

NFPA 303

Fire Protection Standard for Marinas and Boatyards

2000 Edition



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An International Codes and Standards Organization

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Fire Protection Standard for Marinas and Boatyards

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This edition of NFPA 303, *Fire Protection Standard for Marinas and Boatyards*, was prepared by the Technical Committee on Marinas and Boatyards and acted on by the National Fire Protection Association, Inc., at its World Fire Safety Congress and Exposition™ held May 14–17, 2000, in Denver, CO. It was issued by the Standards Council on July 20, 2000, with an effective date of August 18, 2000, and supersedes all previous editions.

This edition of NFPA 303 was approved as an American National Standard on August 18, 2000.

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 1952 and 1957. A revised edition was produced in 1960 by the Committee on Motor Craft and Marinas. In 1961, the Sectional Committee on Marinas and Boatyards was established to deal exclusively with these matters. A complete revision of NFPA 303 was developed and adopted in 1963, amendments to which were adopted in 1966, 1975, and 1984. 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 contains amendments to the electrical wiring and equipment requirements in Chapter 3. Other amendments have been incorporated in Chapters 1, 2, 4, 5, and 6 of this revised edition.

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

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.

Contents

Chapter 1 Introduction	303- 4	Chapter 4 Fire Protection	303-10
1.1 Scope	303- 4	4.1 Planning	303-10
1.2 Purpose	303- 4	4.2 Portable Fire Extinguishers	303-10
1.3 Retroactivity	303- 4	4.3 Fixed Fire Extinguishment Systems	303-10
1.4 Definitions	303- 4	4.4 Fire Standpipe Systems	303-11
Chapter 2 Management	303- 5	4.5 Hydrants and Water Supplies	303-11
2.1 Smoking Restrictions	303- 5	4.6 Fire Pumps	303-11
2.2 Maintenance of Fire-Fighting Equipment and Systems	303- 5	4.7 Maintenance	303-11
2.3 Employee Training	303- 5	4.8 Exposure Protection	303-11
2.4 Fire Department Liaison	303- 5	4.9 Transmittal of Fire Emergency	303-11
2.5 Watch Service	303- 6	4.10 Fire Detectors	303-11
2.6 Boat Owners and Guests	303- 6	Chapter 5 Berthing and Storage	303-11
Chapter 3 Electrical Wiring and Equipment	303- 6	5.1 Wet Storage and Berthing	303-11
3.1 National Electrical Code	303- 6	5.2 Dry Storage	303-11
3.2 Listed or Labeled	303- 6	Chapter 6 Operational Hazards	303-12
3.3 Electrical Datum Plane	303- 6	6.1 Conditions on Individual Boats	303-12
3.4 Power Supply	303- 6	6.2 Heating	303-13
3.5 Grounding	303- 6	6.3 Storage and Handling of Fuels	303-14
3.6 Dry Locations	303- 7	6.4 Storage and Handling of Paints and Solvents	303-14
3.7 Damp Locations	303- 7	6.5 Storage and Handling of Fiberglass- Reinforced Plastic Materials	303-14
3.8 Wet Locations	303- 7	6.6 Paint Removal and Painting	303-14
3.9 Hazardous Locations	303- 7	6.7 Lumber Storage	303-15
3.10 Electrical Installation	303- 7	6.8 Welding, Brazing, Soldering, and Metal Cutting	303-15
3.11 Circuit Breakers, Switches, Panels, and Marine Power Outlets (Damp and Wet Locations) . .	303- 7	6.9 Woodworking	303-15
3.12 Marine Power Outlet	303- 7	6.10 Machine Shop	303-15
3.13 Receptacles	303- 7	6.11 Battery Service and Storage	303-15
3.14 Disconnects	303- 8	6.12 Servicing Liquefied Petroleum and Compressed Natural Gas Systems	303-16
3.15 Lighting Fixtures	303- 8	6.13 Maintenance	303-16
3.16 Electrical Equipment Enclosures	303- 8	Chapter 7 Referenced Publications	303-16
3.17 Feeders and Branch Circuits on Piers	303- 8	Appendix A Explanatory Material	303-17
3.18 Hazardous (Classified) Locations	303-10	Appendix B Referenced Publications	303-19
3.19 Tests	303-10	Index	303-20
3.20 Marine Hoists, Railways, Cranes, and Monorails	303-10		
3.21 Maintenance of Electrical Wiring and Equipment	303-10		

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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 Appendix A.

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

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

Chapter 1 Introduction

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

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:

- (1) Servicing small recreational and commercial craft, yachts, and other craft of not more than 300 gross tons
- (2) Not covered by NFPA 307, *Standard for the Construction and Fire Protection for Marine Terminals, Piers, and Wharves*; or NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*

1.1.3 No requirement in this standard shall 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.

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.

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.

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.

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

1.4.1* Approved. Acceptable to the authority having jurisdiction.

1.4.2* Authority Having Jurisdiction. The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.

1.4.3 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 definition 1.4.25, Slip.*)

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

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

1.4.6 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.

