Seattle Department of Construction & Inspections

2018 Seattle Building Code Excerpt: Elevators and other Conveying Systems*

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*Includes excerpts from Chapters 4, 7, 8, 9 , and 30 of the 2018 Seattle Building Code and section 620 of the 2020 Seattle Electrical Code.

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SEATTLE CODE SECTION RELOCATIONS

The following table indicates relocations resulting from Seattle amendments made to the 2018 edition of the International Building Code.

Note: Seattle has incorporated provisions from 2008 WAC 296-96 Part D, Regulations for Existing Elevators, Dumbwaiters, and Escalators, into the 2018 *Seattle Elevator Code* instead of adopting them by reference as done in the 2015 *Seattle Building Code.*

2018 SBC LOCATION	2015 SBC LOCATION
3011.5.2.1 Doors to elevator and dumbwaiter machine rooms and machinery spaces	3011.2 Doors to elevator and dumbwaiter machine rooms
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3011.5.2.2 Machine rooms and machinery spaces	3011.6 Machine space lighting receptacles
3011.6.3.2 Material for passenger car enclosure	3011.8 Wall covering material for passenger cars
3011.7.7.11 Roped hydraulic elevators	3011.10 Roped hydraulic elevators
3011.5.3.1 and 3011.5.3.3 Pits	3011.11 Pit access and equipment
3011.5.5.9 Floor number	3011.12 Floor numbers
3011.5.2.6 Anchorage for elevator equipment	3011.19 Anchorage for elevator equipment
3011.6.3.9 Car top work light	3011.13 Car top work light
3011.10.2 Conveyance labeling	3011.14 Labeling
3011.6.3.3 Interior alteration	3011.15 Interior alterations
3011.6.3.8 Car illumination	3011.16 Illumination
3011.10.1 Conveyance identification designation	3011.17 Conveyance number designation
3011.8.4.2 Escalator starting switches	3011.18 Escalator starting switches
3011.6.10.11 Restricted opening of doors	3011.20 Restricted opening of doors
3011.5.5.10 Additional doors other than hoistway and car doors	3016.8 Additional doors

Note: This table has been abridged to only include relocations in Chapter 30 of the elevator code. The original table is found on pages vii and viii of the 2018 Seattle Building Code.

HELPFUL LINKS

For electrical requirements for Elevators and other Conveyer Systems please see:

2020 National Electrical Code Section 620
www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70

2020 Seattle Electrical Code Quick Reference Guide:
http://www.seattle.gov/Documents/Departments/SDCI/Codes/2020SeattleElectricalCodeQuickReference.pdf

CHAPTER 30

ELEVATORS AND CONVEYING SYSTEMS

Note: Chapter 30 is comprised entirely of Seattle amendments to the *International Building Code* and is not underlined. Where Seattle adopts and amends portions of standards, the underlining and striking out of text indicates changes from the language of the standard.

Large portions of the 2008 WAC 296-96, *Part D – Regulations for existing elevators, dumbwaiters, and escalators*, have been incorporated into Section 3011 for the first time. The City of Seattle previously enforced these requirements by referencing State of Washington administrative code sections, but now locates these requirements within Chapter 30 of the *Seattle Building Code.*

SECTION 3001
PURPOSE

The purpose of this chapter is to protect persons, buildings and the contents thereof from hazards arising from the use of elevators, dumbwaiters, material lifts, escalators, moving walks and other conveyances by establishing minimum requirements regulating the design, construction, alteration, operation, testing and maintenance of elevators, dumbwaiters, material lifts, escalators, moving walks and other conveyances, and by establishing procedures by which these requirements may be enforced.

SECTION 3002
SCOPE

3002.1 General. This code of safety standards covers the design, construction, installation, operation, inspection testing, maintenance, alteration and repair of elevators, dumbwaiters, material lifts, escalators, moving walks and other conveyances.

