

NFPA 312

Standard for Fire Protection of Vessels During Construction, Repair, and Lay-up

2000 Edition



NFPA, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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NFPA 312

Standard for

Fire Protection of Vessels During Construction, Repair, and Lay-Up

2000 Edition

This edition of NFPA 312, *Standard for Fire Protection of Vessels During Construction, Repair, and Lay-Up*, was prepared by the Technical Committee on Shipbuilding, Repair, and Lay-Up 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 312 was approved as an American National Standard on August 18, 2000.

Origin and Development of NFPA 312

The first standard on this subject was adopted by NFPA in 1933 on the recommendation of its Marine Committee, predecessor of the Marine Section. The standard was further considered in 1935, 1936, and 1937, and it was finally adopted by the Association in 1938 on the recommendation of the Marine Section Committee on Builders Risk, Repair, and Lay-Up. Editorial changes were made in 1942.

With the reorganization of NFPA marine activities in 1948, responsibility for the standard fell to the Committee on Shipbuilding, Repair, and Lay-Up. Its recommendations were adopted by the Association in 1950 (Parts I and II) and 1951 (Part III), and revised editions were adopted in 1964, 1968, 1976, and 1984.

The 1990 edition of NFPA 312 was a complete revision that incorporated expanded requirements for vessel lay-up and an update of the fire protection requirements for vessels undergoing construction, conversion, and repair.

The 1995 edition of NFPA 312 consisted of amendments and editorial changes to the 1990 edition.

The 2000 edition of NFPA 312 consists of amendments and editorial changes to the 1995 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 safeguarding against the fire and explosion hazards associated with vessels in course of construction, under repair, and during lay-up.

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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. Where one or more complete paragraph(s) has been deleted, the deletion is indicated by a bullet in the margin between the paragraphs that remain.

Information on referenced publications can be found in Chapter 4 and Appendix B.

Chapter 1 Administration

1.1 Scope. This standard shall apply to vessels during the course of construction, conversion, repairs, or while laid up. It shall not apply to situations where it is in conflict with or superseded by requirements of any government regulatory agency.

1.2* Purpose. Every reasonable means of preventing fire shall be provided and supplemented by means of detection and protection equipment that permit the prompt discovery, retard the spread, and permit extinguishment of any fire before it has passed the incipient stage. These fire-fighting methods shall include full coordination and cooperation with municipal fire departments.

Nothing in this document shall be construed as prohibiting the immediate drydocking of a vessel whose safety is imperiled, as by being in a sinking condition or by being seriously damaged. In such cases, all necessary precautionary measures shall be taken as soon as practicable.

1.3 Definitions.

1.3.1* Approved. Acceptable to the authority having jurisdiction.

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

1.3.3 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.

1.3.4* 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.

1.3.5 Responsible Person. A person who, by education or training, has experience in identifying and resolving problems in a specific area.

1.3.6 Shall. Indicates a mandatory requirement.

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

1.3.8 Standard. A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

Chapter 2 Construction, Conversion, and Repair

2.1 Inspection.

2.1.1 Regular inspections shall be made by a responsible person representing the shipyard during the entire construction, conversion, or repair period to note and initiate actions to eliminate fire hazards or to implement work procedures to keep these hazards to a minimum.

2.1.2 An inspection of a vessel shall be made by a yard representative to evaluate potential fire hazards as soon as practicable after the vessel enters a repair yard and before any work is started. It shall be conducted jointly with a representative of the owner. Such inspections shall note the following:

- (1) Housekeeping conditions, including location of dunnage and trash
- (2) The kind and amount of cargo aboard
- (3) The type, amount, and condition of the vessel's fire protection equipment

2.1.3 The types and approximate amounts of fuel oils and other flammable liquids in all cargo, bunker, deep, settler, and double-bottom tanks shall be determined. Such determination shall include all associated piping systems. This information shall be provided by an owner's representative.

