shall be used.

(b) Ladders sufficiently long to reach the deck of any stored boat shall be located so as to be readily available.

(c) The use of blow torches or flammable paint remover shall be prohibited.

Exception: Flammable solvents can be used as provided in 6-6.1.

(d) The use of gasoline or other flammable solvents for cleaning purposes shall be prohibited.

(e) Where a boat is to be dry-stored for the season or stored indoors for an extended period of time, e.g., while awaiting repairs, the following precautions shall be taken:

1. The vessel shall be inspected for any hazardous materials or conditions that may exist and corrective action shall be taken.

2. LPG and CNG cylinders, reserve supplies of stove alcohol or kerosene and charcoal shall be removed from the premises or stored in a separate, designated safe area.

3. All portable fuel tanks shall be removed from the premises or emptied. If portable fuel tanks are emptied, the cap shall be removed and the tank left open to the atmosphere.

4. Permanently installed fuel tanks shall be stored approximately 95 percent full.

(f) No unattended electrical equipment shall be in use aboard boats.

(g) All storage areas shall be routinely raked, swept, or otherwise policed to prevent the accumulation of rubbish.

(h) Ready access by fire fighting equipment shall be provided at all times for boats stored both inside and outside. In the case of inside storage areas, the local fire department authorities shall be appraised of the quickest way to gain access to the building in case of emergency.

5-2.2 Indoors.

(a) When work is being carried out on board a vessel in an unsprinklered storage building, management shall require an inspection of the vessel at the end of the day to ensure that there are no hazards present resulting from the day's work. If a guard is employed, the vessel shall be included in the regular rounds.

(b) No Class I flammable liquids shall be stored in an indoor boat storage area.

(c) All work performed on boats stored indoors shall be performed by qualified personnel only. Facility management shall maintain control over all personnel access to storage facilities and boats stored indoors.

5-2.3 In-Out Dry Storage or Rack Storage.

(a) Any facility utilizing a rack storage system of more than one level shall be considered to fall under the definition of "in-out dry storage facility."

(b) Water supply and hoses or portable fire extinguishers and wheeled cart assemblies equipped with discharge nozzles capable of reaching all boats on the highest racks shall be provided.

(c) Boats stored either inside or outside in single or multiple level racks shall have unimpeded vehicular access at one end and shall have equipment available to remove any stored boat.

(d)* Where boats are stored on multilevel racks in buildings, automatic sprinkler protection shall be installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems.*

Exception No. 1: Buildings under 5,000 sq ft (464.5 m^2) provided with an automatic fire detection and alarm system supervised by a central station complying with NFPA 71, Standard for the Installation, Maintenance and Use of Signaling Systems for Central Station Service. If such a system is not technically feasible, an automatic fire detection and alarm system supervised by a local protective signaling system complying with NFPA 72, Standard for the Installation, Maintenance and Use Protective Signaling Systems, or a full-time watch service shall be utilized.

Exception No. 2: In existing facilities, considering water supply availability and adequacy and size of facility, where clearly impractical for economic or physical reasons.

(e) Where boats are stored in multilevel racks, either inside or outside, for seasonal storage or for in-out operation, the following precautions shall be taken:

1. Drain plugs shall be removed (in sprinklered buildings).

2. Batteries shall be disconnected or the master battery switch turned off.

3. Fuel tank valves shall be closed.

4. For seasonal storage the requirements of 5-2.1 shall apply.

(f) All repair operations while boats are on racks or inside an in-out dry storage building shall be prohibited.

(g) All portable power lines such as drop cords shall be prohibited from any boat in an in-out dry storage building. Portable battery chargers shall also be prohibited aboard any boat.

5-2.4 Battery Storage.

(a) Lead-acid type batteries shall be removed for storage and recharging wherever practical. Where, due to size and weight, it is impractical to remove them for storage, batteries may be permitted to remain on board provided:

1. The battery compartment is arranged to provide adequate ventilation.

2. A listed battery charger shall be used to provide a suitable charge.

3. The power connection to the charger consists of a three-wire cord of not less than No. 14 AWG conductors connected to a source of 110 to 125 volt single phase current, with a control switch and approved circuit protection device designed to trip at not more than 125 percent of the rated amperage of the charger.

4. There is no connection on the load side of this device from this circuit to any other device and the boat battery switch shall be turned off.

5. The battery is properly connected to the charger and the grounding conductor effectively grounds the charger enclosure.

