

## Liability

# The Life Safety Code

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## Abstract

NFPA 101, *Life Safety Code*, published by the National Fire Protection Association (NFPA), provides minimum requirements for the design, operation and maintenance of buildings and structures for safety to life from fire and similar emergencies. The *Life Safety Code* has been adopted as a regulatory requirement by many States. It is also useful for evaluating the premises liability exposures of a building or structure. This report provides an overview of NFPA 101 and the main code requirements.

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## Introduction

The National Fire Protection Association (NFPA) publishes NFPA 101, *Life Safety Code*. The *Code* establishes minimum requirements for the design, operation, and maintenance of buildings and structures for safety to life from fire. NFPA 101 applies to both new construction and existing buildings and structures. Various editions of NFPA 101 have been adopted as regulatory requirements in many States and municipalities. In addition, the federal government requires that all health care facilities receiving Medicare or Medicaid funding comply with the provisions of NFPA 101.

The primary goal of NFPA 101 is to provide an environment, for occupants, which is reasonably safe from fire and similar emergencies. A second goal is to provide for reasonably safe crowd movement in emergencies. These goals are accomplished by ensuring that buildings or structures provide a sufficient number of adequately designed egress facilities in combination with other safeguards to provide adequate egress time or protection for occupants exposed to fire.

Compliance with NFPA 101 can be achieved in either of two ways. The facility can choose to comply with the prescriptive design and operational requirements of NFPA 101. Alternatively, it can use a new performance-based compliance option that was introduced with the 2000 edition of NFPA 101.

NFPA 101 can be used in evaluating premises liability exposures. Compliance with NFPA 101 indicates that the facility has achieved a minimum level of occupant safety under fire or emergency conditions.

This report provides an overview of NFPA 101 and the main code requirements.

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## Structure of the Code

The 2006 edition of NFPA 101 consists of 43 chapters and 2 Annexes. Chapters 1 through 6 provide the administrative provisions and general requirements of the code. Chapters 7 through 12 provide detailed design requirements for means of egress, fire protection features, building services, fire protection equipment, building contents and other safeguards. Chapters 12 through 42 provide life safety requirements for twelve classes of occupancies. While chapter 43 addresses provisions and requirements for building rehabilitation. There are two annexes providing explanations, non-mandatory interpretations of code provisions, and additional references.

## The Life Safety Code

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### Fundamental Requirements

The following fundamental concepts of building design and operation for life safety serve as the basis for the prescriptive requirements of NFPA 101:

- Every building or structure shall be provided with means of egress and other safeguards of the kinds, numbers, locations, and capacities appropriate to the individual building or structure.
- Safety to life should not depend solely upon any single safeguard.
- At least two means of egress must be provided in all situations where occupants would be endangered attempting to use a single means of egress. The means of egress should be arranged to minimize the possibility that both might be rendered impassable by the same emergency.
- Egress paths must be maintained free and unobstructed.
- Locks or fastenings that prevent the free escape from the inside of any building are only allowed for certain occupancies, such as prisons, when additional steps are taken to remove occupants during emergencies.
- Means of egress should be accessible to the extent necessary to ensure the safety of those having impaired mobility.
- Every exit should be clearly visible, or the route to reach each exit conspicuously indicated.
- Each means of egress, in its entirety, must be arranged or marked so that the way to a place of safety is indicated in a clear manner.
- Egress facilities must be adequately lighted.
- Fire alarms or other systems must be provided, when necessary, to warn occupants of the existence of fire.
- Vertical openings must be enclosed or protected to prevent the spread of fire, smoke, or fumes from floor to floor.
- Any fire protection system, building service equipment, feature, or safeguard must be designed, installed, and approved in accordance with all applicable NFPA standards.
- Devices, equipment, or other features required for complying with NFPA 101 must be maintained.

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### General Requirements

NFPA 101 contains a series of general requirements that apply to all buildings and structures. These requirements can be divided into seven general areas:

- Means of egress.
- Fire protection features.
- Building services and fire protection equipment.
- Interior finishes, contents, and furnishings.
- Modifications for special structures.

## The Life Safety Code

Not all requirements apply in all situations. In some cases, the requirements are only applicable when authorized by an occupancy-specific chapter. In other cases, the requirement may be exempted if certain conditions are met. If an occupancy-specific chapter contains a requirement that is different from a general requirement, the general requirement will usually contain an exception allowing the more specific requirement.

### Means of Egress

A means of egress is “a continuous and unobstructed way of travel from any point in a building or a structure to a public way consisting of three separate and distinct parts: (1) the exit access, (2) the exit, and (3) the exit discharge. A means of egress includes both horizontal and vertical travel elements, such as intervening room spaces, corridors, ramps, stairs, elevators, and escalators.