2.1.4 The information obtained shall be distributed to the departments responsible for the fire safety of vessels while in the yard and to the various departments involved in construction, conversion, and repair.

2.1.5 For minor repairs, the inspection shall be permitted to be limited to the actual working area and adjacent compartments. Supplementary information necessary for fire and explosion prevention shall be obtained.

2.2 Rubbish, Waste Materials, Oil Spills, and General Care.

2.2.1 Work areas shall be kept clean. All accumulations, and particularly combustible rubbish, refuse, and waste materials, shall be collected and safely disposed of as they accumulate.

2.2.2 Uncrating of equipment or working materials shall be accomplished before taking the contents aboard ship. If there is a risk of damage from handling, the consignment shall be taken aboard to be uncrated. All crating and packing material shall be removed immediately to a remote location ashore.

2.2.3 Protective coverings (e.g., tarpaulins) used to protect machinery and equipment shall be either noncombustible or fire retardant approved material.

2.3 Smoking. Smoking shall not be permitted in designated hazardous areas. No Smoking signs shall be prominently posted in all prohibited areas.

2.4 Storage of Explosives, Flammable Material, and Dangerous Cargo.

2.4.1* The storage of explosive, flammable, or combustible materials shall not be permitted on or in close proximity to vessels in the course of construction, conversion, or repair. Ship's fuel and standard ship's stores shall be permitted to be stowed in specifically designated spaces.

2.4.2 Vessels carrying explosives or other dangerous cargo — such as flammable gases, hazardous chemicals, and flammable liquids, but excepting ship's fuel and stores in specifically designated spaces — shall not be permitted to enter a repair yard until such materials have been removed. NFPA 306, *Standard for the Control of Gas Hazards on Vessels*, outlines the circumstances under which exceptions to this requirement shall be permitted to be exercised with respect to gas hazards.

2.5 Use of Open-Flame or Spark-Emitting Devices, and Fire Watch.

2.5.1 It shall be the responsibility of yard management to determine that any hot work or other fire- or spark-producing operations proceed with safety.

2.5.2 Where there is any danger of fire caused by hot work, despite the fact that ordinary precautions are employed, a fire watch, with fire-fighting equipment appropriate for the type of possible fire, shall be provided to stand by during such operations, ready to extinguish any incipient fire that could occur. Persons acting as the fire watch shall be instructed as to the fire hazards anticipated and as to the use of fire-extinguishing equipment provided. Special attention shall be paid to opposite sides of the bulkheads or decks where hot work is to be done to be certain that there are no combustible materials, painted surfaces, wiring runways, and so forth, that are in contact with, or in close proximity to, such bulkheads or decks that can be damaged by heat or fire.

2.5.2.1 When it is necessary to remove combustible insulation to a safe distance from the location where welding or burning is to be done, special care shall be taken to prevent sparks or hot slag from entering exposed insulated spaces. Doorways, hatch and tank openings, portholes, and so forth, shall be protected where there is a danger of sparks or hot slag dropping or ricocheting into such openings and igniting combustible materials. Hot work shall not be done on vessels where there is a danger of sparks or hot slag falling into oil slicks on the waters beneath.

2.5.2.2 Where hot work processes cannot be properly safeguarded for making necessary repairs, such repairs shall be accomplished by safer means, such as by drilling, sawing, bolting, or other appropriate methods.

2.5.3 The riveting of furnaces shall not be permitted in confined spaces or in close proximity to combustible materials.

2.5.4 Before any hot work involving riveting, welding, burning, heating, or other fire- or spark-producing operations is started in or on any fuel spaces, including fuel tanks of motor-driven lifeboats, or other areas that contain or have contained flammable or combustible liquids or vapors, including freshly painted areas, certification shall be obtained in accordance with NFPA 306, *Standard for the Control of Gas Hazards on Vessels*.