6. Unattended battery chargers are checked at intervals not exceeding two hours while in operation.

Chapter 6 Operational Hazards

6-1 Conditions on Individual Boats.

6-1.1 The management shall have an inspection made of boats received for major repair or storage. This shall be accomplished as soon as practicable after arrival of a boat and before commencement of any work aboard for the purpose of determining:

(a) Presence of combustible vapors in any compartment.

(b) General maintenance and cleanliness, and location of any combustible materials that require removal or protection for the safe accomplishment of the particular work involved.

(c) Quantity, type, and apparent condition of fire extinguishing equipment on board.

(d) Presence of appropriate listed shore power inlet(s) and listed ship-to-shore cable(s).

6-1.2 The management shall, as a condition to accepting a boat received for major repair or storage, require the owner to correct any discrepancies found in 6-1.1 or to authorize management to do so.

6-1.3 The following general precautions shall be observed:

(a) Smoking in the working area shall be prohibited.

(b) Loose combustibles in the way of any hazardous work shall be removed.

(c) Unprotected battery terminals shall be suitably covered to prevent inadvertent shorting from dropped tools or otherwise. The ungrounded battery lead shall be disconnected.

(d) Only experienced personnel shall be employed in the removal or installation of storage batteries.

(e) Precautions recommended elsewhere herein for specific kinds of work shall be followed.

(f) When in dry storage, all metallic hull appendages shall be tested by a competent electrician for evidence of electrical leakage if any shore power is supplied to the boat's electrical system. If commonly bonded, a major appendage such as a shaft or rudder shall be grounded to earth ground. If not commonly bonded, no shore power shall be supplied to the boat's system without grounding every metallic appendage while shore power is energized.

6-1.4 The marina or boatyard operator shall post in a prominent location or provide to boat operators using a marina or boatyard for mooring, repair, servicing, or storage, a list of safe operating procedures containing such information as:

(a) The use of hibachis or any type of portable charcoal or wood cooking equipment shall be limited to specifically authorized areas where they can be used safely (not on the docks or near flammables).

(b) Procedures for disposal of trash.

(c) Nonsmoking areas.

(d) Location of fire extinguishers and hoses.

(e) Procedures for turning in fire alarm.

(f) Fueling procedures.

6-1.5 The information on fueling procedures referred to in 6-1.4(f) shall be as a minimum the following:

Before Fueling

1. Stop all engines and auxiliaries.

2. Shut off all electricity, open flames, and heat sources.

3. Check bilges for fuel vapors.

4. Extinguish all smoking materials.

5. Close access fittings and openings that could allow fuel vapors to enter the boat's enclosed spaces.

6. Remove all personnel from the boat except the person handling the fueling hose.

During Fueling

1. Maintain nozzle contact with fill pipe.

2. Fuel filling nozzle must be attended at all times.

3. Wipe up spills immediately.

4. Avoid overfilling.

After Fueling and Before Starting Engine

1. Inspect bilges for leakage or fuel odors.

2. Ventilate until odors are removed.

6-2 Heating.

6-2.1 Heating equipment shall be installed in accordance with local ordinances and the following standards as appropriate:

NFPA 31, *Standard for the Installation of Oil Burning Equipment*

NFPA 54, *National Fuel Gas Code*

NFPA 58, *Standard for the Storage and Handling of Liquefied Petroleum Gases*

NFPA 90B, *Standard for the Installation of Warm Air Heating and Air Conditioning Systems*

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances.*

6-2.2 Adequate and suitable fire extinguishing equipment shall be supplied, installed, and maintained in an approved manner in proximity to heating equipment in accordance with Section 4-3.

6-2.3 Heat generating plants for steam, hot water, or forced air systems shall be located in detached buildings or rooms separated from other areas by fire walls.

6-2.4 Coal and wood burning stoves shall not be used unless such installations are periodically checked and found to possess adequate safeguards by the local fire authority having jurisdiction. If such stoves are used, the following precautions shall be in effect unless the authority having jurisdiction modifies the precautions specifically for each installation:

(a) A radial clearance of 36 in. (0.91 m) shall be maintained from any combustible material unless such material is effectively protected in accordance with NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances.*

(b) Combustible flooring under stoves shall be protected in accordance with NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances.*

(c) Chimney connectors shall be substantially supported and have a clearance of at least 18 in. (0.46 m) from all combustible material. Connectors passing through a combustible partition shall be protected at the point of passage by a metal ventilated thimble not less than 12 in. (0.31 m) larger in diameter than the protector, or in accordance with Chapter 5 of NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances.* Chimney connectors shall not pass through concealed spaces.

