**Chapter 40 Industrial Occupancies**

40.1 General Requirements

40.1.1 Application

40.1.1.1

The requirements of this chapter shall apply to both new and existing industrial occupancies.

40.1.1.2 Administration

The provisions of Chapter 1, Administration, shall apply.

40.1.1.3 General

The provisions of Chapter 4, General, shall apply.

40.1.1.4

Industrial occupancies shall include factories making products of all kinds and properties used for operations such as processing, assembling, mixing, packaging, finishing or decorating, repairing, and similar operations.

40.1.1.5

Incidental high-hazard operations protected in accordance with Section 8.7 and 40.3.2 in occupancies containing low- or ordinary-hazard contents shall not be the basis for high-hazard industrial occupancy classification.

40.1.1.6

Where construction, alteration, or demolition operations are conducted, the provisions of 4.6.10.2 shall apply.

40.1.2 Classification of Occupancy

Classification of occupancy shall be in accordance with 6.1.12.

40.1.2.1 Subclassification of Occupancy

Each industrial occupancy shall be subclassified according to its use as described in 40.1.2.1.1, 40.1.2.1.2, and 40.1.2.1.3.

40.1.2.1.1 General Industrial Occupancy

General industrial occupancies shall include all of the following:

Industrial occupancies that conduct ordinary- and low-hazard industrial operations in buildings of conventional design that are usable for various types of industrial processes

Industrial occupancies that include multistory buildings where floors are occupied by different tenants, or buildings that are usable for such occupancy and, therefore, are subject to possible use for types of industrial processes with a high density of employee population

40.1.2.1.2 Special-Purpose Industrial Occupancy

Special-purpose industrial occupancies shall include all of the following:

Industrial occupancies that conduct ordinary- and low-hazard industrial operations in buildings designed for, and that are usable only for, particular types of operations

Industrial occupancies that are characterized by a relatively low density of employee population, with much of the area occupied by machinery or equipment

40.1.2.1.3\* High-Hazard Industrial Occupancy

High-hazard industrial occupancies shall include all of the following:

Existing industrial occupancies that conduct industrial operations that use, process, store, or handle high-hazard contents, as defined by 6.2.2.4

New industrial occupancies that conduct industrial operations that use, process, store, or handle high-hazard contents, as defined by 6.2.2.4, in excess of the maximum allowable quantities (MAQ) as permitted by the fire code

Industrial occupancies in which incidental high-hazard operations in low- or ordinary-hazard occupancies that are protected in accordance with Section 8.7 and 40.3.2 are not required to be the basis for overall occupancy classification

40.1.2.2 Change of Industrial Occupancy Subclassification

A change from one subclassification of industrial occupancy to another shall comply with Chapter 43.

40.1.3 Multiple Occupancies

All multiple occupancies shall be in accordance with 6.1.14.

40.1.4 Definitions

40.1.4.1 General

For definitions, see Chapter 3, Definitions.

40.1.4.2 Special Definitions

Special terms applicable to this chapter are defined in Chapter 3.

40.1.5 Classification of Hazard of Contents

Classification of hazard of contents shall be in accordance with Section 6.2.

40.1.6 Minimum Construction Requirements

(Reserved.)

40.1.7\* Occupant Load

The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the occupant load factors of Table 7.3.1.2 that are characteristic of the use of the space, or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

40.2 Means of Egress Requirements

40.2.1 General

40.2.1.1

Each required means of egress shall be in accordance with the applicable portions of Chapter 7.

40.2.1.2\*

Normally unoccupied utility chases that are secured from unauthorized access and are used exclusively for routing of electrical, mechanical, or plumbing equipment shall not be required to comply with the provisions of Chapter 7

40.2.1.3

Newly installed bathtubs, bathtub-shower combinations, and nonemergency showers shall be provided with grab bars in accordance with the provisions of 24.2.8.

40.2.2 Means of Egress Components

40.2.2.1 General

Components of means of egress shall be limited to the types described in 40.2.2.2 through 40.2.2.13.

40.2.2.2 Doors

40.2.2.2.1

Doors complying with 7.2.1 shall be permitted.

40.2.2.2.2

Delayed-egress electrical locking systems complying with 7.2.1.6.1 shall be permitted.

40.2.2.2.3

Sensor-release of electrical locking systems complying with 7.2.1.6.2 shall be permitted.

40.2.2.2.4

Locks in accordance with 7.2.1.6.3 shall be permitted.