2.5.5 Equipment such as blow torches and cutting and welding apparatus shall be stored so as to prevent tampering by unauthorized persons. Oxygen, acetylene, and other flammable gas lines shall be disconnected at the source of supply at the end of each working shift, and the discharge end of the hose shall be removed from below decks or enclosed spaces. During meal periods or other extended nonwork periods, lines shall be disconnected at the source of supply.

Only oxygen, acetylene, and other flammable gas hoses in good repair shall be used. Where gases are supplied from portable cylinders, the portable cylinders shall not be placed below the main deck, in confined spaces, or under overhanging decks. Portable outlet headers from piped systems shall comply with the provisions of NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*.

2.5.6 Electric welding cables shall be inspected frequently, and cables with damaged insulation shall be reinsulated or replaced. Cables shall be triced-up off steel decks, bulkheads, or wherever possible, to reduce the possibility of short-circuiting or grounding. Where cables must be run in areas of personnel or vehicular traffic, suitable protection shall be provided to prevent crushing of the cables. When not in use, electrodes shall be removed from holders and the holders so placed that they will not cause arcing or electrical short circuits.

2.5.7 Vessels in drydock shall be suitably grounded and bonded.

2.5.8 Heating for the personal comfort of employees or for other reasons shall be done by means of steam, hot water, or electricity, using the vessel's heating facilities as far as practicable. Where salamanders must be used, they shall be mounted on 4-in. (102-mm) legs and shall be permitted only where someone is constantly in attendance and where adequate ventilation is provided. They shall be located a safe distance from combustible materials and so arranged as to avoid any danger of upset. Use of wood kindling fuel shall not be permitted. Under no conditions shall compressed air or oxygen be discharged into salamanders to increase the rate of burning.

2.6 Temporary Electrical Installations.

2.6.1 Temporary electrical wiring and equipment shall be protected from physical damage and shall be frequently inspected. Defects in wiring, fixtures, or equipment of a type liable to create hazardous conditions shall be promptly remedied. Circuits serving portable equipment shall be grounded and provided with overcurrent protection and shall be disconnected when not in use. When temporary wiring and equipment is needed in hazardous locations, such wiring and equipment shall conform to the provisions of Articles 500 through 503 of NFPA 70, *National Electrical Code*.[®]

2.6.2 Electric current to the vessel's lighting system shall be cut off when no work is being done, unless lights are required for inspection and safety purposes, in which case the vessel's lighting system shall remain active.

2.6.3 The vessel's permanent lighting system shall be used when conditions permit.

2.6.4 Temporary, portable electric lights shall be used in accordance with NFPA 70.

2.6.5 Temporary electrical wiring shall be installed and maintained in a safe manner and shall be provided with overcurrent protection; installations in accordance with the provisions of Article 305 of NFPA 70 shall constitute compliance with this

requirement. Such wiring and lamps shall not be placed in direct contact with combustible materials. Makeshift hangers, such as nails, which might damage wiring insulations, shall not be used. Where temporary wiring cables are run in areas of personnel or vehicular traffic, they shall be triced-up to prevent physical damage. Protective guards shall be installed on all lights that have the possibility of sustaining physical damage.

2.7 Application of Paints and Other Flammable Compounds. No welding, burning, or other open-flame or spark-producing machines or operations, such as chipping, grinding, and so forth, shall be permitted in close proximity to the application of flammable paints or other flammable compounds. Adequate ventilation shall be provided to maintain the atmosphere at no more than 10 percent of the lower explosive limit or below the lower limit of toxicity for that particular material, as determined by a certificated marine chemist. In all instances, precautions and application instructions of the manufacturer shall be obtained and observed. Monitoring of these areas shall be carried out by a designated competent person.

2.8 Protection to Door Openings.

2.8.1 As work advances, so far as practicable, all door openings shall be provided with permanent doors.

2.8.2 In order to minimize the spread of fire, all doors and personnel accesses shall be kept completely closed, except as required by the work. All other openings, for example, vent ducts, shall be kept completely closed wherever practicable.

