NFPA 312
Standard for Fire Protection of Vessels During Construction, Repair, and Lay-Up

1995 Edition

National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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Standard for

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

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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 Annual Meeting held May 22-25, 1995 in Denver, CO. It was issued by the Standards Council on July 21, 1995, with an effective date of August 11, 1995, and supersedes all previous editions.

This edition of NFPA 312 was approved as an American National Standard on August 11, 1995.

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

Origin and Development of NFPA 312

The first standard on these subjects was adopted by the NFPA in 1933 on recommendation of its Marine Committee, predecessor of the Marine Section. It was further considered in 1935, 1936, and 1937 and was finally adopted by the Association in 1938 on 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. Their 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.

NFPA 312-1995 consists of amendments and editorial changes to NFPA 312-1990.

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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 fire protection of vessels in course of construction, under repair and during lay-up.

Contents

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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.

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

Chapter 1 Introduction

Due to the quantity and character of combustible materials used, many vessels undergoing construction, conversion, or repairs, and vessels laid up in a shipyard or elsewhere are readily vulnerable to fire. Long passageways, unenclosed stairways, hatches, and hoistways facilitate the rapid spread of fire throughout the vessel. The location of the vessel is often so isolated that private protection is the main source of fire-fighting services. Even where major municipal protection is available, the possible delayed response due either to lateness in the discovery of the fire or the absence of means for quick notification, lack of special equipment in many municipal fire departments for combating shipboard fires, or an unfamiliarity with ship construction due to the transitory nature of the risk can cause material damage or complete destruction before effective means of extinguishment can be brought into action. Therefore, 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. This includes full coordination and cooperation with municipal fire departments.

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.

1-1.1 Emergency Exception. 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.

1-2 Definitions.

Approved.* Acceptable to the authority having jurisdiction.

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

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.

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 identified standards or has been tested and found suitable for a specified purpose.

Shall. Indicates a mandatory requirement.

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

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, but before any work is started. It shall be conducted jointly with a representative of the owner. Such inspections shall note housekeeping conditions, including location of dunnage and trash; the kind and amount of cargo aboard; and 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.

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 production departments involved.

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 unless there is a risk of damage from handling, in which case 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 course of construction, conversion, or repair.

Exception: Ship's fuel and standard ship's stores 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 storage 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.

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 suitable portable fire-fighting equipment shall be provided to stand by during such operations ready to extinguish any incipient fire that might occur. The employees acting as the fire watch shall be instructed as to the fire hazards anticipated and how to use the 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, etc., 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, etc., 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 means.

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 removed from below decks or enclosed spaces. During meal periods or other extended nonwork periods, lines shall be disconnected at the source of supply.

2-5.5.1 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 in Use of Cutting and Welding Processes.*

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 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.

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 Electrical wiring and equipment of a temporary nature shall be substantially installed in such a manner as to be safe from physical damage and shall be frequently inspected. Defects in wiring, fixtures, or equipment of a type liable to create dangerous conditions shall be promptly remedied. Portable equipment shall be grounded and provided with overcurrent protection and shall be disconnected when not in use.

2-6.1.1 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.

Exception: Where lights are required for inspection and safety purposes, 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, *National Electrical Code*.

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, *National Electrical Code*, 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 subjected to physical damage.

2-7 Application of Paints and Other Flammable Compounds.

2-7.1 No welding, burning, or other open-flame or spark-producing machines or operations such as chipping, grinding, etc., 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, e.g., 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 guard 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 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.

2-10 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 competent guard shall be on duty at all times when work is not in progress.

2-10.2 Where central station systems are not feasible or are not deemed necessary, an approved portable clock system shall be provided on the vessel during the outfitting, repair, or conversion period.

2-10.3 Watch service 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.

2-10.4 Before going on duty, guards shall be informed of locations where riveting, welding, burning, or other hot work has been performed in the vicinity of combustible material while work is in progress. They shall also be advised of the locations of freshly painted areas, tanks containing oil, or other hazardous conditions. All such locations shall be inspected while work is in progress and as soon as practicable after work has been stopped. The regular watch force shall be assisted by other competent persons when necessary in order to complete the inspection within a reasonable period. The guards shall be required to give further special attention to these locations during their rounds so as to ensure against the spread of any previously undetected fires.

2-10.5 Guards shall be familiar with the location of all items of fire equipment on vessels, inspect them during their daily tours of inspection, and know how to use them.

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 or fire alarm supervised guard service is not provided, telephones shall be available at convenient locations on or near vessels and connected to a central office where someone is constantly on duty.

2-11.3 Provisions shall be made for the establishment, marking, and maintenance of proper fire lanes at ways and berths.

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, and under repair. One-and-one-half-inch (38.1 mm) and $2^1/_2$-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. Due regard shall be given to the capacity of existing shore hydrants to ensure that an adequate water supply is available.

