NFPA® 303

Fire Protection Standard for Marinas and Boatyards

2016 Edition

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

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NFPA®303

Fire Protection Standard for

Marinas and Boatyards

2016 Edition

This edition of NFPA 303, *Fire Protection Standard for Marinas and Boatyards*, was prepared by the Technical Committee on Marinas and Boatyards. It was issued by the Standards Council on May 26, 2015, with an effective date of June 15, 2015, and supersedes all previous editions.

This edition of NFPA 303 was approved as an American National Standard on June 15, 2015.

Origin and Development of NFPA 303

This first standard on the subject of marinas and boatyards was adopted by NFPA in 1940 on the 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 1951, 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, 1969, 1975, and 1984. In 1986, a complete revision of NFPA 303 was adopted; it incorporated boat condominiums and multiple berthing facilities and provided updated electrical and fire protection requirements. The 1990 edition of NFPA 303 contained amendments to the previous edition, while the 1995 edition contained amendments to Chapters 1, 2, 3, and 4 of the 1990 edition.

The 2000 edition contained amendments to the electrical wiring and equipment requirements in Chapter 3, among others.

The 2006 edition underwent a complete revision to comply with the *Manual of Style for NFPA Technical Committee Documents*. In addition, the Technical Committee created new sections for shrink-wrap operations and ground fault monitoring and incorporated other amendments throughout the remainder of the document.

In the 2011 edition, the Committee updated information concerning referenced publications and revised general definitions in accordance with the *Manual of Style for NFPA Technical Committee Documents*. Design requirements for automatic sprinkler protection for buildings with multilevel boat rack storage arrangements were amended to conform to a revision in the 2010 edition of NFPA 13, *Standard for the Installation of Sprinkler Systems*. A new requirement for posting emergency contact information at marinas and boatyards was added to that edition of NFPA 303, as well as guidance for reducing electric shock hazards and use of corrosion-resistant materials in certain fixed extinguishing systems. Sections and subsections within Chapter 8 were renumbered.

Marinas and boatyards are subject to harsh environmental conditions, which makes maintaining fire-fighting equipment and electrical equipment a challenge. The 2016 edition of NFPA 303 includes revisions to address that problem. The Technical Committee revised the requirements for inspection, testing, and maintenance of fire-fighting equipment to incorporate references to all applicable NFPA standards. Portable fire extinguishers need to be protected from environmental exposures. In addition, NFPA 303 now mandates that the marina or boatyard pre-fire plan be submitted to the AHJ annually for approval. The pre-fire plan must include more detailed lists of fire-fighting equipment within the facility and employee responsibilities during emergencies situations

The Committee also has added new requirements for isolation valves in standpipe systems and has clarified the minimum flow rate for supply piping. Isolation valves are critical for maintaining water supply by closing off damaged sections of piping systems. A minimum flow rate of 300 gpm (1136 L/min) for standpipes on piers and bulkheads is needed to provide adequate water supply for two fire service hose streams.

To address the high percentage of fires in marinas and related facilities that are attributable to boat owners and guests, who cannot be expected to be aware of fire hazards at the level of a professional, the Committee added requirements to address hazards that could be introduced to the facility by boat owners or their guests. Two examples of those requirements are the prohibition of portable cooking equipment onboard boats in berthing areas and new requirements for the use of portable electric heaters.

Electric shock drowning (ESD) is principally seen in fresh water environments but it can occur in brackish water too. ESD begins with an electrical fault on the dock or onboard a boat when a voltage source comes into contact with the body of water. The voltage radiates throughout the water in a hemispherical field. As a swimmer approaches the electric field, electric current flows through the swimmer's body causing a shock that immobilizes the swimmer or even causes cardiac arrest. A swimmer exposed to this electric shock hazard is at risk of drowning.

The Committee addressed the technical aspects of the ESD problem with the information available at the time of its deliberations and focused on tightening the requirements for ground fault protection. The user of the 2016 edition of NFPA 303 will be directed to the *National Electrical Code,* Article 555.3, for the installation of ground fault protection at marinas and boatyards. Previous editions of NFPA 303 did not specify regular testing of the ground fault devices. This has been corrected in the 2016 edition with a requirement that regular inspection of ground fault protection devices be conducted at regular intervals and at least annually. Furthermore, any deficiencies found during regular inspection and testing (such as damaged or inoperative ground fault protection devices or 120 volt neutral currents flowing through grounding conductors) must be corrected.

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Committee Scope: This Committee shall have primary responsibility for documents on fire prevention and protection in the design, construction, and operation of marinas and boatyards.

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NFPA 303

Fire Protection Standard for

Marinas and Boatyards

2016 Edition

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

Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1 Scope. This standard applies to the construction and operation of marinas, boatyards, yacht clubs, boat condominiums, docking facilities associated with residential condominiums, multiple-docking facilities at multiple-family residences, and all associated piers, docks, and floats.

1.1.1 This standard also applies to support facilities and structures used for construction, repair, storage, hauling and launching, or fueling of vessels if fire on a pier would pose an immediate threat to these facilities, or if a fire at a referenced facility would pose an immediate threat to a docking facility.

1.1.2 This standard applies to marinas and facilities servicing small recreational and commercial craft, yachts, and other craft of not more than 300 gross tons.

1.1.3 This standard is not intended to apply to a private, noncommercial docking facility constructed or occupied for the use of the owners or residents of the associated single-family dwelling.

1.1.4 No requirement in this standard is to be construed as reducing applicable building, fire, and electrical codes.

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 marinas and related facilities.

1.3 Retroactivity. The provisions of this standard reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this standard at the time the standard was issued.

1.3.1 Unless otherwise specified, the provisions of this standard shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard. Where specified, the provisions of this standard shall be retroactive.

1.3.2 In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard deemed appropriate.

1.3.3 The retroactive requirements of this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, and only where it is clearly evident that a reasonable degree of safety is provided.

Chapter 2 Referenced Publications

2.1* General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 10, *Standard for Portable Fire Extinguishers,* 2013 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems,* 2016 edition.

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

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection,* 2016 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances,* 2016 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,* 2014 edition.

NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages,* 2015 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment,* 2011 edition.

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials,* 2016 edition.

NFPA 54, *National Fuel Gas Code,* 2015 edition.

NFPA 58, *Liquefied Petroleum Gas Code,* 2014 edition.

NFPA 70®, National Electrical Code®, 2014 edition.

NFPA 72®, National Fire Alarm and Signaling Code, 2016 edition.

NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems,* 2015 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems,* 2016 edition.

NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems,* 2016 edition.

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel–Burning Appliances,* 2013 edition.

NFPA 220, *Standard on Types of Building Construction,* 2015 edition.

NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft,* 2015 edition.

NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves,* 2016 edition.

NFPA 326, *Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair,* 2015 edition.

NFPA 1962, *Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances,* 2013 edition.

2.3 Other Publications.

2.3.1 NEMA Publications. National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, VA 22209.

ANSI/NEMA WD6, *Wiring Devices — Dimensional Specification*, 2012.

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

ANSI/UL 231, *UL Standard for Power Outlets*, 2008.

ANSI/UL 1686, *UL Standard for Pin and Sleeve Configurations*, 2012.

2.3.3 Other Publications.

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

2.4 References for Extracts in Mandatory Sections. (Reserved)

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

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

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

3.2.5 Shall. Indicates a mandatory requirement.

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

3.2.7 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Berth. The water space to be occupied by a boat or other vessel alongside or between bulkheads, piers, piles, fixed and floating docks, or any similar access structure. *(See also 3.3.20, Slip.)*

3.3.2* Boatyard. A facility used for constructing, repairing, servicing, hauling from the water, storing (on land and in water), and launching of boats.

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

3.3.4 Bulkhead. A vertical structural wall, usually of stone, timber, metal, concrete, or synthetic material, constructed along, and generally parallel to, the shoreline to retain earth as an extension of the upland, and often to provide suitable water depth at the waterside face.

3.3.5* Crane. A mechanical device used for lifting or moving boats.

3.3.6* Docking Facility. A covered or open, fixed or floating structure that provides access to the water and to which boats are secured.

3.3.7 Electrical Datum Plane. The electrical datum plane is defined as follows: (a) in land areas subject to tidal fluctuation, the electrical datum plane is a horizontal plane 2 ft (610 mm) above the highest tide level for the area occurring under normal circumstances, that is, highest high tide; (b) in land areas not subject to tidal fluctuation, the electrical datum plane is a horizontal plane 2 ft (610 mm) 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 (1) installed to permit rise and fall response to water level, without lateral movement, and (2) that are so equipped that they can rise to the datum plane established for (a) or (b) is a horizontal plane 30 in. (762 mm) above the water level at the floating pier or landing stage and a minimum of 12 in. (305 mm) above the level of the deck.

3.3.8* Fuel Product Lines. Piping that connects the fuel storage tanks to the fuel dispensing pumps.

3.3.9 Fuel Storage. An area or structure (i.e., tank) that contains fuel products in storage for subsequent dispensing.

3.3.10* Fueling Station or Pier. An area on a pier, dock, bulkhead, or similar structure that is specifically used for the dispensing of fuel products.

3.3.11 Liquids.

3.3.11.1* *Combustible Liquid.* Any liquid that has a closed-cup flash point at or above 37.8°C (100°F).

3.3.11.2* *Flammable Liquid.* A liquid that has a closed-cup flash point that is below 37.8°C (100°F) and a maximum vapor pressure of 2068 mm Hg (40 psia) at 37.8°C (100°F).

3.3.12* Marina. A facility, generally on the waterfront, that stores and services boats in berths, on moorings, and in dry storage or dry stack storage.

3.3.13 Marine Power Outlet. An enclosed assembly that can include receptacles, circuit breakers, fused switches, fuses and watt-hour meter, and monitoring means approved for marine use.

3.3.14* Marine Railway. A device used for hauling boats out of the water or placing boats into the water.

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

3.3.16* Mooring(s). Any place where a boat is wet stored or berthed.

3.3.17 Pier. A structure extending over the water and supported on a fixed foundation (fixed pier), or on flotation (floating pier), that provides access to the water.

3.3.17.1 *Covered Pier.* A fixed or floating pier that is provided with a roof system to protect berthed boats from the weather.