2.8.3 Where doors are kept locked to prevent theft or unauthorized entry, the keys shall be made available to the watchman and fire brigade, or shall be located at a designated place aboard where they can be obtained without delay in emergencies by such personnel.

2.9 Staging, Gangways, Access, and Miscellaneous Structures.

2.9.1 Staging other than metal or fire retardant treated wood shall be removed as soon as its purpose has been served.

2.9.2 Small buildings on or under shipways shall be restricted to those absolutely necessary and shall be of noncombustible construction.

2.9.3 Gangways, ladders, or other access facilities shall provide unobstructed, safe and efficient access to the vessel or vessels for fire-fighting purposes at all times. Gangways, ladders, or other access facilities shall be constructed of noncombustible materials.

2.10 Watch Service.

2.10.1 During the outfitting of new vessels, or in the case of vessels berthed for construction, conversion, or repair operations, a watchman shall be on duty at all times when work is not in progress.

2.10.2* Watchmen shall be familiar with the location of all fire alarms and with the procedures for turning in alarms.

2.10.3* Where central stations are not feasible or are not deemed necessary, a log of inspections and two-way hourly communications shall be maintained.

2.10.4 Watchmen shall also be provided on the shipways during earlier stages of construction if a fire hazard exists due to completion of another vessel, combustibility of ways, stocks,

and staging, and any significant obstruction or congestion caused by the proximity of adjacent structures.

2.10.5 Before going on duty, watchmen shall be informed of locations where riveting, welding, burning, or other hot work has been performed. In the event of fire, the watchman for the area in which the fire occurs shall perform the following functions:

- (1) Call the fire department
- (2) Turn in the alarm to the fire department
- (3) Open the gate
- (4) Direct the responding fire service to the location of the fire

2.11 Fire Alarm Service.

2.11.1 A suitable means of alerting all persons aboard the vessel shall be provided and clearly identified. Instructions on what to do in case of fire shall be posted at points of vessel access.

2.11.2* Where central station supervised fire alarm service is not provided, telephones shall be available at convenient locations on or near vessels. They shall be connected to a central office or directly to the public fire department where a knowledgeable person is constantly on duty.

2.11.3 Provisions shall be made for the establishment, marking, and maintenance of proper fire lanes.

2.11.4 Ways, hulls, and berths shall be prominently identified. Yard layout diagrams shall be provided for public fire-fighting whenever the yard is primarily dependent upon those facilities for fire protection.

2.12 Fire Protection Equipment.

2.12.1* Water with adequate pressure for fire extinguishing purposes shall be available to all parts of vessels in the course of construction, conversion, or repair. One-and-one-half-inch (38.1 mm) and $2\frac{1}{2}$ -in. (63.5 mm) lines of adequate length connected to shore hydrants for hose connections shall lead to points on vessels convenient for use in an emergency. Adequate supplies of spare hose and nozzles shall be readily available.

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2.12.2 Temporary pipe risers with hose connections supplied by shore lines shall be installed at the shipways, and a supply of hose shall be available at such connections on the various decks of vessels under construction. These risers shall be installed in the ratio of one for each 200 ft (62 m) of vessel length.

2.12.3* While vessels are at berths or in drydock, temporary hose lines supplied by shore connections shall be placed aboard the vessels, connected and ready for use, in the ratio of at least one hose line for each 200 ft (62 m) of vessel length. Where this arrangement is deemed unnecessary due to the size and type of vessel involved, hose lines shall be provided at the berthing spaces or drydocks.

2.12.4 Hose line connections or hydrants shall be provided with adapters to permit the connection of shore fire department hose.

2.12.5 On vessels under repair, the vessel's fire system piping, where the system is intact and capable of being used, shall be connected to water supplies from the yard by means of temporary shore-to-ship connections.