40.2.2.2.5

Approved existing horizontal-sliding fire doors shall be permitted in the means of egress where they comply with all of the following conditions:

They are held open by fusible links.

The fusible links are rated at not less than 165°F (74°C).

The fusible links are located not more than 10 ft (3050 mm) above the floor.

The fusible links are in immediate proximity to the door opening.

The fusible links are not located above a ceiling.

The door is not credited with providing any protection under this Code.

40.2.2.3 Stairs

40.2.2.3.1

Stairs shall comply with 7.2.2 and shall be permitted to be modified by any of the following:

Noncombustible grated stair treads and noncombustible grated landing floors shall be permitted.

Industrial equipment access stairs in accordance with 40.2.5.3 shall be permitted.

40.2.2.3.2

Spiral stairs complying with 7.2.2.2.3 shall be permitted.

40.2.2.3.3

Existing winders complying with 7.2.2.2.4 shall be permitted.

40.2.2.4 Smokeproof Enclosures

Smokeproof enclosures complying with 7.2.3 shall be permitted.

40.2.2.5 Horizontal Exits

40.2.2.5.1

Horizontal exits complying with 7.2.4 shall be permitted.

40.2.2.5.2\*

In horizontal exits where the opening is protected by a fire door assembly on each side of the wall in which it is located, one fire door shall be of the swinging type, as provided in 7.2.4.3.8, and the other shall be permitted to be an automatic-sliding fire door that shall be kept open whenever the building is occupied.

40.2.2.6 Ramps

Ramps complying with any of the following shall be permitted:

Ramps in accordance with 7.2.5

Industrial equipment access in accordance with 40.2.5.2

40.2.2.7 Exit Passageways

Exit passageways complying with 7.2.6 shall be permitted.

40.2.2.8 Escalators and Moving Walks

Existing previously approved escalators and moving walks complying with 7.2.7 and located within the required means of egress shall be permitted.

40.2.2.9 Fire Escape Stairs

Existing fire escape stairs complying with 7.2.8 shall be permitted.

40.2.2.10 Fire Escape Ladders

40.2.2.10.1

Fire escape ladders complying with 7.2.9 shall be permitted.

40.2.2.10.2

Fixed industrial stairs in accordance with the minimum requirements for fixed stairs and stair railing systems in ANSI/ASSP A1264.1, Safety Requirements for Workplace Walking/Working Surfaces and Their Access; Workplace Floor, Wall and Roof Openings; Stairs and Guardrail/Handrail Systems, shall be permitted where fire escape ladders are permitted in accordance with 7.2.9.1.

40.2.2.11 Slide Escapes

40.2.2.11.1

Approved slide escapes complying with 7.2.10 shall be permitted as components in 100 percent of the required means of egress for both new and existing high-hazard industrial occupancies.

40.2.2.11.2

Slide escapes permitted by 40.2.2.11.1 shall be counted as means of egress only where regularly used in emergency egress drills to ensure that occupants are familiar with their use through practice.

40.2.2.12 Alternating Tread Devices

Alternating tread devices complying with 7.2.11 shall be permitted.

40.2.2.13 Areas of Refuge

Areas of refuge complying with 7.2.12 shall be permitted.

40.2.3 Capacity of Means of Egress

Capacity of means of egress shall comply with either 40.2.3.1 or 40.2.3.2.

40.2.3.1

The capacity of means of egress shall be in accordance with Section 7.3.

40.2.3.2

In industrial occupancies, means of egress shall be sized to accommodate the occupant load as determined in accordance with 40.1.7; spaces not subject to human occupancy because of the presence of machinery or equipment shall not be included in the computation.

40.2.4 Number of Means of Egress

See also Section 7.4.

40.2.4.1

The number of means of egress shall comply with either 40.2.4.1.1 or 40.2.4.1.2.

40.2.4.1.1

Not less than two means of egress shall be provided from every story or section, and not less than one exit shall be reached without traversing another story.

40.2.4.1.2

A single means of egress shall be permitted from any story or section in low- and ordinary-hazard industrial occupancies, provided that the exit can be reached within the distance permitted as a common path of travel.

40.2.4.2

In new buildings, floors or portions thereof with an occupant load of more than 500 shall have the minimum number of separate and remote means of egress specified by 7.4.1.2.

40.2.4.3

Areas with high-hazard contents shall comply with Section 7.11.