3.3.17.2 *Fixed Pier.* Pier constructed on a permanent, fixed foundation, such as on piles, that permanently establishes the elevation of the structure deck with respect to land.

3.3.17.3 *Floating Pier.* Pier designed with inherent flotation capability that allows the structure to float on the water surface and rise and fall with water level changes.

3.3.18 Qualified Person. One who has skills and knowledge related to the construction and operation of the equipment and installations and has received safety training on the hazards involved.

3.3.19 Readily Accessible. Capable of being reached quickly and safely for effective use.

3.3.20 Slip. A berthing space between or adjacent to piers, wharves, or docks; the water areas associated with boat occupation. *(See also 3.3.1, Berth.)*

3.3.21 Stack Storage. See 3.3.23.2, Dry Stack Storage.

3.3.22* Standpipe System. An arrangement of piping, valves, hose connections, and allied equipment 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 designated buildings, structures, or property in addition to providing occupant protection as required.

3.3.23 Storage.

3.3.23.1* *Covered Storage.* A structure or building capable of receiving and storing boats for extended periods of time while protecting the boats from exposure to the weather.

3.3.23.2* *Dry Stack Storage.* A facility, either covered or uncovered, constructed of horizontal and vertical structural members designed to allow placement of small boats in defined slots arranged both horizontally and vertically.

3.3.23.3 *Seasonal Storage.* Storage of boats for extended periods when not in use (e.g., winter storage).

3.3.23.4 *Wet Storage.* Storage of a boat afloat in a partly or completely laid-up status.

Chapter 4 Management

4.1* Smoking Restrictions.

4.1.1 Smoking shall be prohibited in the following areas:

(1) Where fuels and other flammable liquids are stored or dispensed
(2) Covered or enclosed boat storage areas
(3) Battery rooms
(4) Locations designated by management or the authority having jurisdiction

4.1.2 "No Smoking" signs shall be posted in the areas identified in 4.1.1.

4.2 Inspection, Testing, and Maintenance of Fire-Fighting Equipment and Fire Protection Systems. A program that requires periodic inspection, testing, maintenance and operation of fire-fighting equipment and fire protection systems and ensures access to all parts of the facility for fire-fighting personnel shall be approved.

4.2.1 All fire-fighting equipment and fire protection systems shall be inspected, tested, and maintained at regular intervals in accordance with manufacturers' instructions and the applicable NFPA standards.

4.2.1.1 Fire extinguishers shall be inspected, tested, and maintained in accordance with NFPA 10.

4.2.1.2* Fire extinguishers shall be emptied at the end of their service period.

4.2.2 Hoses on standpipe and sprinkler systems shall be inspected, tested, and maintained in accordance with NFPA 1962.

4.2.3 Sprinkler systems, standpipe systems, private fire service mains, fire pumps, and water storage tanks shall be inspected, tested, and maintained in accordance with NFPA 25.

4.2.4 Fire alarm and detection systems shall be inspected, tested, and maintained in accordance with *NFPA 72*.

4.2.5 Emergency generators shall be inspected, tested, and maintained in accordance with NFPA 110.

4.2.6 Fire Department Access.

4.2.6.1 The fire department shall have access to fenced, gated, or locked grounds or piers.

4.2.6.2 Appropriate means of access such as keys, cardkeys, or combinations shall be provided to the fire department or shall

be permitted to be secured in a lockbox on the premises accessible to the fire department.

4.2.6.3 The fire department shall be notified immediately of any changes in the means of access.

4.2.6.4 Approved berthing and slip identification from the land and water shall be provided.

4.3* Employee Training.

4.3.1* Practice drills shall be held at least twice a year.

4.3.2* All employees shall know the location of fire-fighting equipment.

4.3.3 Each employee shall be instructed in the procedures for responding to a fire, responding to a fire alarm, and reporting a fire to the proper authorities (and to designated facility employees), as well as the employee's designated role(s) in prefire planning matters. *(See Section 4.4.)*

4.3.4 All employees, including office personnel, shall be given training in the use of portable fire extinguishers.

4.4 Fire Department Liaison.

4.4.1 Annually, the management shall submit a pre-fire plan to the authority having jurisdiction and the local fire department for approval.

4.4.2 At a minimum, the pre-fire plan shall include the following:

(1) Entries and access routes for equipment within the premises
(2) Location, construction, use, and accessibility of all buildings and all their subdivisions including basements and storage lockers
(3) Location and extent of outside working areas
(4) Location and means of access to both dry and wet boat storage areas
(5) Type and capacity of water lines on piers and walkways, including all points where connection of hydrant or pumper supplies can be affected
(6) Types, capacities, and location of facility equipment, including work or tow boats, portable pumps, pier-mounted hose cabinets, and all portable fire extinguishers
(7) Voltages and capacities of electrical systems and location of electrical disconnecting means
(8) Employee responsibilities in the event of an emergency

4.4.3* The placement of fire-extinguishing equipment shall be planned in cooperation with the authority having jurisdiction and local responding fire departments at least annually in order to accommodate changing conditions and personnel responsible for fire control in the facility.

4.4.4 A copy of this plan shall be kept on site in an approved location.

4.5* Watch Service.

4.5.1 Route.

4.5.1.1 If a watch person is employed, the route shall be laid out to include every important and potentially hazardous area within the premises.

4.5.1.2 Important and potentially hazardous areas shall be incorporated in a recognized watch person's recording system, such as a portable watch clock or a computerized reporting system.

4.5.2 Rounds.

4.5.2.1 The watch person's first round shall consist of a complete inspection immediately at the close of the working day.

4.5.2.2 Subsequent rounds shall be scheduled so that the interval between visiting each area shall not exceed 1 hour.

4.6* Boat Owners and Guests.

4.6.1 Signs, posters, or posted instructions shall be provided where practicable to remind the public of basic fire safety practices and to warn of unusual or extreme fire hazards.

4.6.2 All boat owners at the marina shall be provided with written instructions for reporting fires and other emergencies and actions to be taken in the event of a fire.

4.7 Open-Flame Devices. Open-flame devices used for lighting or decoration shall not be used on a float, pier, or bulkhead unless approved by the authority having jurisdiction.

4.8 Portable Cooking Equipment. The use of any form of hibachis, charcoal, wood, or gas-type portable cooking equipment shall be prohibited on boats in berthing areas or on docks unless approved by the AHJ.

Chapter 5 Electrical Wiring and Equipment

5.1* National Electrical Code. The requirements set forth herein supplement and relate the requirements of *NFPA 70* to the specific conditions and combinations of conditions found in marinas and boatyards and shall be followed in addition to any requirements found in *NFPA 70*, including, but not limited to, Article 555.

5.2 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 installed and connected in accordance with listing requirements and/or manufacturer's instructions.

5.3 Electrical Datum Plane.

5.3.1 A bench mark indicating the electrical datum plane *(see 3.3.7)* of the land area shall be permanently located on shore in the marina or boatyard.

5.3.2 Electrical services shall be disconnected from the power source when the water level reaches the bench mark for the electrical datum plane.

5.3.3 All electrical connections shall be located at least 12 in. (305 mm) above the deck of a floating pier.

5.3.4 All electrical connections shall be located at least 12 in. (305 mm) above the deck of a fixed pier but not below the electrical datum plane. *(See 5.12.1 for receptacle locations.)*

5.4 Power Supply.

5.4.1 Poles or structures used to support electrical service, feeder, or branch circuit shall be used only for that purpose unless otherwise permitted by 5.4.1.1 or 5.4.1.2.

5.4.1.1 Poles or structures shall be permitted to be used to support communications and television cables and lighting

fixtures, provided the spacing and separation between such cables and fixtures on poles are as required in *NFPA 70*.

5.4.1.2 A building shall be permitted to be used to support electrical service to that building.

5.4.2 Primary power shall be carried to piers where design considerations require more than 250 V maximum due to load requirements and the use of the system has been approved by the authority having jurisdiction.

5.4.2.1 All cable connections shall be in accordance with *NFPA 70*.

5.4.3 Maximum Voltage.

5.4.3.1 Primary power, when introduced in excess of 250 V phase to phase, shall be transformed to reduce the marina or boatyard electrical system to be not in excess of 250 V phase to phase unless otherwise permitted by 5.4.3.2.

5.4.3.2 A marina or boatyard electrical system shall be permitted to be in excess of 250 V phase to phase where engineered and the system has been approved by the authority having jurisdiction.

5.4.4 Transformers and Enclosures.

5.4.4.1 Transformers and enclosures shall be specifically approved for the intended location.

5.4.4.2 The bottom of enclosures for transformers shall not be located below the electrical datum plane.

5.4.5 Service Equipment.

5.4.5.1 Service equipment, including service disconnecting equipment, meters, and associated equipment, and the main switchboard or panel, shall not be installed in wet locations unless listed for wet locations.

5.4.5.2 The equipment addressed in 5.4.5.1 shall be protected against access by unauthorized persons.

5.4.5.3 The equipment addressed in 5.4.5.1 shall be in compliance with the requirements of Article 230 in *NFPA 70* that are not addressed in 5.4.5.

5.4.6 Where auxiliary emergency or optional standby power supply equipment is provided, the standby electrical system shall be designed, installed, and maintained as required by Articles 700, 701, or 702 of *NFPA 70*, and NFPA 110 or NFPA 111.

5.4.6.1 The engine and generator shall be housed in a well-ventilated, fire-resistive enclosure that shall contain only the auxiliary power unit and the necessary controls.

5.4.6.2 The engine and generator shall not be located below the electrical datum plane.

5.4.6.3 Interior areas of the enclosure shall be lighted by a fixture connected to the normal power supply.

5.5 Grounding.

5.5.1* The means and methods of grounding the non-current-carrying metal parts of the electrical system and for equipment and portable appliances connected thereto shall comply with the requirements of Articles 250 and 555 of *NFPA 70*.

5.5.2 Metal poles, lighting standards, and other metal supports that carry or enclose electrical wiring shall be grounded in accordance with Section 250.50 of *NFPA 70*.

5.5.3 Ground fault protection shall be installed in accordance with *NFPA 70*, Article 555.3.

5.6 Dry Locations. The entire electrical system installed in a dry location shall comply with the requirements of *NFPA 70* for dry locations.

5.7 Damp Locations. The entire electrical system installed in a damp location shall comply with the requirements of *NFPA 70* for damp locations.