3002.2 Application to existing conveyances.

3002.2.1 Minimum standard for existing conveyances. All existing conveyances shall comply with Section 3011 as minimum standards.

3002.2.2 Maintenance. All conveyances covered under this chapter, both existing and new, and all parts thereof shall be maintained in a safe condition. All devices and safeguards that are required by this chapter shall be maintained in good working order. All devices or safeguards that were required by a code in effect when the conveyance was installed, altered, or repaired shall be maintained in good working order. Maintenance shall comply with ASME A17.1/CSA B44 Section 8.6. The owner or the owner's designated agent is responsible for the maintenance of such equipment.

3002.2.3 Repairs and replacements. Repairs to existing conveyances and replacements of devices and components shall be made with parts of at least equivalent material, strength and design. They shall comply with Section 3011 of this code and ASME A17.1/CSA B44 Section 8.6. The owner or the owner's designated agent is responsible for the repair and replacement of such equipment.

3002.2.4 Additions and alterations. Additions and alterations are permitted to be made to the conveyance system of *existing buildings* or structures without making the entire system comply with all of the requirements of this chapter for new buildings or structures, provided the additions and alterations that are made comply with the requirements of this chapter for a new system, except as otherwise specifically provided in this code and in other applicable retroactive ordinances of the city.

Unless otherwise *approved* by the *building official,* alterations, repairs, replacements, testing and maintenance of conveyances shall comply with the requirements of ASME A17.1/CSA B44 Section 8.7. Where Section 8.7 refers to a requirement that has been amended by this chapter, the requirements of this chapter take precedence. Alterations to existing material lifts shall conform with the requirements of WAC Chapter 296-96 Part C1 Standard Application Material Lifts or ASME A17.1/CSA B44, 7.4, or 7.5, or 7.6, where applicable. The owner or the owner's designated agent is responsible for additions and alterations of such equipment.

3002.2.5 Seismic improvements. The *building official* is authorized to promulgate rules to establish standards for seismic improvements to existing conveyances.

3002.2.6 Change of use. A change in use of an elevator from freight to passenger, passenger to freight, or from one freight class to another freight class shall comply with Section 3011 of this code and Sections 8.7 and 2.16.4 of ASME A17.1/CSA B44 for passenger elevators.

3002.2.7 Landmark buildings and structures. See the *International Existing Building Code* for regulations regarding *landmark buildings* or structures.

3002.3 References to the *National Electrical Code.* For the purpose of this chapter, all references in the ASME Code to the *National Electrical Code* include the *Seattle Electrical Code.* All electrical work shall be done in accordance with the requirements of the *Seattle Electrical Code.*

3002.4 Conflicts. In any case where the codes adopted by reference in Section 3003 conflict with the requirements of this chapter, this chapter controls.

SECTION 3003
CODES

3003.1 Seattle Elevator Code. The following are adopted by reference as part of the *Seattle Building Code.* They also constitute the *Elevator Code* of the City of Seattle.

1. Safety Code for Elevators and Escalators, ASME A17.1/CSA B44-2019, as amended in this ordinance and Appendices A through D, F through J, L, M and P through V.

   Exceptions:

   1.1. ASME A17.1 Sections 5.8, 5.9, 5.10, 5.11, and 5.12 are not adopted.

   1.2. ASME A17.1 Section 1.2.1, Purpose, is not adopted.

2. Safety Standard for Platform Lifts and Stairway Chairlifts, ASME A18.1-2017.
3. Standard for Elevator Suspension, Compensation, and Governor Systems, ASME A17.6-2017.

   Exception: ASME A17.6 Part 2 Aramid Fiber Ropes for Elevators, is not adopted.

4. Washington Administrative Code Chapter 296-96 Part C1 Minimum Standards for New and Altered Standard Application Material Lifts.

3003.2 Licensing. All persons and firms working on conveyances in Seattle shall comply with chapter 70.87 RCW and chapter 296-96 WAC.