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 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 extin- guishing 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 laying of hose lines, the handling of hose streams and special extinguishing equipment, and the 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.

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 the flooding indicates there could be danger from lack of 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 free.

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.

Exception: 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 declared as laid up by the owner or operator, without a full crew, but with equipment either in operable condition or requiring a minimum of work to restore it to service. This chapter does not apply to vessels in a long term inactive status ("mothballed"), requiring extensive work to return to active service, or to vessels in a reduced operating status. It also does not apply to those vessels in routine shipyard maintenance availability (e.g., two year drydock) or to those in emergency availability for repairs.

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:

3-3.1 Sufficient water depth at all tidal stages year round.

3-3.2 The presence of a fire alarm box, telephone, or other reliable means of communication.

3-3.3 Freedom from high humidity, and very low temperature extremes, which could affect the fire main system.

3-3.4* The arrangement of vessel moorings, singly or in groups, to facilitate vessel movement in case of fire or other emergency.

3-3.5 The availability of fenders or camels of ample size alongside at areas of possible or actual contact with other vessels or land structures.

3-3.6* The availability of towing craft and waterborne or land-based fire-fighting assistance, or both.

3-3.7 The availability of anchors not already in use for emergency deployment.

3-3.8 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, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves*, contains specifications for fire warps.

3-6 Power Source.

3-6.1 There shall be a source of power that might be from land, from another vessel, or on the vessel 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, and 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 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 outside the deckhouse.

3-8 General Care and Cleanliness.

3-8.1 Vessels 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 deck houses, and all hatches shall be kept closed, covered, or sealed. All interior doors shall be kept closed.

Exception: 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 the lay-up is intended to exceed 60 days.

3-10.2 Fuel shall be drained from tanks and fuel systems of auxiliary motor craft and removed from the vessel if lay-up is intended to exceed 60 days.

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 provided with a grounding conductor in the supply cable and disconnected when not in use.

3-13 Watches.

3-13.1 There shall be a watch 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 The watch personnel shall be capable of performing emergency procedures, operating fire protection equipment, and assisting in removing the vessel from the lay-up location. Oxygen breathing apparatus or similar device shall be provided and maintained for immediate use.

3-13.4 The watch service shall be equipped for and satisfy the requirements of 2-10.5.

3-14 Fire Detection and Fire Alarms.

3-14.1 Where automatic fire detection and fire alarm systems are not installed or operable, the requirements of 2-11 shall be satisfied.

3-14.2 Vessels shall maintain the capability of two-way voice radio or telephone emergency communication. Portable radios 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.

3-15 Fire Protection.

3-15.1 Access. Gangways, ladders, or other facilities providing access to the vessel or vessels for fire-fighting purposes shall be available 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 and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

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*, 1994 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 1995 edition.

NFPA 51B, *Standard for Fire Prevention in Use of Cutting and Welding Processes*, 1994 edition.

NFPA 70, *National Electrical Code, 1996 edition.*

NFPA 306, *Standard for the Control of Gas Hazards on Vessels*, 1993 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 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 concerned with product evaluations that is in a position to determine compliance with appropriate standards for the current production of listed items.

A-1-2 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-1-2 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

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-2-12.1 The minimum nozzle residual pressure should be 60 psi (4.14×10^5 Pa) at 100 gpm (6.3×10^{-3} m^3/s). The minimum total flow should be 500 gpm (3.15×10^{-2} m^3/s) for ships approximately 300 ft (93 m) in length, having small interior compartments such as small passenger vessels. The minimum total flow for larger ships having 2000 ft^2 (186 m^2) in area or smaller compartments should be 1000 gpm (6.3×10^{-2} m^3/s). Ships, such as cargo ships, having compartments larger than 2000 ft^2 (186 m^2) should have at least 1500 gpm (9.45×10^{-2} m^3/s) available. Ships having large cargo holds may require higher capacities.

A-2-12.3 The hose lines should be nominal $1^1/_2$ in. (38.1 mm) or $2^1/_2$ 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, refer to NFPA 600, *Standard on Industrial Fire Brigades*.

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: protection from open seas and surge; good holding ground for anchors, clear of wrecks, cables, or other obstacles; clear of known cyclone or tidal wave danger; clear of open roadstead anchorages or shipping channels; clear of high velocity or turbulent tidal or river currents; clear of floating hazards or significant amounts of moving ice; clear of hazardous shore facilities; and 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 shall 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 shall 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 thus are not considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

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*, 1992 edition.

B-1.2 Other Publications.

B-1.2.1 U.S. Government Publications. USGPO Superintendent of Documents, Washington DC 20402.

Code of Federal Regulations
33 CFR
46 CFR 49 CFR
29 CFR Part 1915.

B-1.2.2 American Bureau of Shipping. ABS, 45 Eisenhower Dr., Paramus, NJ 07652.

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