(d) Ready fuel supplies, particularly if scrap wood is used, shall be neatly stowed to maintain safe clearance from stoves.

(e) Substantial metal cans shall be provided for handling ashes. These cans shall not be used as receptacles for combustible waste.

6-2.5 Heating devices employing a flame or exposed hot wires shall not be used in areas where flammable vapors or combustible dusts may be present.

6-3 Storage and Handling of Fuels.

6-3.1 The fueling station shall be located to minimize the exposure of all other plant facilities. All fueling stations shall be accessible by boat without entering or passing through the main berthing area.

Exception: Where inside fueling stations are made necessary by prevailing sea conditions (wake, surge, tide, etc.) such stations shall be located near an exit by water from the berthing area or at some other location from which, in case of fire aboard a boat alongside, the stricken craft may be quickly removed without endangering other boats nearby.

6-3.2 All boat fueling operations shall be carefully accomplished in accordance with NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, at the fueling station or other specifically designated remote location.

6-3.3 No tank barge or other fuel supply boat shall be permitted within the berthing area. Outside berths and connections shall be provided for the use of tank barges or fuel supply boats.

6-3.4 Fuel storage tanks shall be installed in accordance with NFPA 30A, *Automotive and Marine Service Station Code*, and in accordance with all state and local ordinances.

6-3.5 Fuel storage tanks shall be securely anchored where they are located subject to flooding or tidal conditions, and the applicable precautions outlined in Chapter 2 of NFPA 30A, *Automotive and Marine Service Station Code*, shall be observed.

6-3.6 Fuel storage tanks and pumps, other than those integral to approved dispensing units supplying gasoline, Class I, or Class II flammable liquids at marine service stations, shall be located only on shore, or with the express permission of the authority having jurisdiction on a pier of solid-fill type. Approved dispensing units with or without integral pumps may be located on shore, on piers of solid-fill type, or on open piers, wharves, or floating piers.

6-3.7 Tanks and pumps supplying diesel Class III flammable liquids at marine service stations may be located on shore, on piers of solid-fill type, or on open piers, wharves, or floating piers. Class III flammable liquid tanks that are located elsewhere than on shore or on piers of the solid-fill type shall be limited to 550 gal (2.08 m^3) aggregate capacity. Pumps not a part of the dispensing unit shall be located adjacent to the tanks.

6-3.8 Fuel pipelines shall be installed in accordance with the provisions of NFPA 30A, *Automotive and Marine Service Station Code.*

6-3.9 Dispensing units for transferring fuels from storage tanks shall be in accordance with provisions of NFPA 30A, *Automotive and Marine Service Station Code*. Gasoline delivery nozzles shall be equipped with a self-closing control valve that will shut off the flow of fuel when the operator's hand is removed from the nozzle. The use of any device to override this safety feature is prohibited. The nozzle shall be inspected daily for proper operation. Any nozzle that shows evidence of possible malfunction or leaking shall be removed from service. The use of any automatic nozzle with a latch-open device is prohibited for the delivery of gasoline. In the construction of the fuel hose assembly, provision shall be made so the fuel delivery nozzle is properly bonded to the shore electric grounding facilities as required in Section 3-6 of this standard.

6-3.10 Gasoline and other flammable liquids stored in drums or cans shall be kept separate from other plant facilities, and stored and dispensed in accordance with applicable requirements of NFPA 30A, *Automotive and Marine Service Station Code*.

6-3.11 Hand carriage of gasoline within the plant area shall be restricted to containers designed for carrying and storage of such fuel. Open buckets, cans, or glass jars shall not be used.

6-3.12 Only soaps, detergents, and approved solvents shall be used for cleaning purposes on the premises or on board boats. Gasoline or Class I flammable liquids shall not be used.

6-4 Storage and Handling of Paints and Solvents. Paint storage and mixing shall be segregated from other working and storage areas, preferably by provision of a well-separated and ventilated building of noncombustible construction, but otherwise by provision of a ventilated fire-resistive room with properly protected openings.

