NFPA®

301

Code for Safety to Life from Fire on Merchant Vessels

2018

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NFPA® 301

Code for

Safety to Life from Fire on Merchant Vessels

2018 Edition

This edition of NFPA 301, *Code for Safety to Life from Fire on Merchant Vessels*, was prepared by the Technical Committee on Merchant Vessels. It was issued by the Standards Council on August 1, 2017, with an effective date of August 21, 2017, and supersedes all previous editions.

This edition of NFPA 301 was approved as an American National Standard on August 21, 2017.

Origin and Development of NFPA 301

In 1993, the Coast Guard approached the NFPA Standards Council with a request to form a new committee that would develop a consensus standard on fire protection of merchant vessels, similar in format to the *Life Safety Code®*.The basis for this request was a Coast Guard initiative known as Maritime Regulatory Reform. One aspect of maritime regulatory reform involves greater use of industry standards in lieu of detailed design requirements contained in the Code of Federal Regulations.

The initial approach advocated by the Coast Guard was to develop a standard that was applicable to passenger vessels only and to add requirements for different vessel types in future editions. However, the committee agreed that it would not take much more effort to draft a standard that was applicable to passenger vessels, cargo vessels, and tank vessels. Towing vessels were added to this list in anticipation of a federal law mandating fire protection upgrades. Other vessel types might be added in future editions.

By shifting development and maintenance of regulations to standards-making organizations, the regulators (in this case, the Coast Guard) are assured of dynamic standards that are regularly updated. The marine industry benefits through increased input into the rules it would subsequently be required to follow. Similar efforts either have been completed or are in progress to add marine-specific criteria to existing fire protection system standards, such as automatic sprinklers, water mist extinguishing systems, foam, carbon dioxide, and clean agent alternatives to halons.

NFPA 301 provides minimum requirements for the design, operation, and maintenance of merchant vessels for safety to life from fire and similar emergencies. The document establishes occupancy classifications and then provides requirements for design and construction, access and egress, and fire protection. The document applies to passenger vessels, towing vessels, and cargo vessels.

The code underwent a complete revision in 2001 to implement *Manual of Style for NFPA Technical Committee Documents* changes, which reorganized the document and stressed the use of enforceable language. This revision incorporated changes to the testing requirements for interior finishes, deck coverings, mattresses and bedding, and electrical cable. The code expanded the vessels covered to include ocean-going towing vessels as part of the cargo vessel requirements. In the passenger vessel chapter, the code redefined the classification criteria for vessel categories. One outcome of this change was an attempt to modify the requirements for sprinkler protection on certain classes of passenger vessels so that the requirements more closely matched existing Coast Guard requirements, in order to encourage use of the code as an alternative to Coast Guard prescriptive regulations.

The code underwent another substantial change in the 2008 edition. A new chapter was added to allow vessel designers and other users to incorporate equivalencies and alternative design considerations in vessel construction that satisfy the fundamentals of fire prevention, fire protection, and means of egress. The chapter on towing vessels was completely revised to update requirements for all new-construction towing vessels regardless of length and horsepower, in accordance with current U.S. Coast Guard regulations and industry best practices.

During the revision cycle for the 2013 edition the committee recognized the code as an essential consensus standard on fire protection of merchant vessels per the U.S. Coast Guard's original request in 1993. The NFPA standards-making process and the code can address a new fire hazard or fire protection issue more urgently than can be done by the government's regulatory rulemaking process.

In the 2013 edition of the code, the Technical Committee on Merchant Vessels revised several definitions and updated the publications referenced within the document. The committee also changed the applicability requirements for automatic sprinkler systems and water mist systems to be limited to passenger vessels with overnight accommodations for more than 36 passengers (in addition to Group I and Group II passenger vessels). This change made mandatory automatic fire protection requirements for certain small passenger vessels equivalent to existing federal regulations.

In the 2018 edition of the code, the Technical Committee on Merchant Vessels has updated the references in Chapter 2 and Annex D. Chapter 3, Definitions, also has been reviewed by the committee and several changes have been incorporated. The term *fire endurance* has been removed from the code because it is an obsolete term that has been replaced throughout most of the NFPA system with *fire resistance*. Other revised definitions include: *furnishings*, *fire protection rating*, *fire resistance rating*, *and fire-rated glazing*.