5.8 Wet Locations. The entire electrical system installed in a wet location shall comply with the requirements of *NFPA 70* for wet locations.

5.9 Electrical Installation.

5.9.1 Wiring electrical equipment and materials installed on piers, wharves, docks, or similar locations, and wiring methods shall specifically conform to the requirements of Article 555 and any other applicable requirements of *NFPA 70*.

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

5.9.3 Electrical wiring shall be installed in such a way as to avoid possible contact with masts and other parts of boats being moved in the yard.

5.9.4 Underground electrical installations shall comply with the requirements of *NFPA 70*.

5.9.5 Permanent wiring on the underside of piers (floating or fixed) shall be permitted to be "extra hard usage" cables *(see Table 400.4, NFPA 70)*, such as Type G and Type W, provided that such cables are properly supported, are not subject to physical damage, and are installed in compliance with any listing requirements, manufacturer's recommendations, and any applicable sections of *NFPA 70*.

5.9.6 Temporary wiring shall not be used to supply power to boats unless permitted by Article 590 of *NFPA 70*.

5.9.7 If electrical wiring is not installed underground, the wiring within yard areas shall be routed to avoid the following:

(1) Wiring within or across any portion of the yard that could be used for moving vessels
(2) Wiring closer than 20 ft (6.10 m) from the outer edge or any portion of the yard that could be used for moving vessels or stepping or unstepping masts

5.9.7.1 Clearance for wiring in other portions of the yard, not inclusive of the areas described in 5.9.7(1) and 5.9.7(2), shall be as follows:

(1) Not less than 18 ft (5.49 m) above grade in open areas
(2) Not less than 8 ft (2.44 m) above highest point of roof where above buildings

5.9.7.2 Warning signs to warn operators of the wire clearance to be encountered shall be located so as to be clearly visible.

5.9.8 Wiring installed over and under navigable water shall be subject to approval by the authority having jurisdiction.

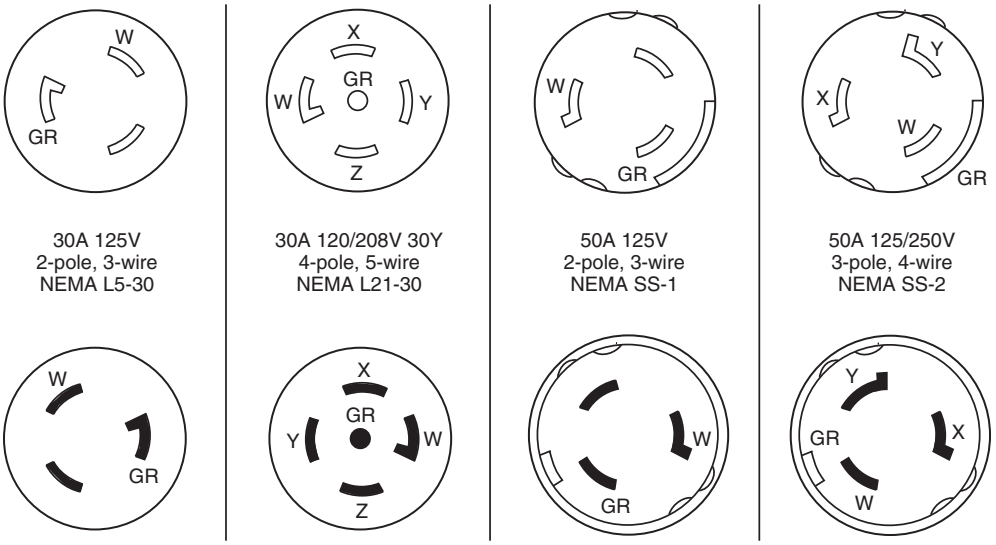


FIGURE 5.12.3 Receptacle Configurations, Ranging from 30 Amperes to 50 Amperes.

5.9.9 Warning signs to warn operators and boaters of the wire clearance to be encountered shall be placed in suitable locations.

5.9.10 Where flexibility is necessary, as on piers composed of floating sections, the feeder conductors, if installed in a wet location, shall meet the following criteria:

(1) Listed for "extra hard usage" as identified in Table 400.4 of *NFPA 70* and rated not less than 167°F (75°C), 600 V, of the required ampacity
(2) Include a common grounding conductor with an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals
(3) Fastened by nonmetallic clips to structural members of the pier other than the deck planking

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

5.9.10.2 An approved junction box of corrosion-resistant construction with permanently installed terminal blocks shall be on each pier section to which the feeder and feeder extensions are to be connected.

5.9.10.3 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 such materials.

5.10 Circuit Breakers, Switches, Panels, and Marine Power Outlets (Damp and Wet Locations).

5.10.1* Overcurrent protection for feeders or branch circuits as required by *NFPA 70* shall be provided by the use of circuit breakers.

5.10.2 Circuit breakers and switches installed in gasketed enclosures shall be arranged to permit required manual operation without exposing the interior of the enclosure.

5.10.3 Enclosures shall be arranged with a weep hole to discharge condensation.

5.11 Marine Power Outlet. A manufactured marine power outlet shall comply with ANSI/UL 231, *UL Standard for Power Outlets*.

5.12 Receptacles.

5.12.1* Where receptacles intended to supply shore power to boats are installed, receptacles shall comply with the requirements in 5.12.1.1 through 5.12.1.3.

5.12.1.1 Receptacles shall meet one of the following:

(1) Housed in marine power outlets listed as marine power outlets
(2) Listed for wet locations
(3) Installed in listed enclosures protected from the weather
(4) Housed in listed weatherproof enclosures

5.12.1.2 The integrity of the receptacle assembly shall not be affected when the receptacles are in use with any type of booted or nonbooted attachment plug/cap inserted.

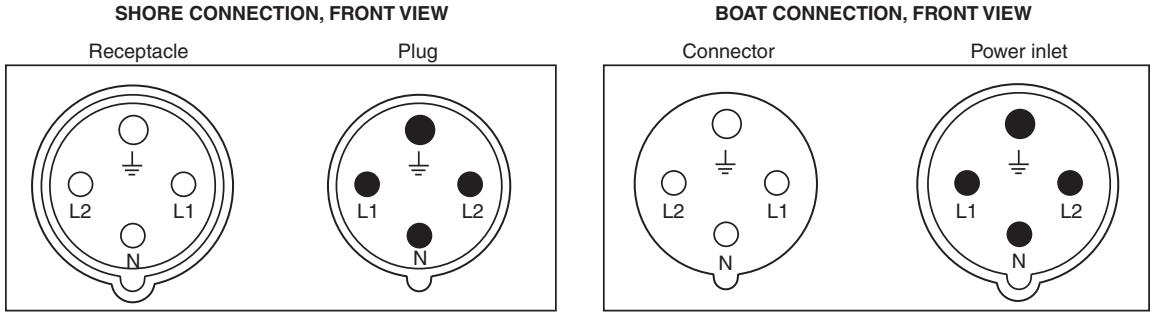
5.12.1.3 Receptacles shall be mounted not less than 12 in. (305 mm) above the deck surface of the pier and not below the electrical datum plane.

5.12.2 Receptacles that provide shore power for boats shall be rated not less than 30 amperes and shall be single-outlet type.

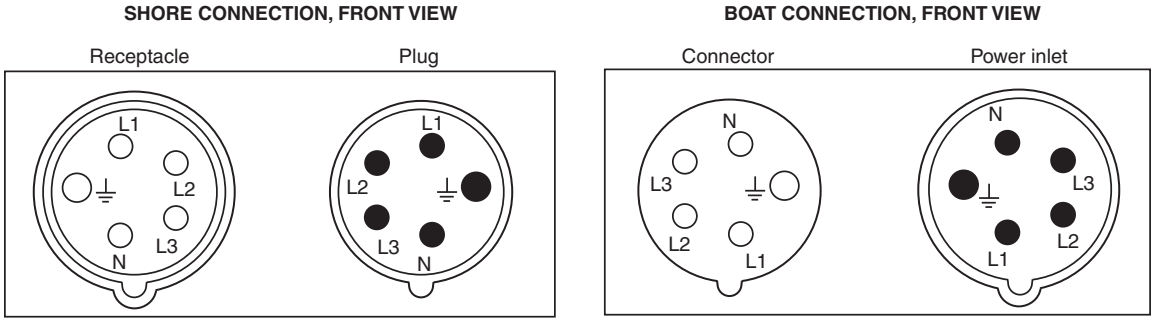
5.12.3 Receptacles rated not less than 30 amperes nor more than 50 amperes shall be of the locking type and shall conform to the configurations of ANSI/NEMA WD6, *Wiring Devices — Dimensional Specification*, as shown in Figure 5.12.3.

5.12.4 Receptacles rated for 60 amperes or 100 amperes shall be of the pin-and-sleeve type and shall conform to the configurations of ANSI/UL 1686, *UL Standard for Pin and Sleeve Configurations*, as shown in Figure 5.12.4.

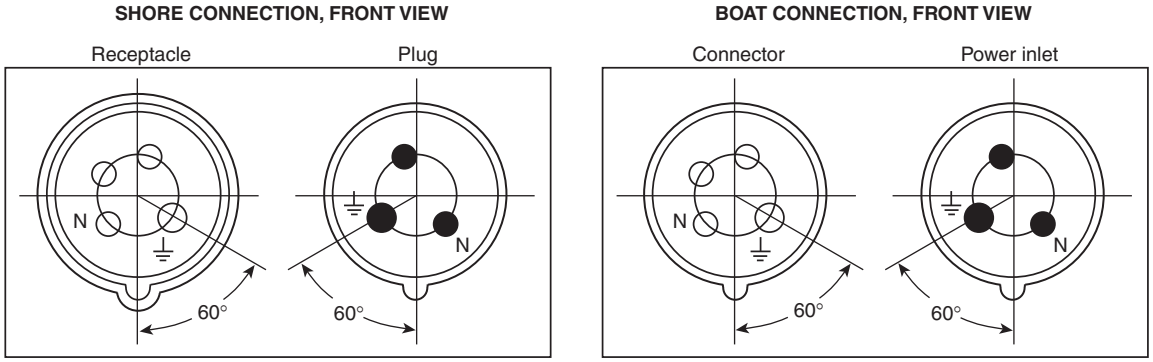
5.12.5 Each single receptacle that supplies shore power for boats shall be supplied by an individual branch circuit of the voltage class and rating corresponding to the voltage class and rating of the receptacle.