6-5 Storage and Handling of Fiberglas Reinforced Plastic Materials. Liquid materials used for the construction and repair of fiberglas reinforced plastic boats such as resins, catalysts, oxidizers, and solvents are usually flammable or combustible. Areas in which these materials are stored or used shall be well ventilated, constructed of noncombustible materials, and shall have particular attention paid to provisions for fire protection of such areas. Catalyzed resins shall be set and cooled before disposal of excess material or waste.

6-6 Paint Removal and Painting.

6-6.1 Removal of paint or other finishes by use of flammable solvents shall be restricted to exterior surfaces of boats and shall be conducted only out-of-doors and well separated from other craft and adjacent (hazardous) operations.

6-6.2 An adequate supply of approved fire extinguishing equipment of suitable type shall be readily accessible to all areas where paint removal, painting, or refinishing is in process.

6-6.3 The operation of open flame shall not be permitted where painting, sanding, scraping, or wire brushing is being performed in confined areas such as boat interiors. The operation of spark producing equipment shall not be permitted where painting is being performed in confined areas such as boat interiors.

6-6.4 Portable electric lamps used in areas where flammable vapors may be encountered, such as in paint removal and painting locations, shall be of the explosionproof type and shall be equipped with guards.

6-6.5 Only such quantities of paint and solvent as required for one day's operations shall be permitted in the work area.

6-6.6 Where spray finishing is performed indoors repeatedly at a fixed location, it shall be conducted in accordance with NFPA 33, *Standard for Spray Application Using Flammable and Combustible Materials*. Where such spray finishing is performed but occasionally and in varying locations either indoors or outdoors, suitable precautions shall be taken to assure that all possible sources of ignition are eliminated throughout and near to the area wherein the spray finishing is to be performed. Ample ventilation of the area shall be provided.

6-7 Lumber Storage.

6-7.1 Main stocks of lumber shall be stored in a segregated area.

6-7.2* Piles of lumber shall be neatly stacked, and unobstructed aisles of adequate width shall be maintained between individual piles, to limit spread of fire and permit access for fire fighting personnel and equipment.

6-8 Welding, Brazing, Soldering, and Metal Cutting.

6-8.1 These operations shall be restricted to a shop specifically provided for the purpose or in an open area. The shop shall be of noncombustible or fire-resistive construction, including its flooring, and all combustibles shall be kept well away from the shop or area.

6-8.2 Only experienced personnel shall be permitted to perform welding, brazing, soldering, and cutting work.

6-8.3 When welding or cutting in or on a boat, the following precautions shall be taken:

(a) Before starting operations a proper fire watch equipped with appropriate fire extinguishers shall be established.

(b) All combustible materials in proximity to hazardous repair work shall, if possible, be moved to a safe location aboard or ashore. Noncombustible material or properly flameproofed tarpaulins shall be used to protect combustible materials that cannot be moved.

(c) The area shall be free of combustible vapor and flammable liquids.

(d) All hatches, ports, tank openings, etc., through which sparks might pass shall be protected.

(e) Noncombustible or properly flameproofed tarpaulins or metal shields shall be set around the work in progress to restrict the travel of sparks.

(f) Before welding or cutting is begun on decks or bulkheads, a careful check shall be made of conditions on the opposite side thereof to eliminate the possibility of damage by heat or fire.

(g) Safeguards shall be taken with any fuel tanks to prevent vapors from creating a fire hazard.

6-8.4 Neither welding nor cutting shall be attempted on a fuel tank unless the tank has been cleaned or otherwise safeguarded in accordance with NFPA 327, *Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers.*

6-8.5 All welding and cutting equipment shall be maintained in the best condition. Oxyacetylene hose shall be neatly coiled and stored in a cool location, free from grease, oil, etc. Spare gas cylinders shall be limited to five and kept in a well-ventilated locker. Electric welding equipment shall conform to the provisions of NFPA 70, *National Electrical Code.*

6-8.6 Wherever welding or cutting operations are in process, adequate and suitable fire extinguishing equipment shall be supplied, installed, and maintained in an approved manner and a competent fire watch provided where deemed advisable.

6-9 Woodworking. Good housekeeping and clean premises being essential to health and safety, woodworking equipment and machinery shall be arranged in a manner to prevent accumulations of sawdust, shavings, and wood waste. The interior of woodworking areas shall be constructed so as to minimize pockets and ledges inaccessible to cleaning, and the following precautions shall be observed:

(a) Sawdust, waste, and refuse shall be removed daily, or more often if necessary, and safely disposed of.