Chapter 7 provides detailed design specifications for the following: components of means of egress (e.g., doors, stairs, and ramps), egress capacity, number of means of egress, arrangement of means of egress, maximum travel distance to an exit, exit discharge, and egress illumination, including emergency lighting. There are also special design provisions for occupancies with high hazard contents and for boiler, mechanical equipment, and furnace rooms. The requirements in this chapter provide design provisions for meeting the fundamental life safety concepts that are related to egress and may be modified for specific classes of occupancies.

General egress requirements include:

- Walking surfaces in the means of egress must be slip resistant.
- Changes in level must be achieved using ramps or stairs where the elevation difference exceeds 21 in (53.5 cm).
- Furnishings, decorations, or other objects must not obstruct exits.
- Locks and hardware must be installed to permit free escape.
- Doors normally required to be kept closed must not be secured in an open position at any time, and must be self-closing or automatic closing.
- Interior finishes in exits must be limited to Class A or B materials.
- The capacity of the means of egress must be sufficient for the expected occupant load.
- Emergency lighting facilities must be provided for means of egress.
- Evacuation signs must be both audible and visible.

### Fire Protection Features

Chapter 8 provides the basic requirements for structural features of fire protection. The requirements apply to both new and existing construction, and include:

- Buildings must meet the minimum construction requirements defined for the occupancy (e.g., multi-story nursing facilities must be either Type I or Type II construction).
- Where required by occupancy chapters, buildings must be divided into compartments using fire barriers.
- In multiple-story buildings, floors should be constructed as smoke barriers and vertical openings protected with fire barriers unless specifically exempt from these requirements.

## The Life Safety Code

- Where required by occupancy chapters, building spaces must be provided with smoke barriers that subdivide the space.
- Areas that pose higher degrees of hazard than the general occupancy should be provided with additional protection, such as automatic sprinkler protection or enclosure.

The purpose of these requirements is to ensure that the integrity of the building or structure is maintained for the time needed to evacuate the facility, to limit the rapid spread of fire and smoke throughout the occupancy, and to protect exit access. The primary difference between a fire and smoke barrier is that the fire barrier must be designed and constructed with a specified fire resistance rating. Openings in barriers, where allowed, must be protected.

## Building Services and Fire Protection Equipment

Chapter 9 provides general requirements for building services and is intended to ensure that building services, where provided, are installed, maintained, and operated in accordance with recognized safe practices. Essentially, this chapter provides cross-references to other codes and standards. Chapter 9 also provides general provisions for the installation and maintenance of smoke control systems, fire detection, alarm and communication systems, and automatic sprinklers and other extinguishing equipment when the occupancy-specific sections (i.e., Chapters 12 through 42) require such systems.

### Building Services

Building services requirements include:

- Gas equipment and piping are required to meet NFPA 54, *National Fuel Gas Code*, and NFPA 58, *Liquefied Petroleum Gas Code*.
- Electrical wiring and equipment are required to meet NFPA 70, *National Electrical Code*.
- Elevators and escalators are required to conform to ANSI A17.1, *Safety Code for Elevators or Escalators*, or ANSI A17.3, *Safety Code for Existing Elevators or Escalators*.
- Heating, ventilating, and air conditioning equipment, commercial cooking equipment, rubbish chutes, incinerators, laundry chutes, emergency generators, and laboratory ventilation are required to meet applicable NFPA standards.

### Fire Protection Equipment

The individual occupancy chapters will define the specific fire protection equipment requirements that must be met. Provisions requiring fire detection systems are typically found in section 3.4 (e.g., New Assembly Occupancies requirements are found in 12.3.4) and fire extinguishment requirements are typically found in section 3.5 of each occupancy chapter.

Fire protection equipment requirements include:

- Sprinkler systems in many types of new construction, including health care facilities, hotels, apartment buildings, board and care facilities, and lodging and rooming houses, and, under certain circumstances, in existing high-rise hotels, apartment buildings, and one- and two-family dwellings.
- Incentives for adding fire protection equipment. For example, in many cases the maximum travel distance to an exit may be increased by at least 50 percent by adding an automatic sprinkler system.

## The Life Safety Code

### Interior Finishes, Contents, and Furnishings

Chapter 10 provides requirements for wall, ceiling, and interior floor finishes. In general, Chapter 10 requires these materials to be evaluated for speed of flame spread and smoke generation, and prohibits the use of higher hazard materials in certain building areas (e.g., means of egress). Chapter 10 also provides requirements for contents and furnishings. These materials include items, such as draperies, upholstered furniture, and mattresses. Contents and furnishings can increase the overall fire hazard in a building or structure by igniting easily and spreading fire rapidly or by generating smoke or toxic gases.