2.12.6 Hose lines or approved portable fire-fighting and extinguishing appliances, such as hand extinguishers, in suitable numbers for Class A, Class B, and Class C fires, shall be provided at convenient locations throughout vessels. Portable extinguishers shall be provided and used in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*.

2.12.7 Alternate means shall be available for extinguishing Class A, Class B, and Class C fires that cannot be controlled by the limited capacity of portable hand extinguishers.

2.13* Fire Brigade. Designated employees shall form the nucleus of a fire brigade and shall be thoroughly drilled in the use of extinguishing equipment provided, including the following:

- (1) Laying of hose lines
- (2) Handling of hose streams and special extinguishing equipment
- (3) Use of self-contained breathing apparatus

Drills shall be held at least once a month.

Exception: This does not apply where a shipyard fire department with paid members is maintained or where a public fire department is utilized.

2.14 Vessel Stability During Fire Fighting.

2.14.1 After an outbreak of fire, at the first indication of lack of stability, the discharge of fire streams shall be reduced to the minimum necessary to prevent the spread of fire. Effective means shall be taken to prevent capsizing of the vessel as soon as the extent of list indicates the possibility of diminished stability.

2.14.2 On vessels under repair, the vessel's pumping facilities, or a shore substitute, shall be in condition and ready to free the bilges of water whenever it tends to accumulate. Scuppers leading from all decks below the main deck to the bilge shall be maintained in unobstructed condition except where construction necessitates temporary closure.

2.14.3 Provision shall be made for the withdrawal of any vessel in the event that fire makes withdrawal necessary.

2.15 Testing of Fire Protection Equipment.

2.15.1 Water-based fire protection systems shall be tested in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

2.15.2 Protected spaces shall be evacuated prior to performing testing or maintenance on a gaseous fire extinguishing system, unless suitable safeguards are in place, such as physical isolation of the system or the provision of breathing apparatus to persons within the space.

Chapter 3 Lay-Up

3.1 Application.

3.1.1 This chapter applies to all vessels that are declared as laid up by the owner or operator, and that are without a full crew, but with equipment either in operable condition or requiring a minimum of work for restoration to service. This chapter does not apply to vessels in a long-term inactive status (mothballed) that require extensive work to return to active service.

3.1.2 This chapter is primarily intended for large self-propelled vessels, although it is applicable to all other vessels to varying degrees. Where a vessel cannot satisfy a requirement,

either because of its design (barges typically do not have fire mains) or because the vessel is not required to have equipment or systems on board (not all vessels are required to have an International Shore Connection), it need not satisfy that requirement.

3.1.3 All repairs, reconstruction, conversion, and alteration performed during lay-up shall satisfy the requirements of Chapter 2 of this standard.

3.2 Governmental Authorities. Lay-up locations and procedures shall satisfy the current Coast Guard Captain of the Port requirements. All U.S. flag vessels that maintain their Certificate of Inspection shall continue to satisfy all applicable Coast Guard regulations.

3.3* General Considerations for Lay-Up Locations. The following factors shall be considered in choosing a lay-up site:

- (1) Sufficient water depth at all tidal stages, year round
- (2) The presence of a fire alarm box, telephone, or other reliable means of communication
- (3) Freedom from high humidity and very low temperature extremes, which could affect the fire main system
- (4)* The arrangement of vessel moorings, singly or in groups, to facilitate vessel movement in case of fire or other emergency
- (5) The availability of fenders or camels of ample size positioned alongside at areas of possible or actual contact with other vessels or land structures
- (6)* The availability of towing craft and waterborne or land-based fire-fighting assistance, or both
- (7) The availability of anchors not already in use for emergency deployment
- (8) The arrangement of the vessel's equipment so that personnel can part or slip the anchor chain

3.4 Lay-Up Berths at Dock.

3.4.1 Where the lay-up berth is adjacent to a wharf, pier, or other land-connected structure, it shall be free from exposure to potential fire and explosion hazards and provide ready access for fire-fighting equipment. Piers shall satisfy the requirements of NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*.