3003.3 Administrative rules. The *building official* is authorized to adopt by administrative rule, in accordance with Section 104.8, that furthers the intent and purpose of this code, that encourages the use of state of the art technology, materials or methods of construction, and which provides standards that are equal or better than those contained in this code.

SECTION 3004
DEFINITIONS

The following words and terms shall, for the purposes of this section and as used elsewhere in this code, have the meanings shown herein. These definitions are in addition to ASME A17.1/CSA B44 Section 1.3, RCW 70.87, Laws Governing Elevators and Other Lifting Devices, and Chapter 2 of this code.

ALTERATIONS, REPAIRS AND REPLACEMENTS. See ASME A17.1 Section 1.3.

AUTOMATIC ELEVATOR. A type of elevator that does not require an attendant. All calls are registered by the passengers.

CONTROL ROOM. An enclosed control space outside the hoistway, intended for full bodily entry, that contains the motor controller. The room could also contain electrical or mechanical equipment used directly in connection with the elevator, dumbwaiter, or material lift but not the electric driving machine or the hydraulic machine.

CONTROL SPACE. A space outside the hoistway, intended to be accessed with or without full bodily entry, that contains the motor controller. This space could also contain electrical or mechanical equipment used directly in connection with the elevator, dumbwaiter, or material lift but not the electric driving machine or the hydraulic machine.

CONVEYANCE. An elevator, accessibility lift, escalator, dumbwaiter, material lift, moving walk or other elevating device.

CONVEYANCES IN SERVICE. Units that are in operation, are inspected and certified by the *building official* for operation.

CONVEYANCES OUT OF SERVICE. The use of the unit has been prohibited either temporarily or permanently in accordance with Section 3005 below.

ELEVATOR GROUP. A grouping of elevators in a building located adjacent or directly across from one another that responds to common hall call buttons.

ENFORCING AUTHORITY. As used in ASME A17.1 means the *building official.*

EXISTING INSTALLATIONS. All conveyances that have been tested and approved for use by the *building official.*

INSPECTOR. Inspectors employed by the City of Seattle and working under the direction of the *building official.*

MACHINE ROOM. An enclosed machinery space outside the hoistway, intended for full bodily entry, that contains the electric driving machine or the hydraulic machine. The room could also contain the motor controller, and electrical and/or mechanical equipment used directly in connection with the elevator, dumbwaiter, or material lift.

MACHINERY SPACE. A space inside or outside the hoistway, intended to be accessed with or without full bodily entry, that contains elevator, dumbwaiter, or material lift mechanical equipment, and could also contain electrical equipment used directly in connection with the elevator, dumbwaiter, or material lift. This space could also contain the electric driving machine or the hydraulic machine.

MATERIAL LIFT. A fixed, stationary conveyance that:

1. Has a car or platform that moves in guides;
2. Serves two or more floors or landings of a building or structure;
3. Has a vertical rise of at least 30 inches (762 mm) and no more than 60 feet (18 288 mm);
4. Has a maximum speed of 50 feet (15 240 mm) per minute;
5. Is an isolated, self-contained lift and is not a part of a conveying system;
6. Travels in an inclined or vertical, but not horizontal, direction;
7. Is operated only by, or under the direct supervision of, an individual designated by the employer; and
8. Is installed in a commercial or industrial area, and not in an area that is open to access by the general public.

SECTION 3005
AUTHORITY TO DISCONNECT UTILITIES, TAKE CONVEYANCES OUT OF SERVICE AND INVESTIGATE ACCIDENTS

3005.1 Disconnection of utilities. In addition to the provisions for Emergency Orders provided in Section 102, the *building official* is authorized to disconnect or order discontinuance of any utility service or energy supply to equipment regulated by this code in cases of emergency or where necessary for safety to life and property. Such utility service shall be discontinued until the equipment, appliances, devices or wiring found to be defective or defectively installed are replaced, repaired, or restored to a safe condition. Proper posting and seals shall be affixed to the equipment to prevent inadvertent use.