(b) Exhaust systems shall be installed for automatic removal of sawdust and shavings from planers.

(c) Machines shall never be left unattended while in operation.

(d) The area provided to accommodate boats undergoing construction or repair shall be large enough to permit free access around and under them. A check shall be made of all boats in this area to make certain the area is free of flammable vapors and other hazards.

(e) All volatile liquids required shall be kept to a minimum and handled only in approved safety cans.

(f) Adequate and suitable fire extinguishing equipment shall be supplied, installed, and maintained in an approved manner.

(g) Open flames, lights, and smoking shall be prohibited.

6-10 Machine Shop.

6-10.1 The machine shop shall be housed in a separate noncombustible or fire-resistive building or effectively segregated by means of a fire wall when it shares a building with other facilities. If a means of egress is necessary in the separating fire wall, it shall comply with the requirements of NFPA 80, *Standard for Fire Doors and Windows.*

6-10.2 Machines and motors shall be kept clean and in good repair at all times.

6-10.3 All flammable liquids required shall be kept at a minimum and handled only in approved safety cans.

6-10.4 Gravity feed from fuel tanks to test stands shall not be permitted.

6-10.5 An adequate supply of approved portable fire extinguishers of suitable type shall be installed and maintained in an approved manner.

6-11 Battery Service and Storage.

6-11.1 Hydrogen gas is formed during the functioning of wet cell storage batteries. Hydrogen gas is highly flammable, is much lighter than air, and will rise to the highest available space. The area used for service or storage of such batteries shall be designed to:

(a) Vent the gas to exterior atmosphere, and

(b) Prevent ignition of such gas that may not be completely vented.

6-11.2 A separate room or completely closed area shall be provided for battery charging and storage. The room shall be used for no other purpose and materials not required for the designated use shall not be placed or stored therein. The access door and windows (if any) shall be kept locked when the room is unattended.

6-11.3 The battery room shall be ventilated in the following manner: air inlets shall be provided at, or below, the level of the battery racks with adequate exhausts at ceiling. A vent stack equipped with natural draft exhaust head shall be installed to aid in providing an upward draft.

6-11.4 The room and the electrical equipment located within the described space shall conform to the applicable requirements of NFPA 70, *National Electrical Code*, for Class I, Division I, Group B, Hazardous Area.

6-11.5 To minimize the hazard, switches for control of services and illumination may be located on the exterior of the room or enclosure, and, in such location, need not be rated explosionproof.

6-11.6 Battery chargers used shall have separate control switches in addition to a master switch to control all units.

6-11.7 Charging equipment shall be well secured, protected from physical damage, and so located as to permit good ventilation all around it. Metal enclosures of battery charging devices shall be bonded to the equipment grounding conductor of the electrical system (green wire).

6-11.8 Racks for storing and charging use shall be substantial, suitably insulated, reasonably open, and shall permit the setting of batteries so that no pockets in which gases might accumulate can be formed, and shall conform to the requirements of Section 480-7, NFPA 70, *National Electrical Code.*

6-11.9 Insulated tools and battery clips equipped with insulated cuffs shall be used to avoid short circuits.

6-11.10 All battery servicing work shall be conducted by experienced personnel only. The following specific precautions shall be followed:

(a) Smoking shall be prohibited in the battery room.

(b) No open flame or spark producing work shall be undertaken in the battery room.

(c) No volatile liquids shall be stored or used in the battery room.

(d) Cell caps shall be kept tight while connecting or disconnecting batteries, but shall be removed whenever possible while charging.

(e) Battery tongs or other appropriate carrying devices shall be used when removing or lifting batteries.

(f) Wiring connections shall never be connected or disconnected if power is being supplied to or released by batteries.

(g) When nickel-cadmium batteries are to be charged or serviced in the reserved area, the work shall be done in a separate work area from which servicing or charging is done on lead-acid types of storage batteries. Tools and equipment used in servicing or charging nickel-cadmium batteries shall be distinguished by an appropriate color applied to them and shall be at all times reserved only for such usage.

6-11.11 One (or more) approved dry chemical portable fire extinguisher(s) shall be provided in a readily accessible location within the enclosed area and shall be maintained in an approved manner.

6-12 Servicing Liquefied Petroleum and Compressed Natural Gas Systems.

6-12.1 Utmost care shall be exercised at all times in the servicing of liquefied petroleum gas and compressed natural gas systems and equipment.