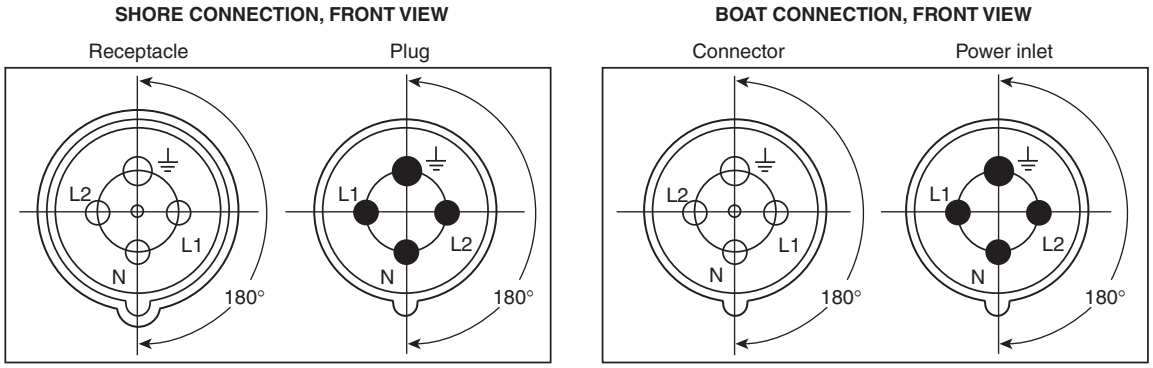
100A 125/250V, 3-pole, 4-wire



100A 120/208V, 30-wye, 4-pole, 5-wire



1P + N + ground, 60A, 125VAC



(Views are of mating faces of devices) 2P + N + ground, 60A, 125/250VAC

FIGURE 5.12.4 Pin-and-Sleeve Configurations, Either 60 Amperes or 100 Amperes.

5.12.6 Fifteen and 20 ampere, single-phase, 125 V outdoor receptacles shall be protected by ground-fault circuit interrupters.

5.12.7 Fifteen and 20 ampere, single-phase, 125 V outdoor receptacles shall not be housed in marine power outlets with the receptacles that provide shore power to boats unless a marking clearly indicates that the receptacle is not to be used to supply power to boats.

5.13 Disconnects.

5.13.1 A disconnecting means, consisting of a circuit breaker, switch, or both, shall be provided by which the shore power to each boat can be isolated from its supply circuit.

5.13.2 The disconnecting means shall meet the following conditions:

(1) Readily accessible
(2) Properly identified
(3) Located within 30 in. (762 mm) of the shore power connection
(4) Constitute the means of cutoff of the shore power to the boat

5.14 Lighting Fixtures and Switches.

5.14.1 Lighting fixtures shall conform to the requirements of *NFPA 70*.

5.14.2 Lighting fixtures shall be located to prevent damage by contact with stored or moving material.

5.14.3 Switches for control of lighting fixtures that are exposed to the weather or splash shall be of a type listed for that use.

5.15 Electrical Equipment Enclosures.

5.15.1 Electrical equipment enclosures installed on piers above deck level shall be supported by structural members independent of any conduit connected to them.

5.15.2 If enclosures are not attached to mounting surfaces by means of external ears or lugs, the internal screw heads shall be sealed to prevent seepage of water through mounting holes.

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

5.16 Feeders and Branch Circuits on Piers.

5.16.1 The load for each feeder and/or service circuit supplying receptacles for the connection of shore power to boats shall be calculated in accordance with Article 555 of *NFPA 70*.

5.16.2 The voltage drop, based on the total load, shall be as required by Article 215 of *NFPA 70*.

5.16.3 Feeder Taps.

5.16.3.1 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.

5.16.3.2 Feeder taps shall comply with Article 240 of *NFPA 70*.

5.16.3.3 Branch circuits connecting 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.

5.16.3.4 Conduit.

5.16.3.4.1 Rigid metallic or nonmetallic conduit shall be installed to protect wiring above the decks of piers and landing stages and below enclosures that the wiring serves.

5.16.3.4.2 Conduit shall be connected to enclosures by full standard pipe threads.

5.16.3.4.3 Special fittings of nonmetallic material shall not be used on nonmetallic conduit to provide a threaded connection into enclosures unless the following criteria are met:

(1) The fitting employs a joint design as recommended by the conduit manufacturer for attachment of the fitting to the conduit.
(2) The method and equipment used for attachment are approved.
(3) The assembly meets the requirements for installation in a damp location.

5.16.4 The disconnects for feeder circuits and branch circuits extending from the main service equipment shall be readily accessible and marked.

5.17 Hazardous (Classified) Locations.

5.17.1 Only qualified persons as defined by Article 100 of *NFPA 70* shall be permitted to use, handle, install, or repair electrical systems or facilities within any area classified as hazardous by Article 500 of *NFPA 70*.

5.17.2 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.

5.17.3 Lighting fixtures for areas used for the handling and dispensing of fuels, and the switches controlling the lighting fixtures, shall be located beyond the hazardous area unless of a type approved for the location.

5.17.4 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.

5.18 Tests. The tests in this section shall be conducted upon completion of the installation.

5.18.1 Insulation Integrity.

5.18.1.1 The electrical system shall be subjected to a test of insulation integrity in the presence of the authority having jurisdiction or a representative thereof.

5.18.1.2 Insulation integrity tests shall meet the requirements of Section 110.7 of *NFPA 70*.

5.18.2* Ground Integrity and Polarity.

5.18.2.1 All receptacles shall be tested for ground integrity and polarity.

5.18.2.2 All improper ground and polarity conditions shall be corrected prior to use.

5.19 Marine Hoists, Railways, Cranes, and Monorails.

5.19.1 Motors and controls for marine hoists and railways shall not be located below the electrical datum plane as defined in 3.3.7.

5.19.2 Where it is necessary to provide electric power to a mobile crane or hoist in the yard and a trailing cable is involved, the power arrangement 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.

5.20 Maintenance of Electrical Wiring and Equipment.

5.20.1 An inspection of all electrical wiring, ground connections, conduit, hangers, 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 ensure a complete inspection at least annually.

5.20.2 The inspection required in 5.20.1 shall include a test of ground integrity and polarity as well as testing of all ground fault protection devices.

5.20.3 All corroded, worn, broken, or improper materials shall be replaced or repaired before further use.

5.20.4 The use of tape to repair broken or cracked insulation of jackets on flexible cables or cords shall be prohibited.

5.20.5 Splicing of flexible cord or cable shall be prohibited.

5.20.6 An inspection to identify any of the following conditions shall be conducted at least annually, and corrective action shall be taken for any deficiencies:

(1) Areas being used for purposes not originally contemplated and that introduce hazards greater than those for which the electrical system was designed
(2) Locked or otherwise restricted areas or equipment being left open
(3) The use of grounding-type portable electrical equipment that is not properly and adequately grounded
(4) Shore power cable sets used by vessels for connection to shore power outlets as follows:
    (a) Shore power cable sets that lie across the surface of pier walkways shall be protected from mechanical abuse and positioned to reduce tripping hazard.
    (b) Shore power cable sets shall be secured so as not to trail into the water.
    (c) Shore power cable sets shall be fitted with molded-on plugs with sealing flanges or weatherproof boots over the plugs of a type and size compatible with the plugs.
(5) Temporary wiring that is not in compliance with Article 590 of *NFPA 70*
(6) Damaged or inoperative ground fault protection devices, switches, lighting fixtures, and receptacle outlets
(7) Overloading of electrical circuits
(8) The introduction of unsuitable appliances into a hazardous area
(9) 120 volt neutral currents flowing through grounding conductors

Chapter 6 Fire Protection

6.1 Portable Fire Extinguishers.

6.1.1 Placement.

6.1.1.1 Placement of portable fire extinguishers shall be in accordance with Chapter 5 of NFPA 10 unless otherwise permitted by 6.1.1.1.1, 6.1.1.1.2, or 6.1.1.1.3.

6.1.1.1.1 Placement of portable fire extinguishers on piers and along bulkheads where vessels are moored or are permitted to be moored shall meet the following criteria:

(1) Extinguishers listed for Class A, Class B, and Class C fires shall be installed at the pier/land intersection on a pier that exceeds 25 ft (7.62 m) in length.
(2) Additional fire extinguishers shall be placed such that the maximum travel distance to an extinguisher does not exceed 75 ft (22.86 m).
(3) Extinguishers shall be protected from environmental exposures to prevent damage and lack of operability.

6.1.1.1.2 Fuel-Dispensing Areas.

6.1.1.1.2.1 Portable fire extinguishers that meet the minimum requirements of Chapter 5 of NFPA 10 for extra (high) hazard type shall be installed on two sides of a fuel-dispensing area.

6.1.1.1.2.2 On piers or bulkheads where long fueling hoses are installed for fueling vessels, additional extinguishers installed on piers or bulkheads shall meet the requirements of Chapter 5 of NFPA 10 for extra (high) hazard type and 6.1.1.1.1 of this standard.

6.1.1.1.3 All extinguishers installed on piers shall meet the rating requirements set forth in Chapter 5 of NFPA 10 for ordinary (moderate) hazard type.

6.1.2 Visibility and Identification. All portable fire extinguishers shall be clearly visible and marked.

6.2* Fixed Fire-Extinguishing Systems.

6.2.1 Buildings on Piers.

6.2.1.1 Buildings in excess of 500 ft^2 (46 m^2) that are constructed on piers shall be protected by an approved automatic fire-extinguishing system unless otherwise permitted by 6.2.1.2 or 6.2.1.3.

6.2.1.2 Buildings of Type I or Type II construction, as specified in NFPA 220 and without combustible contents shall not be required to be protected by an automatic fire-extinguishing system.

6.2.1.3* Existing facilities shall not be required to be protected by an automatic fire-extinguishing system where acceptable to the authority having jurisdiction.

6.2.2* Buildings Exceeding 5000 ft^2 (465 m^2).

6.2.2.1 Marina and boatyard buildings in excess of 5000 ft^2 (465 m^2) in total area shall be protected by an approved automatic fire-extinguishing system unless otherwise permitted by 6.2.2.2.