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

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

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

1.4.10 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 (0.606 m) 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 (0.606 m) above the highest water level for the area occurring under normal circumstances; (c) the electrical datum plane for floating piers and landing stages that are (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.

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

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

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

1.4.14 Fueling Station or Pier. An area on a pier, dock, bulkhead, or similar structure that is specifically used for the dispensing of fuel products. Also known as a marine service station, fuel dispensing facility, or fuel dock.

1.4.15 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.

1.4.16* 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.

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

1.4.18 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.

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

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

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

1.4.22 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.

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

1.4.22.2 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.

1.4.22.3 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.

1.4.23 Shall. Indicates a mandatory requirement.

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

1.4.25 Slip. A berthing space between or adjacent to piers, wharves, or docks; the water areas associated with boat occupation. (See also definition 1.4.3, *Berth*.)

1.4.26 Stack Storage. See definition 1.4.27.2, Dry Stack Storage.

1.4.27 Storage.

1.4.27.1* 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.

1.4.27.2* 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.

1.4.27.3 Seasonal Storage. Storage of boats for extended periods when not in use, that is, winter storage.

1.4.27.4 Wet Storage. A term used to indicate that a boat is stored afloat in a partly or completely laid-up status.

1.4.28* 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.

Chapter 2 Management

2.1* Smoking Restrictions. Smoking shall be prohibited and "No Smoking" signs shall be posted in all areas where fuels and other flammable liquids are stored or dispensed, in all covered or enclosed boat storage areas, in battery rooms, and in other such locations as management or the authority having jurisdiction shall designate.

2.2 Maintenance of Fire-Fighting Equipment and Systems. A maintenance program that requires periodic inspection, testing, and operation of fire-fighting equipment and systems, and that assures access to all parts of the facility for fire-fighting personnel, shall be adopted.

2.2.1 All fire-fighting equipment and systems shall be inspected and tested at regular intervals. As part of this requirement, fire extinguishers shall be inspected at least annually and provided with a tag showing the last date of inspection, and shall be emptied at the end of their service period, preferably as part of a training exercise (see Section 2.3).

2.2.2 Hoses shall be unrolled, inspected, and tested (in accordance with the manufacturer's instructions) at least once a year.

2.2.3 The fire department shall have access to fenced, gated, or locked grounds or piers. Appropriate means of access (including keys, cardkeys, and combinations) shall be provided to the fire department or shall be permitted to be secured in a lock box on the premises accessible to the fire department. The fire department shall be notified immediately of any changes in the means of access.

2.3* Employee Training.

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

2.3.2* All employees shall know the location of fire-fighting equipment, and shall be instructed in the procedures for response to a fire, response to a fire alarm, reporting a fire to the proper authorities (and to designated facility employees), and in the employee's designated role(s) in pre-fire planning matters. See Section 2.4.

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

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

2.4 Fire Department Liaison. The local fire department shall be encouraged to visit the facility annually to become acquainted with every part of the plant and to conduct

employee training sessions. Management shall assist the fire department in pre-fire planning for 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, storage lockers, and so on
- (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 and capacities of facility equipment, including work or tow boats, portable pumps, pier-mounted hose cabinets, all portable fire extinguishers, and so on
- (7) Voltages and capacities of electrical systems, and location of electrical disconnecting means

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

2.6* Boat Owners and Guests. 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. 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.

Chapter 3 Electrical Wiring and Equipment

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

3.2 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.

3.3 Electrical Datum Plane. See definition 1.4.10.

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

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

3.3.3 All electrical connections shall be located at least 12 in. (305 mm) above the deck of a floating pier. 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 3.13.1 for receptacle locations.

3.4 Power Supply.

3.4.1 Poles or structures used to support electrical service, feeder, or branch circuit shall be used for that purpose only.

Exception No. 1: These 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, National Electrical Code.

Exception No. 2: Buildings used to support electrical service to that building.

3.4.2 Primary power of 600 volts maximum shall be carried to piers where design considerations require more than 250 volts maximum due to load requirements and the use of the system has been approved by the authority having jurisdiction. Transformers shall be located in locked vaults of design appropriate for the environment and all cable connections shall be in accordance with NFPA 70, *National Electrical Code*.

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

Exception: 600 volts maximum shall be permitted to be used for a yard's distribution system where the use of the system has been approved by the authority having jurisdiction.

3.4.4 Transformers and enclosures shall be specifically approved for the intended location of installation and installed in accordance with the requirements of Article 450 of NFPA 70, *National Electrical Code*. Transformers shall not be located below the electrical datum plane or in a wet location as defined in NFPA 70.

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

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

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

3.4.6 Where auxiliary emergency standby power supply equipment with an output rating in excess of 5 kW is provided and is driven by an internal combustion engine, the emergency electric system shall be arranged as required by Article 700, NFPA 70, *National Electrical Code*, and NFPA 110, *Standard for Emergency and Standby Power Systems*. 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. The engine and generator shall not be located below the electrical datum plane. Interior areas of the enclosure shall be lighted by a fixture connected to the normal power supply.

3.5 Grounding.

3.5.1* The means and methods of grounding the noncurrent-carrying metal parts of the electrical system and for equipment and portable appliances connected thereto shall comply with the requirements of NFPA 70, *National Electrical Code* (Articles 250 and 555).