3.4.2 Vessels shall be moored singly at the lay-up berth unless there is access for shore-based fire-fighting and salvage equipment to the outboard nested vessels.

3.5 Vessel Preparation.

3.5.1 Sea Valves. Sea suction for fire mains intended for immediate use shall not be covered and shall be kept clear from fouling.

3.5.2 Escape Preparation. Tow wires (fire warps) shall be secured at the bow and stern of each vessel and paid out through suitable hawse pipes or chocks so that the free end of the wire is readily accessible to tug boats for towing purposes. NFPA 307, contains specifications for fire warps.

3.6 Power Source.

3.6.1 There shall be a source of power from land, from another vessel, or on the vessel that is sized for lighting, flooding alarms, fire fighting, fire detection systems, and bilge pumping through the ship. This source shall be maintained and immediately available. The power source shall not be a battery.

3.6.2 Where the service or emergency source of power is a portable generator set located on the weather deck, selection and placement shall take into account fire safety considerations of the fuel system, exhaust system, fire-fighting systems, weather protection, electrical installation, and electrical protection devices.

3.7 Planning and Station Bills.

3.7.1 There shall be standard and emergency communication plans between vessel and shore.

3.7.2 There shall be contingency plans for fire fighting (including coordination with local, public fire departments), heavy weather, use of tug boats, movement of the vessel, and emergency evacuation of personnel.

3.7.3 A fire station bill must be conspicuously posted for all personnel on the vessel, and safety observers for each work party shall be identified. Personnel shall be trained to perform their safety and emergency duties.

3.7.4 Fire control plans showing general arrangements, fire-fighting equipment (including clear indication of which systems are operational), fire detection systems, ventilation systems, fire-resistant boundaries, and means of escape shall be available in a prominently marked weathertight enclosure at the point of embarkation.

3.8 General Care and Cleanliness.

3.8.1 Vessels that are laid up shall be kept thoroughly clean throughout. Any accumulations, particularly combustible rubbish, refuse, and waste material, shall be collected and disposed of promptly.

3.8.2 Galley exhaust grease traps shall be cleaned prior to lay-up. If in use by watch personnel, the traps shall be inspected at least monthly and cleaned as necessary.

3.8.3 Smoking shall not be permitted aboard laid-up vessels except at locations specifically designated and approved as smoking areas.

3.8.4 Protective coverings (e.g., tarpaulins) used to protect machinery and equipment shall be either noncombustible or fire retardant approved material.

3.8.5 All liquid and gaseous cargoes shall be offloaded from the vessel, and all vessels shall be certified in accordance with NFPA 306, *Standard for the Control of Gas Hazards on Vessels*, immediately prior to being laid up, and weekly thereafter, until conditions are stabilized, subject to requirements of regulatory authorities.

3.8.6 Machinery space bilges shall be clear of all debris, oil, and other flammable materials.

3.9 Ventilation — Closure of Openings.

3.9.1 All spaces, except those that are sealed, shall be ventilated and accessible for ready inspection.

3.9.2 All cargo and ship's service tanks, double bottom, deep, peak, settling, day, and all other miscellaneous tanks used for the vessel's fuel oil and lubricants shall have their manhole cover plates closed and secured and all exterior traces of oil or lubricants removed.

3.9.3 All vents serving tanks used for the vessel's fuel and lubricants, and all vents serving adjacent cofferdams, shall be fitted

with flame screens or flame arresters, as appropriate, and left open.

3.9.4 Except where required for distribution of humidified air, all closures (including fire dampers, but not automatic fire dampers), in ventilation systems shall be closed. All automatic fire dampers shall be maintained in operating condition.

3.9.5 All ports, doors, and other openings in the vessel's shell or deckhouses, and all hatches shall be kept closed, covered, or sealed. All interior doors shall be kept closed. Hatches used for ventilation and access to holds shall be permitted to be open.

3.10* Storage of Explosive and Flammable Materials.