40.2.5 Arrangement of Means of Egress

40.2.5.1 General

Diagram

Means of egress, arranged in accordance with Section 7.5, shall not exceed that provided by Table 40.2.5.1, unless otherwise permitted by the fire code.

Table 40.2.5.1 Arrangement of Means of Egress

Level of Protection General Industrial Occupancy Special-Purpose Industrial Occupancy High-Hazard Industrial Occupancy

ft m ft m

Dead-End Corridor

Protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1) 50 15 50 15 Prohibited, except as permitted by 7.11.4

Not protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1) 50 15 50 15 Prohibited, except as permitted by 7.11.4

Common Path of Travel

Protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1) 100 30 100 30 Prohibited, except as permitted by 7.11.4

Not protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1) 50 15 50 15 Prohibited, except as permitted by 7.11.4

Upcodes Diagrams

40.2.5.2 Ancillary Facilities

40.2.5.2.1\*

New ancillary facilities shall be arranged to allow travel in independent directions after leaving the ancillary facility so that both means of egress paths do not become compromised by the same fire or similar emergency.

40.2.5.2.2\*

Diagram

New ancillary facilities in special-purpose industrial occupancies where delayed evacuation is anticipated shall have not less than a 2-hour fire-resistance-rated separation from the predominant industrial occupancy, and shall have one means of egress that is separated from the predominant industrial occupancy by 2-hour fire-resistance-rated construction.

UpCodes Diagrams

P

Predominant Occupancy

40.2.5.3 Industrial Equipment Access

40.2.5.3.1

Industrial equipment access doors, walkways, platforms, ramps, and stairs that serve as a component of the means of egress from the involved equipment shall be permitted in accordance with the applicable provisions of Chapter 7, as modified by Table 40.2.5.3.1.

Table 40.2.5.3.1 Industrial Equipment Access Dimensional Criteria

Feature Dimensional Criteria

Minimum horizontal dimension of any walkway, landing, or platform 22 in. (560 mm) clear

Minimum stair or ramp width 22 in. (560 mm) clear between rails

Minimum tread width 22 in. (560 mm) clear

Minimum tread depth 10 in. (255 mm)

Maximum riser height 9 in. (230 mm)

Handrails are permitted to terminate, at the required height, at a point directly above the top and bottom risers.

Maximum height between landings 12 ft (3660 mm)

Minimum headroom 6 ft 8 in. (2030 mm)

Minimum width of door openings 22 in. (560 mm) clear

40.2.5.3.2

Any means of egress component permitted by 40.2.5.3.1 shall serve not more than 20 people.

40.2.6 Travel Distance to Exits

40.2.6.1

Travel distance, measured in accordance with Section 7.6, shall not exceed that provided by Table 40.2.6.1 except as otherwise permitted by 40.2.6.2 or the fire code.

Table 40.2.6.1 Maximum Travel Distance to Exits

Level of Protection General Industrial Occupancy Special-Purpose Industrial Occupancy High-Hazard Industrial Occupancy\*

ft m ft m ft m

Protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1) 250† 76† 400 122 75 23

Not protected throughout by an approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1) 200 61 300 91 NP NP

NP: Not permitted.

\*In high-hazard industrial occupancies, where required to comply with NFPA 400 Protection Level 1 through Protection Level 4, travel distance is permitted to be in accordance with NFPA 400.

†In one-story buildings, a travel distance of 400 ft (122 m) is permitted, provided that a performance-based analysis demonstrates that safe egress can be accomplished.

40.2.6.2\* Power-Generation Buildings

Buildings of noncombustible construction used exclusively for the enclosure of steam generators, steam turbines, gas turbines, heat recovery generators, and flue gas treatment equipment shall be permitted to have a maximum travel distance of 400 ft (122 m), where all special hazards are protected by approved automatic suppression systems in accordance with one or more of the following standards, as applicable:

NFPA 11

NFPA 12

NFPA 13

NFPA 15

NFPA 16

NFPA 17

NFPA 750

NFPA 2001

40.2.7 Discharge From Exits

Discharge from exits shall be in accordance with Section 7.7.

40.2.8 Illumination of Means of Egress

Means of egress shall be illuminated in accordance with Section 7.8 or with natural lighting that provides the required level of illumination in structures occupied only during daylight hours.

40.2.9\* Emergency Lighting

40.2.9.1

Emergency lighting shall be provided in accordance with Section 7.9.