3.5.2 The partial or complete burial of a metal enclosure in earth shall not be accepted as a substitute for the grounding requirements stated herein with respect to such enclosure, as required by NFPA 70, *National Electrical Code* (Section 250–51).

3.5.3 Metal poles, lighting standards, and other metal supports that carry or enclose electrical wiring shall be grounded in accordance with NFPA 70, *National Electrical Code* (Section 250–51).

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

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

3.8 Wet Locations. The entire electrical system in a wet location shall be suitable for wet locations as defined in Article 100, NFPA 70, *National Electrical Code*.

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

3.10 Electrical Installation. 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, *National Electrical Code*.

3.10.1 Electrical wiring shall be installed to avoid possible contact with masts and other parts of boats being moved in the yard. Underground electrical installations shall comply with the requirements of NFPA 70, *National Electrical Code*. It shall be permitted to utilize “extra hard usage” cables (see Table 400-4, NFPA 70), such as Type G and Type W, as permanent wiring on the underside of piers (floating or fixed), 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.

3.10.2 Temporary wiring shall not be used to supply power to boats.

Exception: As permitted by Article 305, NFPA 70, National Electrical Code.

3.10.3 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 might be used for moving vessels
- (2) Wiring closer than 20 ft (6.1 m) from the outer edge or any portion of the yard that might be used for moving vessels or stepping or unstepping masts

3.10.3.1 Clearance for wiring in other portions of the yard, not inclusive of the areas described in 3.10.3(1) and (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

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

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

3.10.5 Where flexibility is necessary, as on piers composed of floating sections, the feeder conductors, if installed in a wet location, shall be cable listed for “extra hard usage” as identified in Table 400-4, NFPA 70, *National Electrical Code*, and rated not less than 167°F (75°C), 600 volts, of the required ampacity and shall include a common grounding conductor with an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals. The cable shall be fastened securely by nonmetallic clips to structural members of the pier other than the deck planking.

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

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

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

3.11.1* Overcurrent protection for feeders or branch circuits as required by NFPA 70, *National Electrical Code*, shall be provided by the use of circuit breakers.

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

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

3.13 Receptacles.

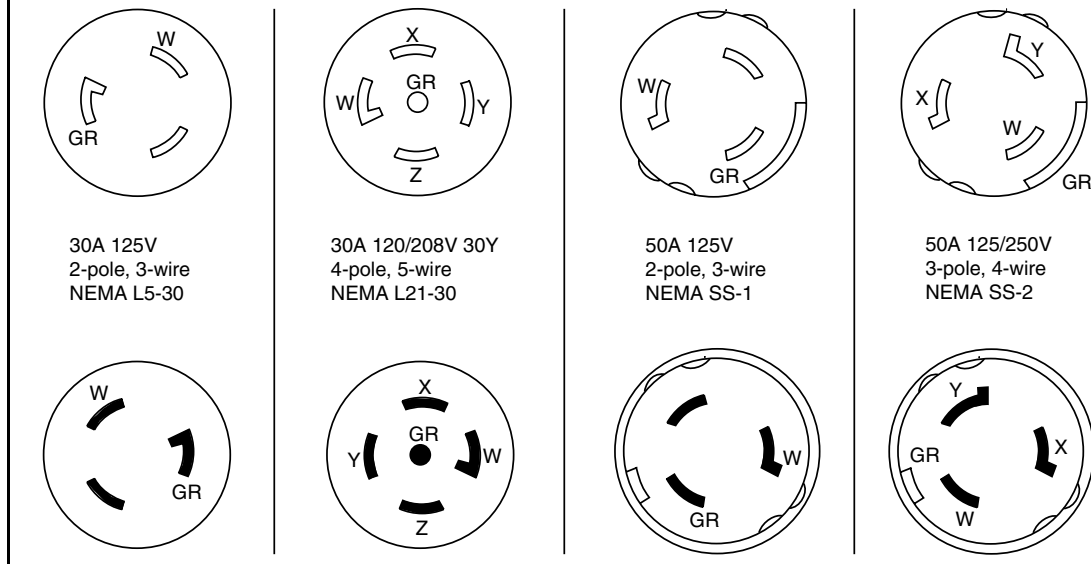
3.13.1* Receptacles intended to supply shore power to boats shall comply with the following.

(a) They shall be housed in marine power outlets listed as marina power outlets or listed for wet locations, or shall be installed in listed enclosures protected from the weather or in listed weatherproof enclosures. The integrity of the assembly shall not be affected when the receptacles are in use with any type of booted or nonbooted attachment plug/cap inserted.

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

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

(a) 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 3.13.2(a).

FIGURE 3.13.2(a) Receptacle configurations, 30 amperes to 50 amperes.

(b) 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 Safety Pin and Sleeve Configurations*, as shown in Figure 3.13.2(b).

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

3.13.4 Fifteen- and 20-ampere, single-phase, 125-volt outdoor receptacles shall be protected by ground-fault circuit interrupters. They shall be permitted to be housed in marine power outlets with the receptacles that provide shore power to boats, provided a marking clearly indicates that they are not to be used to supply power to boats.