3.10.1 Explosives, flammable gases, hazardous chemicals, and flammable liquids, other than ship's fuel, shall not be retained aboard vessels if lay-up exceeds 30 days.

3.10.2 Fuel tanks and systems of auxiliary motor craft shall be maintained full and stabilized.

3.10.3 When fuel is transferred, unless the fueling system is hard piped, the tank, hose, and machinery shall be bonded.

3.11 Temporary Heating Arrangements. Open-flame heaters are prohibited. Temporary heating sources shall be disconnected when the vessel is unattended. When heat tracing cable is used in a hazardous area, a ground-fault circuit-interrupter shall be used in conjunction with the overcurrent device.

3.12 Temporary Electrical Wiring.

3.12.1 Electrical wiring for temporary use shall comply with the requirements of 2.6.1.

3.12.2 Portable electrical equipment shall be the double insulated type or shall be provided with a grounding conductor in the supply cable. Portable electrical equipment shall be disconnected when not in use.

3.13 Watch Service.

3.13.1 Watch service shall be maintained whenever there is no functioning automatic fire detection and alarm system.

3.13.2 Watch service shall be established to monitor the vessel's condition and to detect unauthorized access.

3.13.3 Watchmen shall be familiar with the location of all fire alarms and procedures for turning in alarms.

3.14 Fire Detection and Fire Alarms.

3.14.1 There shall be a suitable means of alerting all persons aboard the vessel. Instructions on what to do in case of fire shall be posted at point of vessel access.

3.14.2 Vessels shall maintain the capability of two-way voice radio or telephone emergency communication; portable radios or cellular telephones satisfy this requirement.

3.14.3 If fire detection and fire alarm equipment is installed in lieu of the requirements of 3.13, it shall be capable of notifying appropriate personnel aboard and ashore.

3.15 Fire Protection.

3.15.1 Access. Gangways, ladders, or other access facilities shall be constructed of noncombustible materials and shall provide safe and efficient access to the vessel or vessels for fire-fighting purposes at all times.

3.15.2 Vessel Stability. The applicable requirements of 2.14 shall be satisfied in the event of fire.

3.15.3 Fire Protection Equipment. Any onboard equipment that is necessary for protection of the vessel shall be maintained in proper operating condition.

Chapter 4 Referenced Publications

4.1 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.

4.1.1 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 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 1998 edition.

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, 1999 edition.

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

NFPA 306, *Standard for the Control of Gas Hazards on Vessels*, 1997 edition.

NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*, 1995 edition.

Appendix A Explanatory Material

This appendix 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 Purpose. Many vessels undergoing construction, conversion, or repairs, and vessels laid up in a shipyard or elsewhere are readily vulnerable to fire, due to the quantity and character of combustible materials used in building. Long passageways, unenclosed stairways, hatches, and hoistways facilitate the rapid spread of fire throughout the vessel. Often the location of the vessel is isolated so that private protection is the main source of fire-fighting services. Even where major municipal protection is available, the following causes often result in material damage or complete destruction before effective means of extinguishment are brought into action:

- (1) Possible delayed response, due either to late discovery of the fire or to the absence of means for quick notification
- (2) Lack of special equipment in many municipal fire departments for combating shipboard fires
- (3) An unfamiliarity with ship construction due to the transitory nature of the risk

A.1.3.1 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.1.3.2 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.1.3.4 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.2.4.1 Flammable and inflammable have the same meaning. The term *flammable liquids* in this instance includes all flammable and combustible liquids having a flash point below 140°F (60°C), closed cup test. Reference OSHA regulations for this definition.

A.2.10.2 The use of cellular phones or the most time-effective way of notifying fire authorities is recommended.

A.2.10.3 Two-way hourly communications between the watchman and another knowledgeable person helps to ensure the watchman’s safety and the security of the vessel.

A.2.11.2 The use of cellular phones or the most time-effective way of notifying fire authorities is recommended.