40.2.9.2

Emergency lighting shall not be required for any of the following:

Special-purpose industrial occupancies without routine human habitation

Structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination on all portions of the means of egress during such hours

40.2.10 Marking of Means of Egress

Means of egress shall have signs in accordance with Section 7.10.

40.2.11 Special Means of Egress Features

40.2.11.1 Reserved

40.2.11.2 Lockups

40.2.11.2.1

Lockups in new industrial occupancies shall comply with the requirements of 22.4.6.

40.2.11.2.2

Lockups in existing industrial occupancies, other than approved existing lockups, shall comply with the requirements of 23.4.6.

40.2.11.3 Hazardous Materials

Where hazardous materials are stored, used, or handled, the provisions of 7.12.2 shall apply.

40.3 Protection

40.3.1 Protection of Vertical Openings

Any vertical opening shall be protected in accordance with Section 8.6, unless otherwise permitted by one of the following:

In special-purpose industrial and high-hazard industrial occupancies where unprotected vertical openings exist and are necessary to manufacturing operations, such openings shall be permitted beyond the specified limits, provided that every floor level has direct access to one or more enclosed stairs or other exits protected against obstruction by any fire or smoke in the open areas connected by the unprotected vertical openings.

Approved existing open stairs, existing open ramps, and existing escalators shall be permitted where connecting only two floor levels.

Approved, existing, unprotected vertical openings in buildings with low- or ordinary-hazard contents that are protected throughout by an approved automatic sprinkler system in accordance with 9.7.1.1(1) shall be permitted, provided that the following conditions exist:

The vertical opening does not serve as a required exit.

All required exits consist of outside stairs in accordance with 7.2.2, smokeproof enclosures in accordance with 7.2.3, or horizontal exits in accordance with 7.2.4.

Vertical openings in accordance with 8.6.9.1 shall be permitted.

Vertical openings in accordance with 8.6.9.2 shall be permitted.

40.3.2\* Protection From Hazards

40.3.2.1

All high-hazard industrial occupancies, operations, or processes shall have approved, supervised automatic extinguishing systems in accordance with Section 9.7 or other protection appropriate to the particular hazard, such as explosion venting or suppression.

40.3.2.2

Protection in accordance with 40.3.2.1 shall be provided for any area subject to an explosion hazard in order to minimize danger to occupants in case of fire or other emergency before they have time to use exits to escape.

40.3.2.3

Activation of the fire-extinguishing or suppression system required by 40.3.2.1 shall initiate the required building fire alarm system in accordance with 40.3.4.3.4.

40.3.2.4

Hazardous areas in industrial occupancies protected by approved automatic extinguishing systems in accordance with Section 9.7 shall be exempt from the smoke-resisting enclosure requirement of 8.7.1.2.

40.3.2.5

Commercial cooking equipment shall be protected in accordance with NFPA 96. (See 9.2.3.)

40.3.2.6

Where hazardous materials are stored or handled, the provisions of 8.7.3.1 shall apply.

40.3.3 Interior Finish

40.3.3.1 General

Interior finish shall be in accordance with Section 10.2.

40.3.3.2 Interior Wall and Ceiling Finish

Interior wall and ceiling finish materials complying with Section 10.2 shall be Class A, Class B, or Class C in operating areas and shall be as required by 7.1.4 in exit enclosures.

40.3.3.3 Interior Floor Finish

40.3.3.3.1

Interior floor finish in exit enclosures and in exit access corridors shall be Class I or Class II in accordance with 10.2.7.4.

40.3.3.3.2

Interior floor finish in areas other than those specified in 40.3.3.3.1 shall not be required to comply with 10.2.7.

40.3.4 Detection, Alarm, and Communications Systems

40.3.4.1 General

A fire alarm system shall be required in accordance with Section 9.6 for industrial occupancies, unless the total occupant load of the building is under 100 persons and unless, of these, fewer than 25 persons are above or below the level of exit discharge.

40.3.4.2 Initiation

Initiation of the required fire alarm system shall be by any of the following means:

Manual means in accordance with 9.6.2.1(1)

Approved automatic fire detection system in accordance with 9.6.2.1(2) throughout the building, plus a minimum of one manual fire alarm box in accordance with 9.6.2.6

Approved, supervised automatic sprinkler system in accordance with 9.6.2.1(3) throughout the building, plus a minimum of one manual fire alarm box in accordance with 9.6.2.6

40.3.4.3 Notification

40.3.4.3.1

The required fire alarm system shall meet one of the following criteria:

It shall provide occupant notification in accordance with 9.6.3.