6.2.2.2* Existing facilities shall not be required to be protected by an automatic fire-extinguishing system where acceptable to the authority having jurisdiction.

6.2.3 Combustible Piers and Substructures.

6.2.3.1 Combustible piers and substructures in excess of 25 ft (7.62 m) in width or in excess of 5000 ft^2 (465 m^2) in area, or within 30 ft (9.14 m) of other structures or superstructures required to be so protected, shall be protected in accordance with Section 4.3 of NFPA 307 unless otherwise permitted by 6.2.3.2, 6.2.3.3, or 6.2.3.4.

6.2.3.2 Fixed piers shall not be required to be protected as specified in 6.2.3.1 where the vertical distance from the surface of mean high water level to the underside of the pier surface does not exceed 36 in. (914 mm).

6.2.3.3 Floating piers shall not be required to be protected as specified in 6.2.3.1 where the vertical distance from the surface of the water to the underside of the pier surface does not exceed 36 in. (914 mm).

6.2.3.4* Existing facilities shall not be required to be protected by an automatic fire-extinguishing system where acceptable to the authority having jurisdiction.

6.2.4 Indoor Rack Storage.

6.2.4.1* Where boats are stored on multilevel racks in buildings, an approved automatic fire-extinguishing system shall be installed throughout the building unless otherwise permitted by 6.2.4.2 or 6.2.4.3.

6.2.4.2 An automatic fire-extinguishing system shall not be required for buildings less than 5000 ft^2 (465 m^2) having multilevel racks where provided with one of the following:

(1) An automatic fire detection and alarm system supervised by a central station complying with *NFPA 72*
(2) An automatic fire detection and alarm system supervised by a local protective signaling system complying with *NFPA 72* if the provisions of 6.2.4.2(1) are not technically feasible
(3) A full-time watch service if the provisions of 6.2.4.2(1) are not technically feasible

6.2.4.3* Existing facilities shall not be required to be protected by an automatic fire-extinguishing system where acceptable to the authority having jurisdiction.

6.2.5* An approved water supply shall be provided within 100 ft (30 m) of the pier/land intersection or fire department connection serving fire protection systems.

6.2.6 Access between water supplies and pier/land intersections or fire department connections shall be by roadway acceptable to the authority having jurisdiction.

6.3* Fire Standpipe Systems.

6.3.1 Class I standpipe systems shall be provided for piers, bulkheads, and buildings where the hose lay distance from the fire apparatus exceeds 150 ft (45 m).

6.3.2 Class I standpipes shall be provided in all buildings used for the rack storage of boats.

6.3.3 Standpipe systems, where installed, shall be in accordance with NFPA 14 except for the provisions identified in 6.3.4 through 6.3.7.

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

6.3.5 Supply piping for standpipes on piers and bulkheads shall be sized for the minimum flow rate of 300 gpm (1136 L/min).

6.3.6 Manual dry standpipes shall be permitted.

6.3.7 Flexible connections shall be permitted on floating piers where acceptable to the authority having jurisdiction.

6.3.8 Location and number of isolation valves shall be subject to AHJ approval.

6.4 In-Out Dry Storage and Rack Storage. 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.

6.5 Hydrants and Water Supplies. Hydrants and water supplies for fire protection in marinas and boatyards shall be provided in accordance with NFPA 13, NFPA 14, and NFPA 24.

6.6 Fire Pumps. Stationary fire pump installations, when required, shall be installed in accordance with NFPA 20.

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

6.8 Transmittal of Fire Emergency.

6.8.1 All marinas and boatyards shall have a means to notify the fire department rapidly in the event of an emergency.

6.8.2 If a telephone is used to meet 6.8.1, the telephone installation shall meet the following criteria:

(1) The telephone shall be available for use at all times.
(2) Use of the telephone for emergency notification shall not require the use of a card, coin, or currency.
(3)* The street address of the facility and the emergency telephone number(s) shall be displayed prominently on a sign at the telephone.

6.9 Fire Detectors.

6.9.1 Fire detection devices and installation shall be in accordance with *NFPA 72*.

6.9.2 Fire detectors shall be installed in the following interior or covered locations unless those locations are protected by a fixed automatic sprinkler system installed in accordance with NFPA 13:

(1) Rooms containing combustible storage or goods
(2) Rooms containing flammable liquid storage or use
(3) Rooms containing battery storage or maintenance
(4) Rooms containing paint and solvent storage or use
(5) Areas used for enclosed or covered storage of vessels
(6) Areas used for enclosed or covered maintenance of vessels
(7) Areas used for public assembly, dining, or lodging
(8) Kitchens and food preparation areas
(9) Dust bins and collectors
(10) Inside trash storage areas
(11) Rooms used for storing janitor supplies or linens
(12) Laundry rooms
(13) Furnace rooms

Chapter 7 Berthing and Storage

7.1 Wet Storage and Berthing.

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

7.1.2 Access to all piers, floats, and wharves shall be provided for municipal fire-fighting equipment.

7.1.3* Electrical lighting shall be provided to ensure adequate illumination of all exterior areas, piers, and floats.

7.1.4 Electrical lighting shall not interfere with navigation or aids to navigation.

7.1.5 Only listed 120/240 V ac electrical equipment shall be operated unattended.

7.1.6 Portable Electric Heaters in Wet Storage Vessels.

7.1.6.1 Portable heaters shall be UL listed.

7.1.6.2 Portable heaters shall not be used on boats when the vessel is unattended.

7.2 Dry Storage.

7.2.1 General.

7.2.1.1 Heaters.

7.2.1.1.1 The use of portable heaters in boat storage areas shall be prohibited except where necessary to accomplish repairs.

7.2.1.1.2 Portable heaters used in accordance with 7.2.1.1.1 shall be used only when personnel are in attendance.

7.2.1.1.3 Open flame heaters shall not be used in boat storage areas.

7.2.1.2 Ladders long enough to reach the deck of any stored boat shall be provided and readily accessible.

7.2.1.3 The use of blow torches or flammable paint remover shall be prohibited unless permitted by 8.7.1.

7.2.1.4 The use of gasoline or other flammable solvents for cleaning purposes shall be prohibited.

7.2.1.5 Where a boat is to be dry-stored for the season or stored indoors for an extended period of time, such as while awaiting repairs, the following precautions shall be taken:

(1) The vessel shall be inspected for any hazardous materials or conditions that could exist, and corrective action shall be taken.
(2) Liquefied petroleum gas (LPG) and compressed natural gas (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 and, if emptied, the cap shall be removed and the tank left open to the atmosphere.
(4)* Permanently installed fuel tanks shall be stored at least 95 percent full.

7.2.1.6 No unattended electrical equipment shall be in use aboard boats.

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

7.2.1.8 Fire Department Access.

7.2.1.8.1 Access to boats stored outside shall be such that the hose-lay distance from the fire apparatus to any portion of the boat shall not exceed 150 ft (45 m).

7.2.1.8.2 Access to buildings in which boats are stored shall be such that the hose-lay distance from the fire apparatus to all exterior portions of the building shall not exceed 150 ft (45 m).

7.2.1.8.3 Wet standpipe systems shall be permitted to be used to meet the requirement in 7.2.1.8.1 or 7.2.1.8.2.

7.2.2 Indoors.

7.2.2.1 When work is being carried out onboard a vessel in an unsprinklered storage building, management shall require an inspection of the vessel at the end of the day to ensure that no hazards resulting from the day's work are present.

7.2.2.2 If a guard is employed, vessels addressed in 7.2.2.1 shall be included in the regular rounds.

7.2.2.3 Class I flammable liquids shall not be stored in an indoor boat storage area.

7.2.2.4 Work performed on boats stored indoors shall be performed by qualified personnel.

7.2.2.5 Facility management shall maintain control over all personnel access to storage facilities and boats stored indoors.

7.2.3 In-Out Dry Storage and Rack Storage.

7.2.3.1 Where boats are stored either inside or outside in single- or multiple-level racks, those boats shall have unimpeded vehicular access at one end and equipment shall be available to remove any stored boat.

7.2.3.2 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 7.2.1 shall apply.

7.2.3.3 Repairs to boats that are on racks or that are inside an in-out dry storage building shall be prohibited.

7.2.3.4 Portable power lines, such as drop cords, shall be prohibited from use on boats in an in-out dry storage building.

7.2.3.5 The charging of batteries shall be prohibited in an in-out dry storage building.

7.2.4* Battery Storage. Where due to size and weight the removal of batteries for storage or charging is impractical, batteries shall be permitted to remain onboard provided the following conditions are met:

(1) The battery compartment is arranged to provide adequate ventilation.
(2) A listed battery charger is 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 V to 125 V 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 the charger to any other device except the battery, and the boat battery switch is 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 8 hours while in operation.

Chapter 8 Operational Hazards

8.1* Conditions on Individual Boats.

8.1.1 The management shall have an inspection made of each boat received for major repair or storage as soon as practicable after arrival of the boat and before commencement of any work aboard.

8.1.2 The inspection required in 8.1.1 shall include the following determinations:

(1) Presence of combustible vapors in any compartment
(2) General maintenance and cleanliness, and location of any combustible materials that require removal or protection for the safe accomplishment of the particular work involved
(3) Quantity, type, and apparent condition of fire-extinguishing equipment onboard
(4) Listed and appropriate shore power inlet(s) and ship-to-shore cable(s), when present

8.1.3 The management shall, as a condition to accepting a boat received for major repair or storage, require the owner to correct any inadequacies found in 8.1.2 or to authorize management to do so.

8.2 General Precautions.

8.2.1 Smoking in the working area shall be prohibited.

8.2.2 Loose combustibles in the area of any hazardous work shall be removed.

8.2.3 Unprotected battery terminals shall be covered to prevent inadvertent shorting from dropped tools or otherwise, and the ungrounded battery lead shall be disconnected.

8.2.4 Personnel employed in the removal or installation of storage batteries shall be qualified.

8.2.5 Where electric service is provided to boats in storage, the receptacle providing the power shall be protected with a ground-fault circuit interrupter.