6-12.2 Changing of cylinders shall be performed in accordance with NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft.*

6-12.3 Checks for leaks in liquefied petroleum gas and compressed natural gas systems shall never be made with a flame.

Chapter 7 Referenced Publications

7-1 The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

NOTE: It is not the intent of this standard that the marina or boatyard owners/operators maintain copies of these standards as a requirement of this standard, nor is it expected that they be knowledgeable as to their detailed contents. The inclusion of these reference standards provides a ready source for specifying compliance in procurement of equipment, systems, and design or installation services. Key requirements of the referenced standards as they apply to marinas and boatyards have been included in Chapters 1 to 6 inclusive with reference to the appropriate NFPA or ANSI standards.

7-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 10-1990, *Standard for Portable Fire Extinguishers.*

NFPA 13-1989, *Standard for the Installation of Sprinkler Systems.*

NFPA 14-1990, *Standard for the Installation of Standpipe and Hose Systems.*

NFPA 20-1990, *Standard for the Installation of Centrifugal Fire Pumps.*

NFPA 24-1987, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances.*

NFPA 30-1990, *Flammable and Combustible Liquids Code.*

NFPA 30A-1990, *Automotive and Marine Service Station Code.*

NFPA 31-1987, *Standard for the Installation of Oil Burning Equipment.*

NFPA 33-1989, *Standard for Spray Application Using Flammable and Combustible Materials.*

NFPA 54-1988, *National Fuel Gas Code.*

NFPA 58-1989, *Standard for the Storage and Handling of Liquefied Petroleum Gases.*

NFPA 70-1990, *National Electrical Code.*

NFPA 71-1989, *Standard for the Installation, Maintenance and Use of Signaling Systems for Central Station Service.*

NFPA 72-1990, *Standard for the Installation, Maintenance and Use of Protective Signaling Systems.*

NFPA 72E-1990, *Standard on Automatic Fire Detectors.*

NFPA 80-1990, *Standard for Fire Doors and Windows.*

NFPA 90B-1989, *Standard for the Installation of Warm Air Heating and Air Conditioning Systems.*

NFPA 211-1988, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances.*

NFPA 302-1989, *Fire Protection Standard for Pleasure and Commercial Motor Craft.*

NFPA 307-1990, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves.*

NFPA 327-1987, *Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers.*

7-2 ANSI Publication. American National Standards Institute, 1430 Broadway, New York, NY 10018.

ANSI C73-1973 (including supplement C73a-1980), *Dimensions of Attachment Plugs and Receptacles.* (*See Appendix B for configuration of plugs and receptacles.*)

Appendix A

This Appendix is not a part of the requirements of this NFPA document, but is included for information purposes only.

A-3-15.5 The use of double insulated appliances is recommended.

A-4-4.2 The combustibility of the boats in storage should be considered in determining the hazard classification for appropriate sprinkler system design.

A-4-7 For guidance on the inspection, testing, and maintenance of sprinkler systems see NFPA 13A, *Recommended Practice for the Inspection, Testing and Maintenance of Sprinkler Systems.*

A-4-8 For evaluation of the hazards of fire exposure and the methods of protection see NFPA 80A, *Recommended Practice for the Protection of Buildings from Exterior Fire Exposures.*

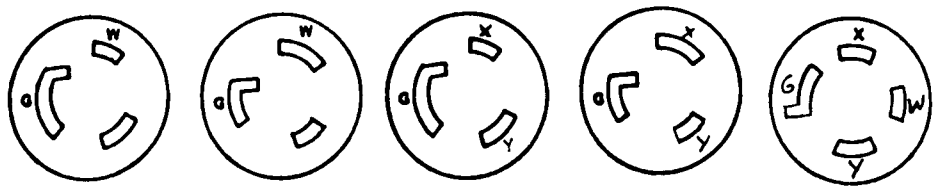
A-5-1.3 It is recommended that an auxiliary power supply be provided to ensure lighting in the event of a power failure.

A-5-2.3(d) Multilevel racks with height of storage not exceeding 12 ft are covered by NFPA 13, *Standard for the Installation of Sprinkler Systems.* The combustibility of the boats in storage should be considered in determining hazard classifications. Where boats are stored on racks and storage height exceeds 12 ft, guidance for the design of automatic sprinkler protection should be taken from NFPA 231C, *Standard for Rack Storage of Materials.* Combustibility of boat construction should be used in determining the appropriate commodity class for fire protection system selection and design. Plan view configuration of the boats in storage should be reviewed in determining whether in-rack sprinklers are needed and to aid in the proper design of the in-rack portion of the sprinkler system. Sound engineering judgment is necessary in selecting sprinkler spacing, placement and design criteria.