#### Interior Finish

Requirements for interior finish include:

- Wall or ceiling finishes can be Class A, B, or C. When tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics*, Class A materials exhibit a flame spread rating of 25 or less; Class B materials exhibit a flame spread rating of 26-75; and, Class C materials exhibit flame spreads between 76 and 200. In addition, all materials exhibit a smoke development rating of 450 or less.
- In general, a Class A material is required for walls, ceilings, and interior partitions. If used on walls or ceilings, the area must be protected by an approved automatic sprinkler system. Provision of automatic sprinklers may also be used to change the way that a particular material is treated (e.g., a Class B material may be used in an area where a Class A material would normally be required if sprinkler protection is provided). In addition, fire retardant coatings may be used to achieve required flame spread and smoke development ratings.
- Interior floor finishes can be Class I or Class II. Class I finishes exhibit a critical radiant flux of less than 0.45 Watts per square centimeter ( $W/cm^2$ ), when tested in accordance with NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*. Class II materials exhibit a critical radiant flux between 0.22 and 0.45  $W/cm^2$  following the same test method.

#### Contents and Furnishings

Requirements for contents and furnishings include:

- Draperies, curtains, and other loosely hanging furnishings are required to be flame resistant.
- Upholstered furniture and mattresses are required to be resistant to cigarette ignition.
- Upholster furniture and mattresses are required to have limited heat release rates.
- The use of highly flammable or explosive furnishings or decorations is prohibited.
- The degree of hazard of the contents can affect requirements related to protection and egress.

#### Special Structures

NFPA 101 establishes additional requirements that apply to occupancies located in special structures or high rises. Special structures include tents, towers, open structures, piers, water-surrounded structures, vehicles and vessels, underground structures, windowless structures, and membrane structures.

High-rise buildings are buildings greater than 75 ft (23 m) in height, where building height is measured from the lowest level of fire department vehicle access to the highest floor. Such buildings must be protected throughout by an approved, supervised automatic sprinkler system, Class I standpipe system, fire alarm system, emergency lighting and standby power system, and an emergency command center.

## The Life Safety Code

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### Occupancy Requirements

Occupancy-specific provisions are provided in Chapters 12 through 42 to supplement the general requirements provided in the other chapters of NFPA 101. These provisions address the unique life safety concerns that arise in a particular occupancy, (e.g., occupants in health care facilities may have limited mobility). In addition, the occupancy chapters address specific operational concerns that may affect life safety (e.g., maintenance concerns, emergency planning, control of smoking, and the hazard of contents). If specific requirements contained in the occupancy chapters differ with the general requirements, the occupancy-specific requirements govern.

### Occupancy Classes

Requirements are specified for 15 major occupancy classes. These are:

- Assembly.
- Educational.
- Day Care.
- Health Care.
- Ambulatory Health Care.
- Detention and Correctional.
- One- and Two- Family Dwellings
- Lodging and Rooming Houses
- Hotel and Dormitories
- Apartment Buildings
- Residential Board and Care.
- Mercantile.
- Business.
- Industrial.
- Storage.

Within these categories, there may be subcategories or special uses that receive separate treatment. For example, there are separate code requirements for new versus existing occupancies, as follows: Assembly, Educational, Day-Care, Health Care, Ambulatory Health Care, Detention and Correctional, Hotel and Dormitories, Apartment Buildings, Residential Board and Care, Mercantile, and Business.

### Mixed Occupancies

A mixed occupancy exists when two or more classes of occupancy exist in the same structure or building and where the classes are so intermingled that separate safeguards are impractical. In general, the more restrictive code provisions apply. The one exception to this rule is when the occupancy is for mercantile, business, industrial, storage, or low-density nonresidential use, and incidental to the predominant

## The Life Safety Code

occupancy; for example, a newsstand in an office building. In this case, the requirements for the predominant occupancy would apply.

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## Performance Option

The 2000 edition of NFPA 101 adopted a performance-based option for complying with the *Code*. This option allows the designer to demonstrate code compliance using alternate engineered designs for the particular building or facility. To be acceptable, the design must meet the goals and objectives of NFPA 101, and the detailed performance requirements specified in chapter 5. The design must be documented, and the building or facility owner must certify compliance annually by filing a warranty of fitness.

Use of this option does not exempt the designer from all prescriptive requirements. The performance chapter specifically requires the designer to meet certain requirements for means of egress and to have fire protection systems and features comply with applicable NFPA standards.

NFPA 101 also contains an equivalence provision that states "...nothing in the code is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability and safety over those prescribed by this Code." Alternative compliance designs can be submitted to the authority having jurisdiction (AHJ) for evaluating code compliance or approval on a case-by-case basis.

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## References

1. National Fire Protection Association (NFPA), *Fire Protection Handbook*. 19th ed. Quincy, MA: NFPA, 2003.
  2. ---. *Life Safety Code*. NFPA 101. Quincy, MA: NFPA, 2006.
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