8.2.6 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 at least the following information:

(1) A prohibition against the use of any form of hibachis, charcoal, wood, or gas-type portable cooking equipment, except in specifically authorized areas that are not on the docks, on boats in the berthing area, or near flammables
(2) Procedures for disposal of trash
(3) Designation of nonsmoking areas
(4) Location of fire extinguishers and hoses
(5) Procedures for turning in a fire alarm
(6) Fueling procedures
(7)* Emergency contact information and marina address for notifying emergency services to respond to an incident

8.2.7 The information on fueling procedures referred to in 8.2.6(6) shall include at least the following information:

(1) Procedures before fueling
    (a) Stop all engines and auxiliaries
    (b) Shut off all electricity, open flames, and heat sources
    (c) Check bilges for fuel vapors
    (d) Extinguish all smoking materials
    (e) Close access fittings and openings that could allow fuel vapors to enter the boat's enclosed spaces
    (f) Remove all personnel from the boat except the person handling the fueling hose
(2) Procedures during fueling
    (a) Maintain nozzle contact with fill pipe
    (b) Attend fuel-filling nozzle at all times
    (c) Wipe up spills immediately
    (d) Avoid overfilling
(3) Procedures after fueling and before starting engine
    (a) Inspect bilges for leakage or fuel odors
    (b) Ventilate until odors are removed

8.3 Heating.

8.3.1 Heating equipment shall be installed in accordance with local ordinances and the following standards as applicable:

(1) NFPA 31
(2) NFPA 54
(3) NFPA 58
(4) NFPA 90B
(5) NFPA 211

8.3.2 Heat-Generating Plants.

8.3.2.1 Where the hazard is not considered severe by the authority having jurisdiction, heat-generating plants for steam, hot water, or forced-air systems shall be located in accordance with one of the following:

(1) In detached buildings or rooms separated from other parts of the building by fire barriers having a fire resistance rating of at least 1 hour, without windows, and with all door openings therein protected by approved self-closing or automatic-closing, positive-latching fire door assemblies having a fire protection rating of at least ¾ hour
(2) Protected by an approved automatic extinguishing system and separated from other parts of the building by smoke partitions, with any door therein self-closing or automatic-closing and constructed and installed to resist the passage of smoke

8.3.2.2 Where the hazard is considered severe by the authority having jurisdiction, any heat-generating plant room shall be both separated from all other parts of the building by approved fire barriers in accordance with 8.3.2.1(1) and protected by an approved automatic extinguishing system.

8.3.3 Coal- and Wood-Burning Stoves.

8.3.3.1 Coal- and wood-burning stoves shall not be used unless such installations are checked periodically and found by the authority having jurisdiction to possess adequate safeguards.

8.3.3.2 If stoves are used, the precautions in 8.3.3.2.1 through 8.3.3.2.7 shall be in effect unless the authority having jurisdiction modifies the precautions specifically for each installation.

8.3.3.2.1 A radial clearance of 36 in. (914 mm) shall be maintained from any combustible material unless such material is effectively protected in accordance with NFPA 211.

8.3.3.2.2 Combustible flooring under stoves shall be protected in accordance with NFPA 211.

8.3.3.2.3 Chimney connectors shall be supported and shall have a clearance of at least 18 in. (457 mm) from all combustible material.

8.3.3.2.4 Chimney connectors passing through a combustible partition shall be protected at the point of passage by a metal ventilated thimble not less than 12 in. (304 mm) larger in diameter than the protector or in accordance with Chapter 5 of NFPA 211.

8.3.3.2.5 Chimney connectors shall not pass through concealed spaces.

8.3.3.2.6 Fuel supplies shall be stowed to prevent spillage or collapse, with safe clearance from stoves maintained.

8.3.3.2.7 Metal cans that are not used as combustible waste receptacles shall be provided for handling ashes.

8.3.4 Heating devices employing a flame or exposed hot wires shall not be installed or used in areas where flammable vapors or combustible dusts could be present.

8.4 Storage and Handling of Fuels.

8.4.1 Fueling Stations.

8.4.1.1 Fueling stations shall be located to minimize the exposure of all other facilities.

8.4.1.2 Inside Fueling Stations.

8.4.1.2.1 Fueling stations shall be accessible by boat without entering or passing through the main berthing area unless permitted by 8.4.1.2.2.

8.4.1.2.2* Where inside fueling stations are made necessary by prevailing sea conditions, such stations shall be located in accordance with one of the following:

(1) Near an exit by water from the berthing area
(2) A location from which, in case of fire aboard a boat alongside, the stricken craft can be removed quickly without endangering other boats nearby

8.4.2 All boat-fueling operations shall be accomplished carefully in accordance with NFPA 302 and NFPA 30A at the fueling station or other specifically designated remote location.

8.4.3 No tank barge or other fuel supply boat shall be permitted within the berthing area.

8.4.4 Where tank barges or fuel supply boats are used, outside berths and connections shall be provided.

8.4.5 Fuel storage tanks shall be installed in accordance with NFPA 30A and with all state and local ordinances.

8.4.6 Fuel storage tanks shall be anchored where they are located subject to flooding or tidal conditions, and the applicable precautions outlined in Chapter 4 of NFPA 30A shall be undertaken.

8.4.7 Flammable and Class II Combustible Liquid Tanks and Pumps.

8.4.7.1 Fuel storage tanks and pumps supplying gasoline, Class I combustible liquids, or Class II combustible liquids at marine service stations, other than tanks or pumps integral to approved dispensing units, shall be located only onshore unless permitted by 8.4.7.2.

8.4.7.2 Tanks or pumps addressed in 8.4.7.1 shall be permitted to be on a pier of solid-fill type where acceptable to the authority having jurisdiction.

8.4.7.3 Approved dispensing units with or without integral pumps shall be located onshore or on piers of solid-fill type, open piers, wharves, or floating piers.

8.4.8 Class III Combustible Liquid Tanks and Pumps.

8.4.8.1 Tanks and pumps supplying Class III combustible liquids at marine service stations shall be located onshore or on piers of solid-fill type, open piers, wharves, or floating piers.

8.4.8.2 Class III combustible liquid tanks that are not located onshore or on piers of the solid-fill type shall be limited to 550 gal (2080 L) aggregate capacity.

8.4.8.3 Pumps that are not a part of a dispensing unit shall be located adjacent to the tanks.

8.4.9 Fuel pipelines shall be installed in accordance with the provisions of NFPA 30A.

8.4.10 Fuel Dispensing.

8.4.10.1 Dispensing units for transferring fuels from storage tanks shall be in accordance with the provisions of NFPA 30A.

8.4.10.2 Fuel delivery nozzles shall be equipped with a self-closing control valve that shuts off the flow of fuel when the operator's hand is removed from the nozzle.

8.4.10.3 The use of a device to override the automatic safety feature required in 8.4.10.2 shall be prohibited.

8.4.10.4 The use of an automatic fuel delivery nozzle with a latch-open device shall be prohibited for the delivery of gasoline.

8.4.10.5 Fuel delivery nozzles shall be inspected daily for proper operation.

8.4.10.6 Fuel delivery nozzles that show evidence of possible malfunction or leaking shall be removed from service.

8.4.10.7 Fuel hose assemblies shall be constructed with provisions for the fuel delivery nozzle to be properly bonded to the shore electric grounding facilities.

8.4.11 Gasoline and other fuels stored in drums or cans shall be kept separate from other facilities and shall be stored and dispensed in accordance with applicable requirements of NFPA 30A.

8.4.12 Hand carriage of gasoline shall be in containers approved to carry and store such fuel.

8.4.13 Gasoline or Class I flammable liquids shall not be used for cleaning purposes on the premises or onboard boats.

8.4.14 Soaps, detergents, and approved solvents shall be permitted to be used for cleaning purposes on the premises or onboard boats.

8.5 Storage and Handling of Paints and Solvents. Paint storage and mixing shall be segregated from other working and storage areas by one of the following methods:

(1) Provision of a well-separated and ventilated building of noncombustible construction
(2) Where acceptable to the authority having jurisdiction, provision of a ventilated fire-resistive room with protected openings

8.6* Storage and Handling of Fiberglass-Reinforced Plastic Materials.

8.6.1 Areas in which liquid materials, such as resins, catalysts, oxidizers, and solvents, used for the construction and repair of fiberglass-reinforced plastic boats are stored or used shall be well ventilated, constructed of noncombustible materials, and have approved fire protection.

8.6.2 Catalyzed resins shall be set and cooled before disposal of excess material or waste.

8.7 Paint Removal and Painting.

8.7.1 Removal of paint or other finishes by use of flammable solvents shall meet the following criteria:

(1) Restricted to exterior surfaces of boats
(2) Conducted out-of-doors
(3) Well separated from other craft and adjacent hazardous operations

8.7.2 Approved fire-extinguishing equipment of applicable type and supply shall be readily accessible to all areas where paint removal, painting, or refinishing is in process.

8.7.3 Open-flame devices shall not be operated where painting, sanding, scraping, or wire brushing is being performed in confined areas such as boat interiors.

8.7.4 Spark-producing equipment shall not be operated where painting is being performed in confined areas such as boat interiors.

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

8.7.6 No more than the quantities of paint and solvent required for a day's operations shall be permitted in the work area.

8.7.7 Spray Finishing.

8.7.7.1 Where spray finishing is performed indoors repeatedly at a fixed location, it shall be conducted in accordance with NFPA 33.

8.7.7.2 Where spray finishing is performed occasionally and in varying locations either indoors or outdoors, all possible sources of ignition shall be eliminated throughout and adjacent to the area where the spray finishing is to be performed.

8.7.7.3 Ventilation shall be provided for the spray area.

8.8 Lumber Storage.

8.8.1 Main stocks of lumber shall be stored in a segregated area.

8.8.2* Piles of lumber shall be stacked to provide unobstructed aisles of an approved width between individual piles to limit spread of fire and to permit access for fire-fighting personnel and equipment.

8.9 Welding, Brazing, Soldering, and Metal Cutting.

8.9.1 Welding, brazing, soldering, and metal cutting operations shall be performed in a shop specifically provided for the purpose or in an open area.

8.9.2 Where the operations addressed in 8.9.1 are performed in a shop, the shop, including its flooring, shall be of noncombustible or fire-resistive construction.