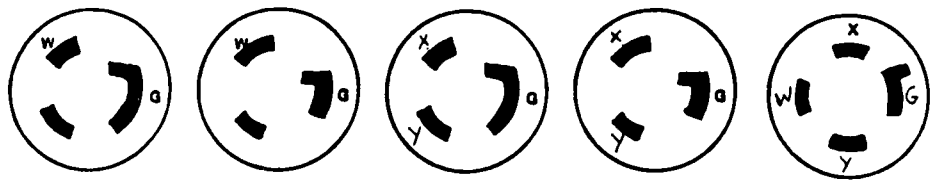
A-6-7.2 See NFPA 46, *Recommended Safe Practice for Storage of Forest Products,* for additional guidance.

Appendix B

Receptacle and Connector - Locking and Grounding

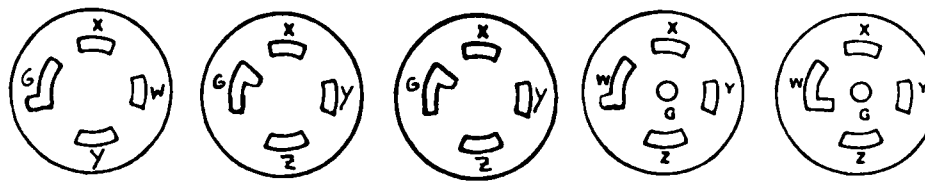


Plug and Inlet - Locking and Grounding

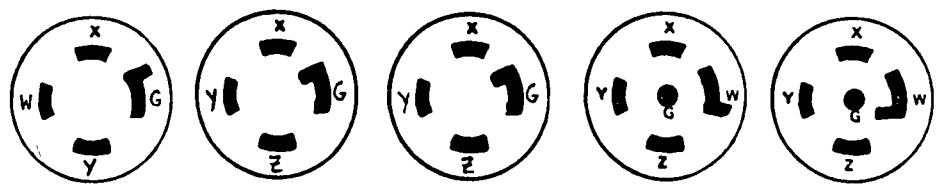


20A 125V	30A 125V	20A 250V	30A 250V	20A 125/250V
2 pole, 3 wire	2 pole, 3 wire	2 pole, 3 wire	2 pole, 3 wire	3 pole, 4 wire
ANSI C-73.72	ANSI C-73.73	ANSI C-73 75	ANSI C-73.75	ANSI C-73.83

Receptacle and Connector - Locking and Grounding



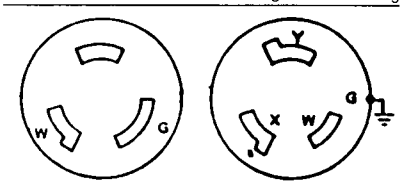
Plug and Inlet - Locking and Grounding



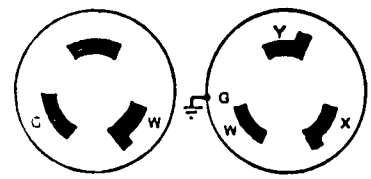
30A 125/250V	20A 250V 3ø	30A 250V 3ø	20A 120/208V 3øY	30A 120/208V 3øY
3 pole, 4 wire	3 pole, 4 wire	3 pole, 4 wire	4 pole, 5 wire	4 pole, 5 wire
ANSI C-73.84	ANSI C-73.85	ANSI C-73.86	ANSI C-73.90	ANSI C-73.91

Unmarked -- Black, G -- Green, XYZ -- Other colors including black

Receptacle and Connector - Locking and Grounding



Plug and Inlet - Locking and Grounding



50A 125V	50A 125/250V
2 pole, 3 wire	3 pole, 4 wire
ANSI C-73.110	ANSI C-73 111

Unmarked -- Black, G -- Green, XYZ -- Other colors including black

Appendix C Referenced Publications

C-1 The following documents or portions thereof are referenced within this standard for informational purposes only and thus are not considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

C-1.1 NFPA Publications. National Fire Protection Association, 1 Battermarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 13-1989, *Standard for the Installation of Sprinkler Systems*

NFPA 231C-1986, *Standard for Rack Storage of Materials.*

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