3005.2 Conveyances out of service. A conveyance shall be taken out of service temporarily after the *building official* has inspected the unit for proper parking of the car, securing the hoistway openings, and disconnection of power. A seal and tag shall be placed on the equipment to insure against unauthorized use. A conveyance is permitted to remain in a temporarily out-of-service status for a period not to exceed two years, after which time it shall be placed in a permanently out-of-service status.

Exception: Elevators that could be returned to service without repair are permitted to remain in a temporary out-of-service status with approval of the *building official.*

A conveyance shall be placed permanently out of service by landing the car and counterweights and removing the hoisting cables or fluid lines. Conveyances placed in a permanently out-of-service status shall have the hoistway sealed off for fire protection by securing existing doors.

Conveyances in an out-of-service status either temporarily or permanently are permitted to be placed back into service and classified as an existing installation unless determined to be hazardous by the *building official.* Requirements in effect at that time must be completed before certification and use. No installation or reconnection of hydraulic elevators powered by city water pressure is permitted.

3005.3 Report and investigation of accidents. The owner or the owner's authorized agent shall promptly notify the *building official* of each accident involving a conveyance that requires the service of a physician or results in a disability exceeding one day, and shall afford the *building official* every facility for investigating and inspecting the accident. The *building official* shall without delay, after being notified, make an inspection and shall place on file a full and complete report of the accident. The report shall give in detail all material facts and information available and the cause or causes, so far as they can be determined. The report shall be open to public inspection at all reasonable hours. If an accident involves the failure or destruction of any part of the construction or the operating mechanism of a conveyance, the use of the conveyance is forbidden until it has been made safe, it has been reinspected and any repairs, changes, or alterations have been *approved* by the department, and a permit has been issued by the *building official.* The removal of any part of the damaged construction or operating mechanism from the premises is forbidden until the *building official* grants permission to do so.

SECTION 3006
INSTALLATION AND ALTERATION PERMITS

3006.1 Installation permits. A permit issued by the *building official* is required to install any elevator, escalator, dumbwaiter, automobile parking elevator, material lift moving walk, accessibility lifts or other conveyance. A separate permit shall be obtained for each conveyance installed regardless of location and/or contract arrangements.

3006.2 Alteration/repair permits. A permit is required to make any alterations to existing elevators, escalators, dumbwaiters, automobile parking elevators, material lifts, moving walks or other conveyances. A separate permit shall be obtained for each conveyance altered or relocated regardless of location and/or contract arrangements.

Exceptions:

1. Permits for repairs required by inspection reports are permitted to be combined for a single building.
2. The *building official* is permitted to issue a single permit for minor alterations to more than one conveyance that do not require individual retesting of each conveyance.
3. No permit shall be required for ordinary repairs made with parts of the same materials, strength and design normally necessary for maintenance.

3006.3 Temporary use permits. The *building official* is permitted to issue a temporary use permit for a period not to exceed 60 days to allow completion of installation and passing of the final inspection. Temporary use permits may be renewed by the *building official.* If, at any time during the period of temporary use, the *building official* determines that the building owner is not making adequate progress toward completion of the installation and passing of the final inspection, the *building official* is permitted to withdraw the temporary use permit on seven days' notice. The *building official* is authorized to forbid further use of the conveyance until a certificate of inspection is obtained. If any conveyance is found to be *unsafe* or fails to comply with a notice of correction, the *building official* is authorized to revoke the temporary use permit.

3006.4 Expiration, renewal and revocation of permits. Sections 106.9 through 106.12 apply to permits required by this chapter.

SECTION 3007
PLANS AND SPECIFICATIONS

3007.1 Permit drawings. Two sets of drawings, which are permitted to be in an electronic format, shall be submitted with applications as determined by the *building official* for installations of new elevators, escalators, dumbwaiters, material lifts, moving walks and other conveyances.