The committee has revised the requirements for backup lighting to reduce the total blackout time in spaces aboard a vessel that do not normally have any natural lighting (e.g., portholes, windows, and so on) to reduce the risk of panic and injury to passengers and crew.

In addition, it has been determined that the signage used on doors, passageways, ladders, or stairways that are neither an exit nor a way of exit access needs to be approved by the authority having jurisdiction (AHJ).

The technical committee also incorporated by reference the requirements from NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, to specify that insulation and coverings for pipes and ducts installed in areas where there is the potential for hot temperatures need to be assessed to ensure they perform properly when exposed to high temperatures.

For fire test requirements for draperies or other vertically hung textiles, users of the code are now directed to NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, or Part 7 of the IMO *Fire Test Procedures Code*.

Finally, the 2018 edition now requires that portable fire extinguishers be classed in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*, or follow the requirements for portable extinguishers in Title 46 of the Code of Federal Regulations.

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This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

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 the protection of human life, property, and the marine environment from fires aboard merchant vessels.

Contents

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Code for

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2018 Edition

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

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex D. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

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

Chapter 1 Administration

1.1 Scope.

Δ **1.1.1 Title.** NFPA 301 shall be known as the *Merchant Vessel Code* and is referred to herein as "this code" or "the code."

1.1.2 The code addresses construction, arrangement, protection, and space utilization factors that are necessary to minimize danger to life from fire, smoke, fumes, or panic. It also provides for reasonable protection against property damage and avoidance of environmental damage consistent with the normal operation of vessels. Fundamental requirements applicable to all vessels are found in Chapters 1 through 9. These fundamental requirements are modified in Chapters 10 through 18 as applicable for any type of space. The requirements in Chapters 1 through 18 are modified in Chapters 19 through 21 as applicable for any given vessel type. For example, a passenger vessel would follow the requirements of Chapters 1 through 18 and Chapter 21.

1.1.3 The code identifies the minimum criteria for the design of egress facilities so as to permit prompt escape of passengers and crew to safe areas aboard vessels and, where necessary, to survival craft embarkation stations.

1.1.4 The code recognizes that life safety is more than a matter of egress and, accordingly, deals with other considerations that are essential to life safety. It also recognizes the unique operating environment of merchant vessels and the relationships among life safety, property protection, and environmental protection and deals with these criteria accordingly.

1.1.5* Where permanently moored and occupied as buildings, merchant vessels shall be permitted to be treated as buildings and shall be permitted to be subject to the provisions of appropriate building codes and standards as specified by the local authority having jurisdiction (AHJ).

1.2 Purpose.

1.2.1 The purpose of this code is to provide minimum requirements, with due regard to function, for the design, operation, and maintenance of merchant vessels for safety to life from fire and similar emergencies.

1.2.2 As related to fire safety, the objective of this code is to protect the passengers and crew from loss of life. It is also intended that the code will provide for minimum loss of property and minimum impact on the environment.

1.2.3* The level of safety is achieved by the combination of design, prevention, protection, egress, and other features enumerated in the individual vessel occupancy classification with due regard to the capabilities and reliability of the features involved. Recognition is given to human factors and to the need for crew training and passenger instruction.

1.2.4 The code endeavors to avoid requirements that could involve unreasonable hardships or unnecessary inconvenience or interference with the normal use of a vessel, but it provides minimum requirements for fire safety consistent with the public interest.

1.3 Application.

Δ **1.3.1*** This code shall apply to new construction merchant vessels to the extent described in Chapters 19 through 21. This code does not apply to pleasure craft or commercial craft covered by NFPA 302 or to warships.

1.3.2 Existing vessels undergoing major modification or conversion shall comply with all requirements of this code within the areas being modified and ancillary support systems.

1.3.3 Any alteration or any installation of new equipment, joinery, or furnishings shall comply with the requirements for new construction.