A.2.12.1 The minimum nozzle residual pressure should be 60 psi (4.14×10^5 Pa) at 100 gpm (6.3×10^{-3} m³/s). The minimum total flow should be 500 gpm (3.15×10^{-2} m³/s) for ships approximately 300 ft (93 m) in length, having small interior compartments, such as those on small passenger vessels. The minimum total flow for larger ships that are 2000 ft² (186 m²) in area, or having smaller compartments, should be 1000 gpm (6.3×10^{-2} m³/s). Ships, such as cargo ships, having compartments larger than 2000 ft² (186 m²), should have at least 1500 gpm (9.45×10^{-2} m³/s) available. Ships having large cargo holds may require higher capacities.

A.2.12.3 The hose lines should be a nominal 1 $\frac{1}{2}$ in. (38.1 mm) or 2 $\frac{1}{2}$ in. (63.5 mm) in size, or a combination of both sizes, and of sufficient length so that any part of the vessel may be reached by at least one line.

A.2.13 For further details on industrial fire brigades, consult NFPA 600, *Standard on Industrial Fire Brigades*. For further information on public fire departments that respond to marine fires, consult NFPA 1405, *Guide for Land-Based Fire Fighters Who Respond to Marine Vessel Fires*.

A.3.3 In addition to the fire related considerations for selecting a site for lay-up, the following general safety guidelines should also be considered:

- (1) Protected from open seas and surge
- (2) Good holding ground for anchors, clear of wrecks, cables, or other obstacles
- (3) Clear of known cyclone or tidal wave danger
- (4) Clear of open roadstead anchorages or shipping channels
- (5) Clear of high velocity or turbulent tidal or river currents
- (6) Clear of floating hazards or significant amounts of moving ice
- (7) Clear of hazardous shore facilities
- (8) Clear of industrial waste discharges

A.3.3(4) The following guidelines should be considered when mooring vessels: The number, size, arrangement, and condition of the mooring lines should be sufficient to hold the vessel secure, based on the vessel's freeboard and draft, and the extreme climatic, tidal, and current conditions in the area.

For vessels at anchorage the following guidelines should be considered: The size and scope of anchor chain and number and size of anchors should be based on the freeboard, depth of water, type of bottom, and extreme climatic, tidal, and current conditions in the area.

A.3.3(6) The fire risk, proximity to port facilities, and location (relative to the pier or waterway) should be considered when determining the reasonable distance and time for availability of assistance.

A.3.10 *Flammable* and *inflammable* have the same meaning. The term *flammable liquids* in this instance includes all flammable liquids having a flash point below 140°F (60°C), closed cup, and having a vapor pressure not exceeding 40 psi absolute (2068.6 mm Hg) at 140°F (60°C). Reference Coast Guard regulations for this definition.

Appendix B Referenced Publications

B.1 The following documents or portions thereof are referenced within this standard for informational purposes only and are thus not considered part of the requirements of this standard unless also listed in Chapter 4. The edition indicated here for each reference is the current edition as of the date of the NFPA issuance of this standard.

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

NFPA 600, *Standard on Industrial Fire Brigades*, 2000 edition.

NFPA 1405, *Guide for Land-Based Fire Fighters Who Respond to Marine Vessel Fires*, 1996 edition.

Appendix C Additional Resources

This appendix is not a part of the recommendations of this NFPA document but is included for informational purposes only.

C.1 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

Title 29, *Code of Federal Regulations*, Part 1915, "Shipyard Industry."

Title 33, *Code of Federal Regulations*, "Navigation and Navigable Waters."

Title 46, *Code of Federal Regulations*, "Shipping."

Title 49, *Code of Federal Regulations*, "Transportation."

C.2 ABS Publication. American Bureau of Shipping, 2 World Trade Center, 106th Floor, New York, NY 10048.

Guide for Lay-Up and for Reactivation of Laid-up Ships, 1986.