3.14 Disconnects.

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

3.14.2 The necessary equipment, consisting of a circuit breaker or switch, or both, shall be readily accessible and properly identified and shall be located within 30 in. (762 mm) of the shore power connection and shall constitute the means of cutoff of the supply to the boat.

3.15 Lighting Fixtures.

3.15.1 Lighting fixtures shall conform to the requirements of NFPA 70, *National Electrical Code*, and, additionally, shall be located to prevent damage by contact with stored or moving material.

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

3.16 Electrical Equipment Enclosures.

3.16.1 Electrical equipment enclosures installed on piers above deck level shall be supported securely and substantially by structural members, independent of any conduit connected to them. If enclosures are not attached to mounting

surfaces by means of external ears or lugs, the internal screw heads shall be sealed to prevent seepage of water through mounting holes.

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

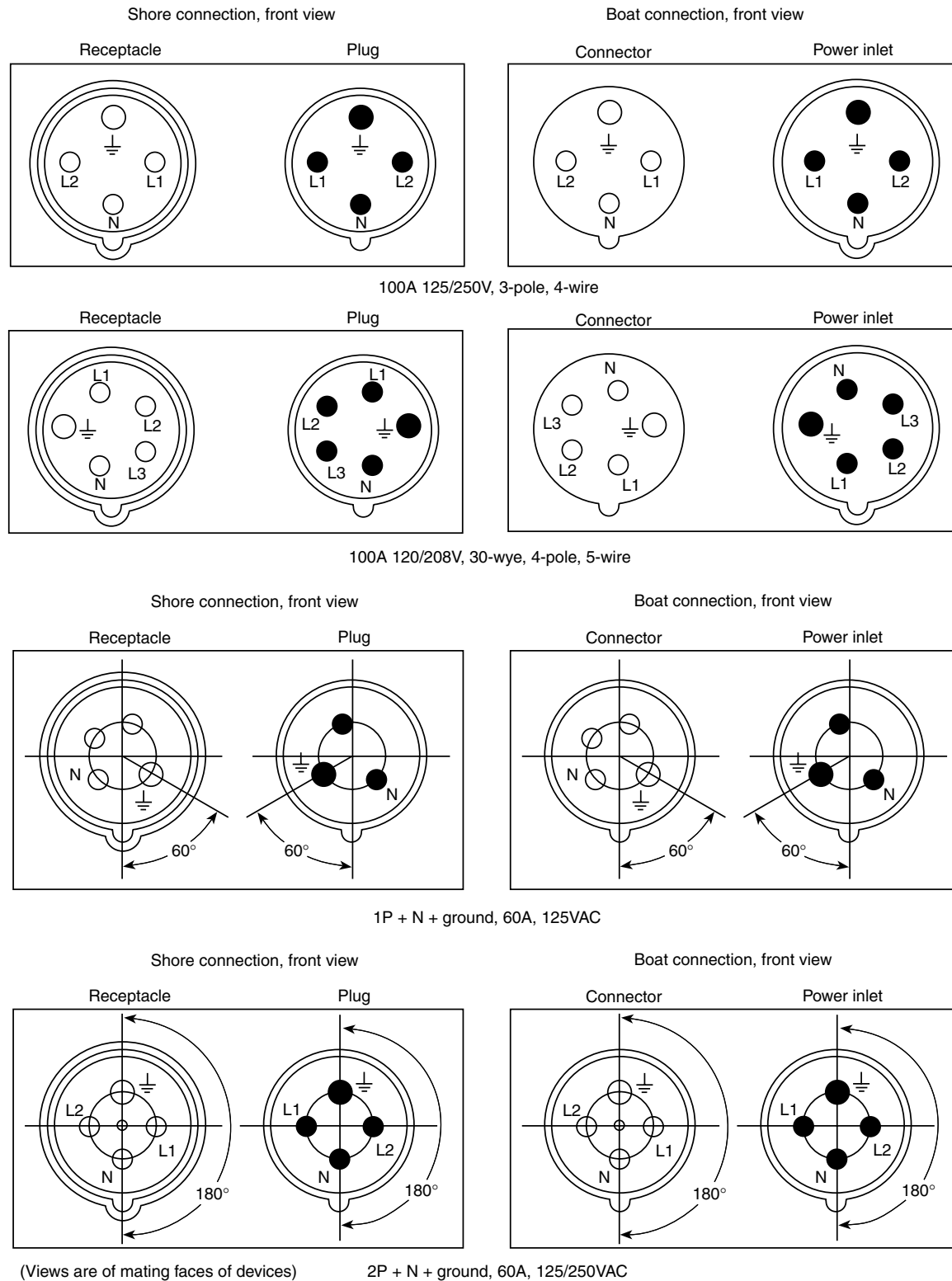
3.17 Feeders and Branch Circuits on Piers.

3.17.1 The load for each feeder and/or service circuit supplying receptacles for the connection of power boats shall be calculated in accordance with Article 555 of NFPA 70, *National Electrical Code*.

