

NFPA® 520

Standard on Subterranean Spaces

2016 Edition



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

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NFPA® 520
Standard on
Subterranean Spaces
2016 Edition

This edition of NFPA 520, *Standard on Subterranean Spaces*, was prepared by the Technical Committee on Subterranean Spaces and acted on by NFPA at its June Association Technical Meeting held June 22–25, 2015, in Chicago, IL. It was issued by the Standards Council on August 18, 2015, with an effective date of September 7, 2015, and supersedes all previous editions.

This edition of NFPA 520 was approved as an American National Standard on September 7, 2015.

Origin and Development of NFPA 520

In 1993, a symposium was convened by the United States Fire Administration to examine the problem of fire in subterranean spaces that have been converted for commercial use. The symposium was the result of a fire in a developed subterranean space in Kansas City, Kansas, that burned from December 1991 to April 1992. The symposium examined several unique fire and life safety issues that exist in subterranean spaces, including means of egress issues such as orientation and excessive travel distances, poor ventilation, communication difficulties, and nontraditional behavior of fire. The result was a recommendation to the National Fire Protection Association to develop a standard that addresses fire and life safety in these occupancies.

For the 2005 edition, the committee made only minor revisions to the document by adding some definitions, clarifying some provisions that users had found unclear, and expanding several concepts that had been found to work well.

For the 2010 edition, the committee found that NFPA 520 generally had been an effective document over the past 15 years. The committee made only minor revisions, revising two definitions with appropriate extracts from other documents and clarifying the provisions of three subsections.

For the 2016 edition, the committee determined that NFPA 520 generally has been an effective document over the past 20 years. The committee made only minor revisions, changing the phrase “areas of refuge” to “refuge areas” and updating various reference documents.



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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 life and property against fire, explosion, and related hazards associated with occupancies located in subterranean spaces not addressed by other documents.



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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 C. 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 C.

Chapter 1 Administration**1.1* Scope.**

1.1.1 This standard addresses the safeguarding of life and property against fire, explosion, and related hazards associated with developed subterranean spaces.

1.1.2 This standard does not cover the following types of subterranean spaces:

- (1) Tourist caverns
- (2) Wine storage caverns
- (3) Gas and oil storage reservoirs
- (4) Hazardous waste repositories
- (5) Utility installations such as pump stations
- (6) Working mines
- (7) Transportation and pedestrian tunnels

- (8) Aboveground buildings with belowground stories
- (9) Cut and cover underground structures specifically addressed in the building code

1.2 Purpose. The purpose of this standard is to provide minimum requirements for the design, operation, and maintenance of developed subterranean spaces for safety to life and property from fire and similar hazards.

1.3 Application.**1.3.1 General.**

1.3.1.1 The requirements of this standard apply to newly developed subterranean spaces.

1.3.1.2 Where specifically noted, this standard also applies to existing facilities.

1.3.2* Modifications, Remodeling, and Additions. Where modifications are made, remodeling is done, or additional space is created in an existing developed subterranean space, the requirements of this standard apply to those modifications, remodeling, or additions.

1.4 Retroactivity. When requirements of this standard apply to existing subterranean spaces, a limited but reasonable time shall be allowed for compliance that is commensurate with the magnitude of the expenditure, the disruption of services, and the degree of hazard.

1.5 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety as alternatives to those prescribed by this standard, provided sufficient technical documentation is submitted to the authority having jurisdiction to demonstrate the system, method, or device is approved for the intended purpose and is equivalent.

Chapter 2 Referenced Publications

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

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

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

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

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

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

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

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

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

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

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

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

NFPA 101®, *Life Safety Code*®, 2015 edition.



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

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

NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls*, 2015 edition.

NFPA 600, *Standard on Facility Fire Brigades*, 2015 edition.

2.3 Other Publications.

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

ASTM E 136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, 2012.

2.3.2 Other Publications.

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

2.4 References for Extracts in Mandatory Sections.

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

Chapter 3 Definitions

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

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

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

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

3.2.4 Shall. Indicates a mandatory requirement.

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

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

activities,” the term “standards” includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Building. An area of the subterranean space that is separated from the common space or the undeveloped space by fire-resistive construction.

3.3.2 Control Area. An area within a building for storage and use of high-hazard materials.

3.3.3 Exit Passageway. An enclosed passageway that leads from the subterranean space to the exterior public way.

3.3.4 Exterior Building Wall. The rock surface or constructed wall that separates a building in the subterranean space from the remainder of the space.

3.3.5 Fire Command Center. The principal attended or unattended room or area where the status of the detection, alarm communications, control systems, and other emergency systems is displayed and from which the system(s) can be manually controlled. [72, 2016] (SIG-ECS)

3.3.6 Floor Area.

3.3.6.1 Gross Floor Area. The floor area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, and thickness of interior walls, columns, or other features. Where the term *area* is used elsewhere in this standard, it shall be understood to be gross floor area unless otherwise specified.

3.3.6.2 Net Floor Area. The gross floor area minus the area of support columns.

3.3.7 Hazard.

3.3.7.1 High Hazard. Contents that are likely to burn with extreme rapidity or from which explosions are likely.

3.3.7.2 Low Hazard. Contents of such low combustibility that no self-propagating fire therein can occur.

3.3.7.3 Ordinary Hazard. Contents that are likely to burn with moderate rapidity or to give off a considerable volume of smoke.

3.3.8 Noncombustible Material. A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E 136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, shall be considered noncombustible materials.

3.3.9 Parking Area. An area used for parking of occupant vehicles that is not intended to serve as storage of vehicles.

3.3.10 Portal. A horizontal roadway or pedestrian entry to or exit from the subterranean space.

3.3.11 Roadway. Any passageway within the subterranean space intended for use by motor vehicles or by pedestrian traffic.

3.3.11.1 Fire Department Vehicle Roadway. Any major thoroughfare designated for fire department apparatus.