1.3.4 Where specific requirements contained in Chapters 10 through 18 differ from general requirements contained in Chapters 1 through 9, the requirements of Chapters 10 through 18 shall govern. Where the requirements in Chapters 19 through 21 differ from the requirements in Chapters 1 through 18, the requirements in Chapters 19 through 21 shall govern.

1.3.5 Provisions in Excess of Code Requirements. Nothing in this code shall be construed to prohibit additional means of egress, or otherwise safer means of egress than those specified by the minimum requirements of this code.

1.3.6* This code is not intended for application in addition to *Safety of Life at Sea (SOLAS)* requirements to vessels in international trade.

1.4 Equivalency Concepts.

1.4.1 Nothing in this code is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, durability, and safety as alternatives to those prescribed in this code.

1.4.2 The specific requirements of this code shall be permitted to be modified by the AHJ to allow alternative arrangements that will ensure, as much as practicable, an equivalent level of safety to life from fire, but in no case shall the modification afford less safety to life than that which, in the judgment of the AHJ, would be provided by compliance with the corresponding provisions contained in this code.

1.4.3 Vessels with alternative fire protection features accepted by the AHJ shall be considered as conforming with the code.

1.5 Units.

1.5.1 Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI).

1.5.2 If a value for measurement as provided in this code is followed by an equivalent value in other units, the first stated value is to be regarded as the requirement. A given equivalent value might be an approximation.

1.6 Vessel Construction, Repair, and Alteration.

1.6.1* Vessels built or converted to meet this code shall comply with all of the provisions of the code.

1.6.2 Changes in Service. In any vessel, whether necessitating a physical alteration or not, a change in service from one use to another shall be permitted only if such vessel, or portion thereof, conforms with the requirements of this code that apply to new construction for the proposed new use.

1.6.3* Vessels or portions of vessels shall be permitted to be occupied during conversion, repair, alterations, or additions only if all means of egress and all fire protection features are in place and continuously maintained for the occupied portion. Temporarily installed fire protection features shall comply with Section 1.4 of this code.

1.7 Maintenance.

1.7.1 Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this code, such device, equipment, system, condition, arrangement, level of protection, or other feature shall thereafter be permanently maintained unless the code exempts such maintenance.

1.7.2 Additional approved life safety features such as, but not limited to, automatic sprinklers, fire alarm systems, standpipes, and horizontal exits, if not required by the code, shall be permanently maintained or removed.

1.8 Enforcement. This code shall be administered and enforced by the authority having jurisdiction designated by the governing authority. *(See Annex C for sample wording for enabling legislation.)*

Chapter 2 Referenced Publications

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

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

NFPA 10, *Standard for Portable Fire Extinguishers,* 2017 edition.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam,* 2016 edition.

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

NFPA 17, *Standard for Dry Chemical Extinguishing Systems,* 2017 edition.

NFPA 17A, *Standard for Wet Chemical Extinguishing Systems,* 2017 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection,* 2013 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,* 2017 edition.

NFPA 30, *Flammable and Combustible Liquids Code,* 2018 edition.

NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products,* 2015 edition.

NFPA 70®, National Electrical Code®, 2017 edition.

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

NFPA 80, *Standard for Fire Doors and Other Opening Protectives,* 2016 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems,* 2018 edition.

NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations,* 2017 edition.

NFPA 99, *Health Care Facilities Code,* 2018 edition.

NFPA *101®, Life Safety Code®,* 2018 edition.

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source,* 2015 edition.

NFPA 262, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces,* 2015 edition.

NFPA 270, *Standard Test Method for Measurement of Smoke Obscuration Using a Conical Radiant Source in a Single Closed Chamber,* 2013 edition.

NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth,* 2015 edition.

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

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films,* 2015 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems,* 2015 edition.

NFPA 1964, *Standard for Spray Nozzles,* 2013 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting,* 2018 edition.

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services,* 2013 edition.

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems,* 2015 edition.

2.3 Other Publications.

2.3.1 ABS Publications. American Bureau of Shipping, ABS Plaza, 16855 Northchase Drive, Houston, TX 77060.

Rules for Building and Classing Steel Vessels Under 90 Meters (295 Feet) in Length, 2012.