General lighting and other loads shall be calculated, and the voltage drop, based on the total load calculated in accordance with Article 555 of NFPA 70, *National Electrical Code*, shall be as required by Section 215.1 of NFPA 70.

3.17.2 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. Such feeder taps shall comply with Article 240, NFPA 70, *National Electrical Code*. The branch circuits connecting the receptacles to the feeder tap shall be equipped with circuit breakers for overcurrent protection, located at the receptacle, with not more than one receptacle connected beyond the required circuit breaker. Rigid metallic or nonmetallic conduit shall be installed to protect wiring above the decks of piers and landing stages and below the enclosure that it serves. The conduit shall be connected to the enclosure by full standard threads. The use of special fittings of nonmetallic material to provide a threaded connection into enclosures on rigid nonmetallic conduit, employing joint design as recommended by the conduit manufacturer for attachment of the fitting to the conduit, shall be permitted provided the equipment and method of attachment are approved and the assembly meets the requirements of installation in a damp location.

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

FIGURE 3.13.2(b) Safety pin-and-sleeve configurations, 60 amperes or 100 amperes.

3.18 Hazardous (Classified) Locations.

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

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

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

3.19 Tests. The following tests shall be conducted upon completion of the installation.

3.19.1 The electrical system shall be subjected to a test of insulation integrity in the presence of the representative of the authority having jurisdiction. Such tests shall meet the requirements of Section 110-7, NFPA 70, *National Electrical Code*.

3.19.2 All receptacles shall be tested for ground integrity and polarity. All improper conditions shall be corrected prior to use. Standard ground and polarity connections are as detailed in Section 200-10, NFPA 70, *National Electrical Code*.

3.20 Marine Hoists, Railways, Cranes, and Monorails.

3.20.1 Motors and controls for marine hoists and railways shall not be located below the electrical datum plane as defined in Article 100, NFPA 70, *National Electrical Code*.

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

3.21 Maintenance of Electrical Wiring and Equipment.

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

- (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

- 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) Flexible cords being used for purposes not in accordance with NFPA 70, *National Electrical Code*, that is, used for permanent wiring

Exception: See 3.10.1.

- (6) Damaged or inoperative switches, lighting fixtures, and receptacle outlets
- (7) Overloading of electrical circuits
- (8) The introduction of unsuitable appliances into a hazardous area

Chapter 4 Fire Protection

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

4.2 Portable Fire Extinguishers.

4.2.1 Placement of portable fire extinguishers shall be in accordance with Chapter 3, NFPA 10, *Standard for Portable Fire Extinguishers*.

4.2.2 Placement of portable fire extinguishers on piers and along bulkheads where vessels are moored or are permitted to be moored shall be as follows.

4.2.2.1 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 (7.6 m) in length. Additional fire extinguishers shall be placed such that the maximum travel distance to an extinguisher does not exceed 75 ft (22.9 m).

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

4.2.3 Portable fire extinguishers that meet the minimum requirements of Chapter 3, NFPA 10, *Standard for Portable Fire Extinguishers*, for extra (high) hazard type shall be installed on two sides of a fuel-dispensing area. On piers or bulkheads where long fueling hoses are installed for fueling vessels, additional extinguishers installed on the pier shall meet the requirements of Chapter 3, NFPA 10, for extra (high) hazard type and 4.2.2.1 of this standard.

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

4.3 Fixed Fire Extinguishment Systems.

4.3.1 Buildings in excess of 500 ft² (46.45 m²) that are constructed on piers shall be protected by an approved automatic extinguishing system.

Exception No. 1: Buildings of Type I or Type II construction, without combustible contents, in accordance with NFPA 220, Standard on Types of Building Construction.

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

4.3.2* Marina and boatyard buildings in excess of 5000 ft² (464.5 m²) in total area shall be protected by an approved automatic extinguishing system.

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

4.3.3 Combustible piers and substructures in excess of 25 ft (7.6 m) in width or in excess of 5000 ft² (464.5 m²) in area, or within 30 ft (11.4 m) of other structures or superstructures required to be so protected shall be protected, in accordance with Section 3.3, NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*.

Exception No. 1: In the case of fixed piers, where the vertical distance does not exceed 36 in. (914 mm) from the surface of mean high-water level to the underside of the pier surface. In the case of floating piers, where the vertical distance does not exceed 36 in. (914 mm) from the surface of the water to the underside of the pier surface.

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

4.3.4* An approved water supply shall be provided within 100 ft (30.5 m) of the pier/land intersection or fire department connection serving fire protection systems. Access between water supplies and pier/land intersections or fire department connections shall be by roadway acceptable to the authority having jurisdiction.

4.4 Fire Standpipe Systems.

4.4.1 Standpipe systems, where installed, shall be in accordance with NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems*. Class I standpipe systems shall be provided for piers, bulkheads, and buildings where the hose lay distance from the fire apparatus exceeds 150 ft (45.8 m). Supply piping for standpipes on piers and bulkheads shall be sized for the minimum flow rate for Class II systems.

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

4.4.2 Manual dry standpipes shall be permitted.

4.4.3 Flexible connections shall be permitted on floating piers, subject to approval by the authority having jurisdiction.