It shall sound an audible and visible signal in a constantly attended location for the purposes of initiating emergency action.

40.3.4.3.2

Positive alarm sequence in accordance with 9.6.3.5 shall be permitted.

40.3.4.3.3

Existing presignal systems in accordance with 9.6.3.4 shall be permitted.

40.3.4.3.4

In high-hazard industrial occupancies, as described in 40.1.2.1.3, the required fire alarm system shall automatically initiate an occupant evacuation alarm signal in accordance with 9.6.3.

40.3.5 Extinguishment Requirements. (Reserved)

40.3.6 Corridors

The provisions of 7.1.3.1 shall not apply.

40.4 Special Provisions

40.4.1 Limited-Access or Underground Structures

Limited-access or underground structures shall comply with Section 11.7.

40.4.2 High-Rise Buildings

40.4.2.1

New high-rise industrial occupancies shall comply with Section 11.8.

40.4.2.2

All existing high-rise industrial occupancy buildings shall be provided with a reasonable degree of safety from fire, and such degree of safety shall be accomplished by one of the following means:

Installation of a complete, approved, supervised automatic sprinkler system in accordance with 9.7.1.1(1)

\*Installation of an engineered life safety system complying with all of the following:

The engineered life safety system shall be developed by a registered professional engineer experienced in fire and life safety systems design.

The life safety system shall be approved by the authority having jurisdiction and shall be permitted to include any or all of the following systems:

Partial automatic sprinkler protection

Smoke detection alarms

Smoke control

Elevators

Compartmentation

Other approved systems

40.4.2.3

All high-rise buildings shall comply with 40.4.2.2 within 12 years of the adoption of this Code.

40.4.2.4

The provisions of 11.8.5.3.4(1) for jockey pumps and 11.8.5.3.4(2) for air compressors serving dry-pipe and preaction systems shall not apply to special-purpose industrial occupancies.

40.4.3 Alcohol-Based Hand-Rub Dispensers

Alcohol-based hand-rub dispensers in accordance with 8.7.3.3 shall be permitted.

40.5 Building Services

40.5.1 Utilities

Utilities shall comply with the provisions of Section 9.1.

40.5.2 Heating, Ventilating, and Air-Conditioning

Heating, ventilating, and air-conditioning equipment shall comply with the provisions of Section 9.2.

40.5.3 Elevators, Escalators, and Conveyors

Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

40.5.4 Waste Chutes, Incinerators, and Laundry Chutes

Waste chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

40.6\* Special Provisions for Aircraft Servicing Hangars

40.6.1

The requirements of Sections 40.1 through 40.5 shall be met, except as modified by 40.6.2 through 40.6.4.

40.6.2

The requirements for exits from aircraft servicing areas shall comply with 40.6.2.1 through 40.6.2.4.

40.6.2.1

There shall be not less than two means of egress from each aircraft servicing area.

40.6.2.2

Exits from aircraft servicing areas shall be provided at intervals not exceeding 150 ft (46 m) on all exterior walls.

Upcodes Diagrams

40.6.2.3

Where horizontal exits are provided, doors shall be provided in the horizontal exit fire barrier at intervals not exceeding 100 ft (30 m).

40.6.2.4

Where egress doors are provided in doors that accommodate aircraft, such doors shall be permitted for compliance with 40.6.2.1 through 40.6.2.3.

40.6.3

Means of egress from mezzanine floors in aircraft servicing areas shall be arranged so that the travel distance to the nearest exit from any point on the mezzanine does not exceed 75 ft (23 m), and such means of egress shall lead directly to a properly enclosed stair discharging directly to the exterior, to a suitable cutoff area, or to outside stairs.

40.6.4

Dead ends shall not exceed 50 ft (15 m) for other than high-hazard contents areas and shall not be permitted for high-hazard contents areas.

40.7 Operating Features

40.7.1 Upholstered Furniture and Mattresses

The provisions of 10.3.2 shall not apply to upholstered furniture and mattresses.

40.7.2 Soiled Linen and Trash Receptacles

The requirements of 10.3.8 for containers for waste, or linen with a capacity of 20 gal (75.7 L) or more shall not apply.

40.7.3 Inspection of Door Openings

Door openings shall be inspected in accordance with 7.2.1.14.

Integrated fire protection and life safety systems shall be tested in accordance with 9.11.4.1.

40.7.4.2

Integrated fire protection and life safety systems in high-rise buildings shall be tested in accordance with 9.11.4.2.