8.9.3 Combustibles shall be kept at an approved distance away from the shop or area.

8.9.4 The operations addressed in 8.9.1 shall be performed by qualified personnel.

8.9.5 When welding or metal cutting in or on a boat, the following precautions shall be taken:

(1) Before operations are started, a fire watch equipped with applicable fire extinguishers shall be established.
(2) Removable combustible materials in proximity to hazardous repair work shall be moved to a safe location aboard or ashore.
(3) Noncombustible material or approved flameproof tarpaulins shall be used to protect combustible materials that cannot be moved.
(4) Combustible vapor and flammable liquid shall not be in the hot work area.
(5) Means shall be provided to prevent sparks from passing through openings, such as hatches, ports, and tank openings.
(6) Noncombustible material, approved flameproof tarpaulins, or metal shields shall be set around the work in progress to restrict the travel of sparks to other areas.
(7) Before welding or metal cutting is begun on decks or bulkheads, personnel shall inspect conditions on the opposite side thereof and shall determine that the operations will not cause damage by heat or fire.
(8) Fuel tanks shall be safeguarded to prevent vapors from creating a fire hazard.

8.9.6 Fuel tanks shall not be welded or cut unless the tank has been cleaned or safeguarded in accordance with NFPA 326.

8.9.7 All welding and cutting equipment shall be maintained in an approved manner.

8.9.8 Oxyacetylene hoses shall be stored coiled in a cool location where grease and oil are not present.

8.9.9 No more than five spare gas cylinders shall be kept on the premises.

8.9.10 Spare gas cylinders shall be kept in a ventilated locker.

8.9.11 Electric welding equipment shall be in accordance with *NFPA 70*.

8.9.12 Wherever welding or cutting operations are in process, approved fire-extinguishing equipment shall be supplied, installed, and maintained.

8.9.13 A fire watch shall be provided where required by the person authorizing hot work.

8.10* Woodworking.

8.10.1* Woodworking equipment and machinery shall be arranged in a manner to prevent accumulation of sawdust, shavings, or wood waste.

8.10.2 The interior of woodworking areas shall be constructed with an approved number of pockets and ledges inaccessible to cleaning.

8.10.3 Sawdust, waste, and refuse shall be removed at least daily and whenever the waste capacity of the woodworking area is reached.

8.10.4 Exhaust systems shall be installed for automatic removal of sawdust and shavings from planers.

8.10.5 Machines in operation shall not be left unattended.

8.10.6 Personnel shall inspect the area provided to accommodate boats undergoing construction or repair, and boats in this area, and there shall be no flammable vapors or other hazards.

8.10.7 The quantity of volatile liquids kept in the area shall be no more than the amount required for a day's operations and shall be handled in approved safety cans.

8.10.8 Approved fire-extinguishing equipment shall be supplied, installed, and maintained in an approved manner.

8.10.9 Open flames and open lights shall not be used in the woodworking area.

8.10.10 Smoking shall be prohibited in woodworking areas.

8.11 Machine Shop.

8.11.1 Where the hazard is not considered severe by the authority having jurisdiction, the machine shop shall meet one of the following criteria:

(1) Located in a separate noncombustible or approved fire-resistive building
(2) Separated from other parts of the building by fire barriers having a fire resistance rating of at least 1 hour, without windows, and with all door openings therein protected by approved self-closing or automatic-closing, positive-latching fire door assemblies having a fire protection rating of at least ¾ hour
(3) Protected by an approved automatic extinguishing system and separated from all other parts of the building by smoke partitions, with any door therein self-closing or automatic-closing and constructed and installed to resist the passage of smoke

8.11.2 Where the hazard is considered severe by the authority having jurisdiction, any metal shop shall be both separated from all other parts of the building by approved fire barriers, in accordance with 8.11.1(1) or 8.11.1(2), and protected by an approved automatic extinguishing system.

8.11.3 Machines and motors shall be kept clean and properly maintained to operate as intended by the manufacturer.

8.11.4 The quantity of flammable liquids kept in the area shall be no more than the amount required for a day's operations and shall be handled in approved safety cans.

8.11.5 Test stands shall not be gravity-fed from fuel tanks.

8.11.6 Approved portable fire extinguishers of applicable type and approved quantity shall be installed and maintained in an approved manner.

8.12 Battery Service and Storage.

8.12.1 Where batteries are stored or charged on the premises, a separate room or completely closed area shall be provided for battery charging and battery storage.

8.12.2* The area used for service or storage of wet cell batteries shall be designed to vent gas to the exterior atmosphere and to prevent ignition of gas that has not yet vented.

8.12.3 Rooms required by 8.12.1 shall be dedicated to battery charging and battery storage.

8.12.4 Access doors and windows shall be kept locked when the room is unattended.

8.12.5 The battery room ventilation shall meet the following criteria:

(1) Air inlets shall be installed at or below the level of the battery racks.
(2) Exhausts shall be installed at the ceiling.
(3) A vent stack equipped with a natural draft exhaust head that provides an upward draft shall be installed.

8.12.6 The battery room and the electrical equipment located within it shall conform to the applicable requirements of *NFPA 70* for a Class I, Division 1, Group B Hazardous Area.

8.12.7 Exterior Switches.

8.12.7.1 Switches for control of services and illumination of the battery room shall be permitted to be located on the exterior of the room or enclosure.

8.12.7.2 Switches located in accordance with 8.12.7.1 shall not be required to be rated explosionproof.

8.12.8 Each battery charger shall have a control switch that controls only that battery charger.

8.12.9 A master control switch shall be installed that controls all battery chargers.

8.12.10 Charging equipment shall be fastened, protected from physical damage, and located to permit ventilation.

8.12.11 Metal enclosures of battery charging devices shall be bonded to the equipment grounding conductor of the electrical system (green wire).

8.12.12 Racks for storing and charging batteries shall meet the following criteria:

(1) Designed for the load
(2) Insulated
(3) Permit batteries and equipment to be readily accessible
(4) Permit the setting of batteries so that no pockets are formed where gases can accumulate
(5) Conform to the requirements of Article 480 of *NFPA 70*

8.12.13 Insulated tools and battery clips equipped with insulated cuffs shall be used in the battery room to avoid short circuits.

8.12.14 Qualified personnel shall conduct battery servicing work.

8.12.15 Smoking shall be prohibited in battery rooms.

8.12.16 Open flame or spark-producing work shall not be undertaken in the battery room.

8.12.17 Volatile liquids shall not be stored or used in the battery room.

8.12.18 Cell caps shall be installed on the battery cells while connecting or disconnecting batteries to the chargers.

8.12.19 Removable cell caps shall be removed from the battery cells while charging.

8.12.20 Battery tongs or other approved carrying devices shall be used when removing or lifting batteries.

8.12.21 Wiring connections shall not be connected or disconnected if power is being supplied to or released by batteries.

8.12.22 Nickel-cadmium batteries shall be charged or serviced in a dedicated room separated from rooms where lead-acid types of batteries are charged or serviced.

8.12.23 Tools and equipment used in servicing or charging nickel-cadmium batteries shall be distinguished by the application of an appropriate color and dedicated to such use.

8.12.24 At least one approved dry chemical portable fire extinguisher shall be provided in a readily accessible location within the enclosed area and shall be maintained in an approved manner.

8.13* Servicing Liquefied Petroleum Gas (LPG) and Compressed Natural Gas (CNG) Systems.

8.13.1 Changing of cylinders shall be performed in accordance with NFPA 302 and NFPA 58.

8.13.2 Flame shall not be used to check for leaks in LPG and CNG systems.

8.14* Maintenance.

8.14.1 Approved covered metal containers shall be provided at approved 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.

8.14.2 The purpose of the containers required in 8.14.1 shall be marked on the outside of each container.

8.14.3 Metal containers in addition to those required in 8.14.1 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.

8.14.4 Refuse and waste containers shall be emptied at least daily.

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

8.14.6 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 removed and disposed of in an approved manner at the end of the specific job.

8.14.7 Covered containers shall be provided throughout the facility, including locations convenient to moored boats, for garbage and trash, and shall be located in areas where ignition of contents will not pose a hazard to the surroundings.

8.14.8 Containers required in 8.14.7 shall be emptied before they have reached their capacity and cleaned at approved frequencies.

8.14.9 Approved access for fire-fighting personnel and equipment to walkways, piers, access roads, and all parts of the facilities shall be maintained.

8.15 Shrink-Wrap Operations. Shrink-wrap operations and devices used for shrink-wrap operations shall be approved.

Annex A Explanatory Material

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

A.1.2 The standard recognizes the following circumstances:

(1) Electrical wiring on and about piers and floats, and connected to crafts, presents an exceptional fire and shock hazard. This standard emphasizes, and in some cases exceeds, the requirements of *NFPA 70*.
(2) Marinas and related facilities frequently are located in remote areas, isolated from public protection, or with docking facilities not easily accessible to community fire equipment. Hence, the selection, location, and maintenance of fire-fighting equipment, and adequate training in its use, are essential.
(3) Continuing operations such as fiberglassing, woodworking, painting and paint removing, welding and cutting, and handling gasoline and other highly flammable liquids are hazardous operations that require careful vigilance and fire prevention effort by management.

A.2.1 It is not the intent of this standard that the marina or boatyard owners/operators maintain copies of these publications as a requirement of this standard, nor is it expected that they be knowledgeable as to the detailed contents of these publications. The inclusion of these reference documents provides a ready source for specifying compliance in procurement of equipment, systems, and design or installation services. Key requirements of the referenced documents as they apply to marinas and boatyards have been included in Chapters 4 through 8, inclusive, with reference to the appropriate NFPA or ANSI standards.

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

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may

be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

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

A.3.3.2 Boatyard. Boatyards are usually, but not necessarily, waterfront facilities. Boatyards provide facilities and services, as described in the definition, that exceed the basic berthing or mooring of boats.

A.3.3.5 Crane. A crane can be fixed in position or mobile. The term generally refers to a device having a movable projecting arm (boom) or a horizontal beam that translates on an overhead support.

A.3.3.6 Docking Facility. Docking facilities can include docks, piers, floats, wharves, bulkheads, breakwaters, and other structures to which boats can be secured.

A.3.3.8 Fuel Product Lines. Piping can be located above or below ground or a combination of the two. The general term includes associated fittings, valves, and hardware.

A.3.3.10 Fueling Station or Pier. A fueling station or pier can also be known as a marine service station, fuel dispensing facility, or fuel dock.