4.4.4 Listed nonferrous piping shall be permitted to be used in accordance with its listing.

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

4.6 Fire Pumps. Fire pumps, when required, shall be installed in accordance with NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*. Electrical components shall be installed in accordance with 3.4.6.

4.7 Maintenance. All sprinkler systems, standpipe systems, water supply facilities, and fire pumps shall be maintained in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

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

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

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

4.10 Fire Detectors.

4.10.1 Fire detection devices and installation shall be in accordance with NFPA 72, *National Fire Alarm Code*®.

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

- (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) 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 janitor supplies or linen storage
- (12) Laundry rooms
- (13) Furnace rooms

Chapter 5 Berthing and Storage

5.1 Wet Storage and Berthing.

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

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

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

5.1.4 Only listed 120/240 volts ac electrical equipment shall be operated unattended.

5.2 Dry Storage.

5.2.1 General.

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

5.2.1.2 Ladders long enough to reach the deck of any stored boat shall be located so as to be readily available.

5.2.1.3 The use of blow torches or flammable paint remover shall be prohibited.

Exception: Flammable solvents shall be permitted to be used as provided in 6.6.1.

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

5.2.1.5 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.

(a) The vessel shall be inspected for any hazardous materials or conditions that might exist and corrective action shall be taken.

(b) 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.

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

(d) Permanently installed fuel tanks shall be stored approximately 95 percent full.

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

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

5.2.1.8 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 (45.8 m). Pressurized standpipe systems shall be permitted to be used to meet this requirement.

5.2.1.9 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 (45.8 m). Pressurized standpipe systems shall be permitted to be used to meet this requirement.

5.2.2 Indoors.

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

5.2.2.2 No Class I flammable liquids shall be stored in an indoor boat storage area.

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

5.2.3 In-Out Dry Storage or Rack Storage.

5.2.3.1 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.

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

5.2.3.3* Where boats are stored on multilevel racks in buildings, an approved automatic extinguishing system shall be installed throughout the building.

Exception No. 1: Buildings less than 5000 ft² (464.5 m²) provided with an automatic fire detection and alarm system supervised by a central station complying with NFPA 72, National Fire Alarm Code. If such a system is not technically feasible, an automatic fire detection and alarm system supervised by a local protective signaling system complying with NFPA 72, or a full-time watch service shall be utilized.

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

5.2.3.4 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.

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

(b) Batteries shall be disconnected or the master battery switch turned off.

(c) Fuel tank valves shall be closed.

(d) For seasonal storage, the requirements of 5.2.1 shall apply.

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

5.2.3.6 All portable power lines, such as drop cords, shall be prohibited from any boat in an in-out dry storage building. The charging of batteries shall be prohibited in the in-out dry storage building.

5.2.4 Battery Storage. Lead-acid type batteries shall be removed for storage and recharging wherever practical. Where, due to size and weight, it is impractical to remove them for storage, batteries shall be permitted to remain on board provided the following conditions are met.

(a) The battery compartment is arranged to provide adequate ventilation.

(b) A listed battery charger is used to provide a suitable charge.

(c) 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-volt to 125-volt single-phase current, with a control switch and approved circuit protection device designed to trip at not more than 125 percent of the rated amperage of the charger.

(d) There is no connection on the load side of this device from this circuit to any other device, and the boat battery switch is turned off.

(e) The battery is properly connected to the charger, and the grounding conductor effectively grounds the charger enclosure.

(f) Unattended battery chargers are checked at intervals not exceeding 8 hours while in operation.

Chapter 6 Operational Hazards

6.1 Conditions on Individual Boats.

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

- (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 on board
- (4) Presence of appropriate listed shore power inlet(s) and listed ship-to-shore cable(s)

6.1.2 The management shall, as a condition to accepting a boat received for major repair or storage, require the owner to correct any discrepancies found in 6.1.1 or to authorize management to do so.

6.1.3 The following general precautions shall be observed.

6.1.3.1 Smoking in the working area shall be prohibited.

6.1.3.2 Loose combustibles in the way of any hazardous work shall be removed.

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

6.1.3.4 Only experienced personnel shall be employed in the removal or installation of storage batteries.

6.1.3.5 Precautions recommended herein for specific kinds of work shall be followed.

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

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

- (1) A prohibition against the use of any form of hibachis, charcoal, wood or gas-type portable cooking equipment, unless limited to specifically authorized areas where they can be used safely (not on the docks or on boats in the berthing area or near flammables)
- (2) Procedures for disposal of trash
- (3) Nonsmoking areas
- (4) Location of fire extinguishers and hoses
- (5) Procedures for turning in a fire alarm
- (6) Fueling procedures

6.1.5 The information on fueling procedures referred to in 6.1.4(6) shall include as a minimum the following.

(1) 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) 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) After fueling and before starting engine:

- a. Inspect bilges for leakage or fuel odors.
- b. Ventilate until odors are removed.