2.3.2 ABYC Publications. American Boat & Yacht Council, Inc., 613 Third Street, Suite 10, Annapolis, MD 21403.

ABYC-H-25, *Marine Gasoline Fuel Systems,* 2010, reaffirmed 2013.

ABYC-P-1, *Installation of Exhaust Systems for Propulsion and Auxiliary Engines,* 2009.

2.3.3 ASME Publications. ASME International, Two Park Avenue, New York, NY 10016-5990.

ASME A17.1, *Safety Code for Elevators and Escalators,* 2013.

ASME A17.2, *Guide for Inspection of Elevators, Escalators, and Moving Walks,* 2012.

Δ **2.3.4 ASTM Publications.** ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM C411, *Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation,* 2011.

ASTM D2859, *Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials,* 2016.

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials,* 2016.

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials,* 2016.

ASTM E136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C,* 2016.

ASTM E648, *Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source,* 2015 e1.

ASTM E814, *Standard Test Method for Fire Tests of Through-Penetration Firestops,* 2013a.

ASTM E1317, *Standard Test Method for Flammability of Marine Surface Finishes,* 2012.

ASTM E1354, *Standard Test Method for Heat and Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter,* 2016.

ASTM E1537, *Standard Test Method for Fire Testing of Upholstered Furniture Items,* 2015.

ASTM E1590, *Standard Test Method for Fire Testing of Mattresses,* 2013.

ASTM E1591, *Standard Guide for Obtaining Data for Deterministic Fire Models,* 2013.

ASTM E1995, *Standard Test Method for Measurement of Smoke Obscuration Using a Conical Radiant Source in a Single-Closed Chamber, with the Specimen Oriented Horizontally,* 2012.

ASTM E2231, *Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics,* 2015.

ASTM E2257, *Standard Test Method Room Fire Test of Wall and Ceiling Materials and Assemblies,* 2016.

ASTM E2652, *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C,* 2016.

ASTM F840, *Standard Specification for Ladders, Fixed, Vertical, Steel, Ship's,* 1983 (2003) (withdrawn).

ASTM F1384, *Standard Test Method for Fire Tests of Marine Joiner Doors,* 1993 (withdrawn).

ASTM F1626, *Standard Practice for Preparing Shipboard Fire Control Plans,* 1995 (2006) (withdrawn).

2.3.5 CGA Publications. Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151-1788.

CGA G-7.1, *Commodity Specifications for Air,* G-7.1, 2011.

2.3.6 CSA Publications. Canadian Standards Association, 5060 Spectrum Way, Mississauga, ON, L4W 5N6, Canada.

CSA C 22.2, No. 0.3, *Test Methods for Electrical Wires and Cables,* 2009, reaffirmed 2014.

2.3.7 IEEE Publications. IEEE, Three Park Avenue, 17th Floor, New York, NY 10016-5997.

IEEE 45, *Recommended Practice for Electric Installations on Shipboard,* 2002.

IEEE 515, *Standard for Testing, Design Installation, and Maintenance of Electrical Resistance Heat Tracing for Industrial Applications,* 2011.

IEEE 844, *Recommended Practice for Electrical Impedance, Induction, and Skin Effect Heating of Pipelines and Vessels,* 2000, reaffirmed 2006.

IEEE 1202, *Standard for Flame Testing of Cables for Use in Cable Tray in Industrial and Commercial Occupancies,* 2012.

IEEE 1580, *Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities,* 2010.

2.3.8 IMO Publications. International Maritime Organization, 4 Albert Embankment, London, SE1 7SR.

Assembly Resolution A752(18), *Guidelines for the Evaluation, Testing, and Application of Low-Location Lighting on Passenger Ships,* 1993.

Assembly Resolution A757(18), *Standard for the Calculation of the Width of Stairways Forming Means of Escape on Passenger Ships,* 1993.

Assembly Resolution A760(18), *Symbols Related to Life-Saving Appliances and Arrangements,* 1993.

Fire Test Procedures Code: International Code for the Application of Fire Test Procedures (FTP Code), 2012.

IMO International Code of Safety for the High-Speed Craft (HSC Code), 2008.

IMO International Maritime Dangerous Goods (IMDG) Code, 2014.