A.3.3.11.1 Combustible Liquid. This definition applies as determined by the test procedures and apparatus set forth in Chapter 4 of NFPA 30. Combustible liquids are classified as Class II or Class III as follows:

(1) Class II Liquid — Any liquid that has a flash point at or above 37.8°C (100°F) and below 60°C (140°F)
(2) Class IIIA — Any liquid that has a flash point at or above 60°C (140°F), but below 93°C (200°F)
(3) Class IIIB — Any liquid that has a flash point at or above 93°C (200°F)

A.3.3.11.2 Flammable Liquid. This definition applies as determined by the test procedures and apparatus set forth in Chapter 4 of NFPA 30. Flammable liquids are classified as Class I as follows:

Class I Liquid — Any liquid that has a closed-cup flash point below 37.8°C (100°F) and a Reid vapor pressure not exceeding 2068.6 mm Hg (40 psia) at 37.8°C (100°F), as determined by ASTM D323, *Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)*.

A.3.3.12 Marina. A dry land marina can provide similar services, but is not necessarily located on the waterfront. The services provided by a marina are those generally associated with active boat use, such as berthing of boats, fueling, sanitary sewage pumpout, seasonal boat storage or short-term storage, seasonal boat painting, boat engine maintenance, and voyage repairs. Servicing of a greater nature is generally associated with boatyard facilities. A marina can also incorporate recreational facilities, ship's stores, offices, restaurants, or other upland amenities.

A.3.3.14 Marine Railway. Generally a structure composed of a movable cradle, a marine railway is capable of accommodating a range of vessel sizes and types and operates on fixed, inclined tracks (ways) extending from the upland into the water. The cradle is moved up or down the tracks by a winched cable or chain.

A.3.3.16 Mooring(s). The term *mooring* can be used locally to differentiate between permanent anchored moorings and slips.

A.3.3.22 Standpipe System. See NFPA 14.

A.3.3.23.1 Covered Storage. The structure might or might not be heated or cooled.

A.3.3.23.2 Dry Stack Storage. Vertically, the boats are placed in tiers, or racks, two or more levels high. Boats are placed in the racks by use of a forklift or mobile crane. Any facility utilizing a rack storage system of more than one level should meet the requirements of an in-out dry storage facility. Dry stack storage is also known as dry rack storage or stack storage.

A.4.1 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 guidelines in this chapter are specifically addressed to those management functions where implementation can significantly reduce the specific and overall hazard.

The marina or boatyard management should 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.

A.4.2.1.2 It is usually preferable to empty extinguishers as part of a training exercise. *(See Section 4.3.)*

A.4.3 The initial minutes are the most vital in fighting a fire. In order to ensure effective application of the available fire-fighting equipment, it is essential that employees of the facility be trained in the equipment's use. Effective equipment use can only be achieved through regular training and practice. The interest taken by management through active leadership and participation in the training of their personnel in fire protection duties has the effect of bringing and keeping all employees up to a high standard of responsibility relative to both fire prevention and fire protection.

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

A.4.3.1 Drills should preferably be held once a month.

A.4.3.2 Such prefire planning matters should include the nature and location of specific hazards, operation of fire alarm equipment, means of access to the facility, and location of water sources for fire-fighting purposes.

A.4.4.3 Due to the unusually high concentration of combustibles and the presence of ordinary combustibles (Class A), flam-

mable 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. The requirements of NFPA 1 should be referenced for conditions not addressed by this standard.

A.4.5 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 6.2.4.

If a watch person is employed, he or she should 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.

A.4.6 A high percentage of fires in marinas and related facilities are attributable to boat owners and guests, who cannot be expected to be aware of fire hazards at the level of a professional.

A.5.1 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:

(1) Locations that are wet or continuously damp, and are exposed to rain, wind-driven spray, atmospheric moisture, and severe corrosive effects including, but not limited to, salt contamination
(2) Locations that are exposed to excessively high or low temperatures
(3) Locations that are subject to flooding by abnormally high water
(4) Locations where flammable or combustible liquids or gases are stored, dispensed, or used
(5) Locations where 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, or going from one to another
(6) Locations where boats are moved to and from the water and to and from storage or repair stations
(7) Locations, such as floating piers, that are subject to movements such as mechanical shock and vibration

NFPA 70 provides basic provisions to be observed in the design, selection, and installation of electrical wiring and equipment.

A.5.5.1 Grounding of all non-current-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.

A.5.10.1 The use of circuit breakers is required to avoid the difficulty of fuse replacement in gasketed enclosures.

A.5.12.1 Consideration should be given to reducing the hazards resulting from the opening and misalignment of plug/receptacle connections. Such hazards can be caused by the strain to receptacles intended to supply shore power to boats due to the weight and catenary of the shore power cable. Such consideration can include the installation of receptacles with faces angled in a direction that reduces the strain of the cable, reinforcement of the receptacle, other means to support the cable when such connections are made, or proper attachment of the plug.

Grounding continuity from the shore power inlet grounding terminal to all non-current-carrying underwater metals on a boat that are likely to become energized is of utmost importance to the prevention of electric shock injury. Continuity testing should be performed at least annually.

A.5.18.2 Sections 200.10 and 200.11 of *NFPA 70* detail standard ground and polarity connections. Power feeders for a dock, pier, or bulkhead should have ground fault monitoring systems that would detect a fault current from any conductor to the grounding system, or to the water, which might occur in the marina electrical distribution system or on a moored vessel. The detection system should provide a visual and/or audible alarm or interrupt the power supply.

Ground fault monitoring systems would provide information to enhance electrical safety for personnel at a marina from the potential of electrical shock hazard or prevent electrically caused fires.

A.6.2 Where fixed fire-extinguishing system components are installed in areas subjecting these components to corrosion or other atmospheric damage, special considerations might be necessary. Corrosion-resistant types of pipe, fittings, and hangers or protective corrosion-resistant coatings should be used where corrosive conditions exist.

A.6.2.1.3 Where clearly impractical for economic or physical reasons, the authority having jurisdiction could permit the omission of an automatic fire-extinguishing system when considering water supply availability and adequacy and size of facility.

A.6.2.2 It is not the intent of this section to limit the types of fire protection systems to automatic sprinklers in order to comply with the requirements of 6.2.2. Other types of automatic fire-extinguishing systems, such as foam/water, expanded foam, or clean agents, can be used for compliance provided that the system is applicable to the hazard present; automatically provides for the detection, control, and extinguishment of fires involving the hazards that might be present in the building; and is acceptable to the authority having jurisdiction. The combustibility of the boats in storage should be considered in determining the hazard classification for appropriate sprinkler system design.

A.6.2.2.2 See A.6.2.1.3.

A.6.2.3.4 See A.6.2.1.3.

A.6.2.4.1 Compliance with the requirements of Chapter 17 of NFPA 13 for the protection of Group A plastics stored on solid shelves should be considered for the design and installation of automatic sprinkler systems provided for the protection of buildings housing boats stored on multilevel racks. The combustibility of the boats in storage should be considered in determining hazard classifications. Plan view configuration of the boats in storage should be reviewed to determine 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.6.2.4.3 See A.6.2.1.3.

A.6.2.5 To comply with this requirement, water supplies can consist of a hydrant that is part of an approved water supply system, drafting hydrant, or drafting site.

A.6.3 Where standpipe system components are installed in areas subjecting these components to corrosion or other atmospheric damage, special considerations might be necessary. Corrosion-resistant types of pipe, fittings, and hangers or protective corrosion-resistant coatings should be used where corrosive conditions exist.

A.6.7 See NFPA 80A.

A.6.8.2(3) EMS and police numbers should be displayed in addition to fire department numbers unless 9-1-1 (E-9-1-1) is in use.

A.7.1.3 It is recommended that an auxiliary power supply be provided to ensure lighting in the event of a power failure.

A.7.2.1.5(4) Where fuel tanks and fuel systems are susceptible to damage by certain fuel additives or fuel blends, special considerations might be required to prevent damage to tanks and fuel systems that could lead to fuel leaks. Such considerations might include, but are not limited to, completely emptying and purging the fuel tank and/or more frequent inspections to detect damage and leakage from the fuel tank and fuel system that are stored at least 95 percent full in accordance with the standard.

A.7.2.4 Batteries should be removed for storage and charging wherever practical.

A.8.1 Marinas and boatyard owners and operators are encouraged to be familiar with the requirements of NFPA 302. It is recommended that marina and boatyard owners and operators encourage vessel owners and occupants to practice proper fire prevention aboard moored and stored vessels.

A.8.2.6(7) For the purpose of this requirement, the emergency contact information should only include the means to contact the fire department or emergency services and the marina or boatyard address.

A.8.4.1.2.2 Sea conditions requiring that fueling stations be located inside include wake, surge, and tide, among others.

A.8.6 Liquid materials used for the construction and repair of fiberglass-reinforced plastic boats, such as resins, catalysts, oxidizers, and solvents, are usually flammable or combustible.

A.8.8.2 See NFPA 1 for additional guidance.

A.8.10 The area provided to accommodate boats undergoing construction or repair should be large enough to permit adequate access around and under the boat.

A.8.10.1 Good housekeeping and clean premises are essential to health and safety.

A.8.12.2 Hydrogen gas is formed during the functioning of wet cell storage batteries. Hydrogen gas is highly flammable, is much lighter than air, and rises to the highest available space.

A.8.13 Utmost care should be exercised at all times in the servicing of LPG and CNG systems and equipment.

A.8.14 The marina or boatyard facility should be maintained at all times in a state of general order and cleanliness. The following list contains examples of conditions that should be eliminated or controlled:

(1) Uncontained trash, wood scraps, sawdust, rags, and so on
(2) Used engines and engine parts, miscellaneous metal, unused machinery, and similar items placed other than in a specifically designated and fenced area
(3) Unswept floors, particularly in shop areas
(4) Open paint cans or other flammable or combustible liquids
(5) Spills of oil, paint, or fuel
(6) Unmowed grass or weeds, brush, dead or dying trees, and other debris

Annex B Informational References

B.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

B.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code*, 2015 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2016 edition.

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

NFPA 30, *Flammable and Combustible Liquids Code*, 2015 edition.

NFPA 70®, National Electrical Code®, 2014 edition.

NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*, 2012 edition.

NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, 2015 edition.

B.1.2 Other Publications.

B.1.2.1 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D323, *Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)*, 2008.

B.2 Informational References. (Reserved)

B.3 References for Extracts in Informational Sections. (Reserved)