6.2 Heating.

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

- (1) NFPA 31, *Standard for the Installation of Oil-Burning Equipment*
- (2) NFPA 54, *National Fuel Gas Code*
- (3) NFPA 58, *Liquefied Petroleum Gas Code*
- (4) NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*
- (5) NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances.*

6.2.2 Adequate and suitable fire extinguishing equipment shall be supplied, installed, and maintained in an approved manner in proximity to heating equipment in accordance with Section 4.2.

6.2.3 Heat-generating plants for steam, hot water, or forced-air systems shall be located in detached buildings or rooms enclosed 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 $\frac{3}{4}$ hour; or protected by an approved automatic extinguishing system and enclosed to resist the passage of smoke, with any door therein self-closing or automatic-closing and constructed and installed to resist the passage of smoke. Where the hazard is considered severe by the authority having jurisdiction, any such room shall be both enclosed by approved fire barriers and protected by an approved automatic extinguishing system.

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

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

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

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

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

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

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

6.3 Storage and Handling of Fuels.

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

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

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

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

6.3.4 Fuel storage tanks shall be installed in accordance with NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, and in accordance with all state and local ordinances.

6.3.5 Fuel storage tanks shall be anchored securely where they are located subject to flooding or tidal conditions, and the applicable precautions outlined in Chapter 2, NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, shall be observed.

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

6.3.7 Tanks and pumps supplying combustible liquids at marine service stations shall be permitted to be located on shore, on piers of solid-fill type, or on open piers, wharves, or floating piers. Class III liquid tanks that are located elsewhere than on shore or on piers of the solid-fill type shall be limited to 550 gal (2.08 m³) aggregate capacity. Pumps not a part of the dispensing unit shall be located adjacent to the tanks.

6.3.8 Fuel pipelines shall be installed in accordance with the provisions of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*.

6.3.9 Dispensing units for transferring fuels from storage tanks shall be in accordance with the provisions of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*. Fuel delivery nozzles shall be equipped with a self-closing control valve that will shut off the flow of fuel when the operator's hand is removed from the nozzle. The use of any device to override this safety feature is prohibited. The nozzle shall be inspected daily for proper operation. Any nozzle that shows evidence of possible malfunction or leaking shall be removed from service. The use of any automatic nozzle with a latch-open device is prohibited for the delivery of gasoline. In the construction of the fuel hose assembly, provision shall be

made so the fuel delivery nozzle is properly bonded to the shore electric grounding facilities as required in Section 3.6 of this standard.

6.3.10 Gasoline and other flammable liquids stored in drums or cans shall be kept separate from other plant facilities, and shall be stored and dispensed in accordance with applicable requirements of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*.

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

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

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

6.5* Storage and Handling of Fiberglass-Reinforced Plastic Materials. 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 shall have particular attention paid to provisions for fire protection of such areas. Catalyzed resins shall be set and cooled before disposal of excess material or waste.

6.6 Paint Removal and Painting.

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

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

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

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

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

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

6.7 Lumber Storage.

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

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

6.8 Welding, Brazing, Soldering, and Metal Cutting.

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

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

6.8.3 When welding or cutting in or on a boat, the following precautions shall be taken.

6.8.3.1 Before operations are started a proper fire watch equipped with appropriate fire extinguishers shall be established.

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

6.8.3.3 The area shall be free of combustible vapor and flammable liquids.

6.8.3.4 All hatches, ports, tank openings, and so on, through which sparks might pass shall be protected.

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

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

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

6.8.4 Neither welding nor cutting shall be attempted on a fuel tank unless the tank has been cleaned or otherwise safeguarded in accordance with NFPA 326, *Standard for the Safe-guarding of Tanks and Containers for Entry, Cleaning, or Repair*.

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

6.8.6 Wherever welding or cutting operations are in process, adequate and suitable fire-extinguishing equipment shall be supplied, installed, and maintained in an approved manner, and a competent fire watch shall be provided where required by the person authorizing hot work.

6.9 Woodworking. Because good housekeeping and clean premises are essential to health and safety, woodworking equipment and machinery shall be arranged in a manner to prevent accumulations of sawdust, shavings, and wood waste. The interior of woodworking areas shall be constructed so as

to minimize pockets and ledges inaccessible to cleaning, and the following precautions shall be observed.

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

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

6.9.3 Machines shall never be left unattended while in operation.

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

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

6.9.6 Adequate and suitable fire-extinguishing equipment shall be supplied, installed, and maintained in an approved manner.

6.9.7 Open flames, lights, and smoking shall be prohibited.

6.10 Machine Shop.

6.10.1 The machine shop shall be housed under one of the following restrictions:

- (1) In a separate noncombustible or fire-resistive building
- (2) Separated 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 $\frac{3}{4}$ hour
- (3) Protected by an approved automatic extinguishing system and enclosed to resist the passage of smoke with any door therein self-closing or automatic-closing and constructed and installed to resist the passage of smoke where the shop shares a building with other facilities

Where the hazard is considered severe by the authority having jurisdiction, any such area shall be both enclosed by approved fire barriers and protected by an approved automatic extinguishing system.

6.10.2 Machines and motors shall be kept clean and in good repair at all times.

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

6.10.4 Gravity feed from fuel tanks to test stands shall not be permitted.

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

6.11 Battery Service and Storage.

6.11.1* The area used for service or storage of wet cell batteries shall be designed to:

- (1) Vent the gas to the exterior atmosphere
- (2) Prevent ignition of such gas that might not be vented completely

6.11.2 A separate room or completely closed area shall be provided for battery charging and storage. The room shall be used for no other purpose, and materials not required for the designated use shall not be placed or stored therein. The

access door and windows (if any) shall be kept locked when the room is unattended.

6.11.3 The battery room shall be ventilated by air inlets at or below the level of the battery racks with adequate exhausts at the ceiling. A vent stack equipped with a natural draft exhaust head shall be installed to aid in providing an upward draft.

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

6.11.5 To minimize the hazard, switches for control of services and illumination shall be permitted to be located on the exterior of the room or enclosure, and, in such location, need not be rated explosionproof.

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

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

6.11.8 Racks for storing and charging use shall be substantial, suitably insulated, reasonably open, and shall permit the setting of batteries so that no pockets where gases might accumulate can be formed, and shall conform to the requirements of Section 480.7, NFPA 70, *National Electrical Code*.

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

6.11.10 All battery servicing work shall be conducted by experienced personnel only. The following specific precautions shall be followed.

- (a) Smoking shall be prohibited in the battery room.
- (b) No open flame or spark-producing work shall be undertaken in the battery room.
- (c) No volatile liquids shall be stored or used in the battery room.
- (d) Cell caps shall be kept tight while connecting or disconnecting batteries, but shall be removed whenever possible while charging.
- (e) Battery tongs or other appropriate carrying devices shall be used when removing or lifting batteries.
- (f) Wiring connections shall never be connected or disconnected if power is being supplied to or released by batteries.
- (g) When nickel-cadmium batteries are to be charged or serviced in the reserved area, the work shall be done in a separate work area from which servicing or charging is done on lead-acid types of storage batteries. Tools and equipment used in servicing or charging nickel-cadmium batteries shall be distinguished by an appropriate color applied to them and shall be at all times reserved only for such usage.

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

6.12 Servicing Liquefied Petroleum and Compressed Natural Gas Systems.

6.12.1 Utmost care shall be exercised at all times in the servicing of LPG and CNG systems and equipment.

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

6.12.3 Checks for leaks in LPG and CNG systems shall never be made with a flame.

6.13* Maintenance. The marina or boatyard facility shall be maintained at all times in a state of general order and cleanliness.

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

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

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

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

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

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

Chapter 7 Referenced Publications

7.1* The following documents or portions thereof are referenced within this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this standard. Some of these mandatory documents might also be referenced in this standard for specific informational purposes and, therefore, are also listed in Appendix B.

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

NFPA 10, *Standard for Portable Fire Extinguishers*, 1998 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1999 edition.

NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems*, 2000 edition.

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, 1999 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, 1995 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 1998 edition.

NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, 2000 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, 1997 edition.

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*, 2000 edition.

NFPA 54, *National Fuel Gas Code*, 1999 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 1998 edition.

NFPA 70, *National Electrical Code*®, 1999 edition.

NFPA 72, *National Fire Alarm Code*®, 1999 edition.

NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*, 1999 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems*, 1999 edition.

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, 2000 edition.

NFPA 220, *Standard on Types of Building Construction*, 1999 edition.

NFPA 302, *Fire Protection Standard for Pleasure and Commercial Motor Craft*, 1998 edition.

NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*, 2000 edition.

NFPA 326, *Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair*, 1999 edition.

7.1.2 Other Publications.

7.1.2.1 ANSI Publications. American National Standards Institute, 11 West 42nd Street, 13th floor, New York, NY 10036.

ANSI/NEMA WD6, *Wiring Devices — Dimensional Specification*, 1997.

ANSI/UL 231, *UL Standard for Safety Power Outlets*, 1998.

ANSI/UL 1686, *UL Standard for Safety Pin and Sleeve Configurations*, 1998.

Appendix A Explanatory Material

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

A.1.2 The standard recognizes the following circumstances.

(a) Electrical wiring on and about piers and floats, and connected to craft, presents an exceptional fire and shock hazard. This standard emphasizes, and in some cases exceeds, the requirements of NFPA 70, *National Electrical Code*®.

(b) 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.

(c) Continuing operations such as fiberglassing, wood-working, 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.1.4.1 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.1.4.2 Authority Having Jurisdiction. The phrase “authority having jurisdiction” is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, 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.1.4.4 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.1.4.7 Combustible Liquid. See also NFPA 30, *Flammable and Combustible Liquids Code*.

A.1.4.8 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.1.4.9 Docking Facility. Docking facilities can include docks, piers, floats, wharves, bulkheads, breakwaters, and other structures to which boats can be secured.

A.1.4.11 Flammable Liquid. See also NFPA 30, *Flammable and Combustible Liquids Code*.

A.1.4.12 Fuel Product Lines. Piping can be located above or below ground or a combination of above and below ground. The general term includes associated fittings, valves, and hardware.

A.1.4.16 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.1.4.17 Marina. A dry land marina would provide similar services, but might not be 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