The drawings shall show beams, attachments, loads and reactions, and shall bear the seal of a structural engineer licensed under the laws of Washington State.

The *structural engineer in responsible charge* for the building shall review the drawings and forward them to the *building official* with a notation indicating that the drawings have been reviewed and been found to be in general conformance to the design of the building.

Exception: An engineer's stamp is not required for hydraulic elevators.

3007.2 Amendments to the permit. If changes to the *approved* work are made during construction, approval of the *building official* shall be obtained prior to execution. The inspector may approve minor changes for work that will not reduce the structural strength or fire and life safety of the structure. The inspector shall determine if it is necessary to revise the *approved construction documents.* No changes that are subject to special inspection required by Chapter 17 shall be made during construction unless approved by the *building official.* If revised plans are required, changes shall be shown on two sets of plans, permitted to be in electronic format, that shall be submitted to and approved by the *building official,* accompanied by fees specified in the *Fee Subtitle* prior to occupancy. All changes shall conform to the requirements of this code and other pertinent laws and ordinances and other issued permits.

SECTION 3008
REQUIRED INSTALLATION INSPECTIONS

3008.1 Installation inspections. It is the duty of the person doing the work authorized by a permit to notify the *building official* that such work is ready for inspection.

It is the duty of the person requesting any inspections required by this chapter to provide access to and means for proper inspection of such work.

Final inspection shall be called for by the applicant when the work described on the permit has been completed, and when ready for testing with weights and instruments, as needed. A final inspection is required after all wiring has been completed and all permanent fixtures such as switches, outlet receptacles, plates, lighting fixtures and all other equipment has been properly installed, and the hoistway, control rooms, spaces are properly completed.

SECTION 3009
CERTIFICATES OF INSPECTION AND OPERATION

3009.1 Certificates required. It is a violation of this code to operate any elevator, escalator, dumbwaiter, material lift, moving walk or other conveyance without a certificate of inspection or authorization of temporary use issued by the *building official.* A certificate of inspection shall be issued following an inspection by the *building official* showing that the conveyance has been found to be in safe operating condition and applicable fees for inspection time, as set forth in the *Fee Subtitle,* have been paid. The certificate is valid until 45 days after the next inspection or until the certificate is withdrawn, whichever comes first.

The certificate of inspection shall be posted in the machine room, control room or management office.

If any conveyance is found to be *unsafe* or fails to comply with a notice of correction, the *building official* is authorized to withdraw the certificate of inspection.

3009.2 Periodic inspections. The *building official* shall cause inspections to be made of every conveyance at intervals of 12 months or as soon thereafter as is practical. The inspector shall file a full and correct report on each conveyance with the *building official* that shall note any code violations, corrections required and the general condition of the conveyance.

3009.3 Inspection report by building official. After each required inspection of a conveyance the *building official* shall mail a copy of the inspection report to the owner of the conveyance inspected. If inspection shows a conveyance to be in violation of the requirements of this chapter, the *building official* shall issue a notice in writing listing the corrections to be made to the conveyance that are necessary to bring it into compliance with this chapter and is authorized to order the operation thereof discontinued until the corrections are made.

The owner upon receipt of inspection report shall complete all corrections within 90 days. The owner or owner's authorized agent shall notify the *building official* in writing when deficiencies are corrected.

3009.4 Inspections, tests, and test reports. Reports of required tests shall be submitted to the owner and to the *building official* on forms furnished by the *building official.* Reports shall be submitted to the *building official* in writing within 60 days of completion of tests. Performance of required tests and their cost shall be the responsibility of the owner. Identification of conveyances shall be noted by use of assigned city numbers.

SECTION 3010
REQUIREMENTS FOR OPERATION AND MAINTENANCE

3010.1 Responsibility for operation and maintenance. The owner or the owner's designated agent is responsible for the safe operation and maintenance of each device regulated by this chapter. The installation of pipes, ducts, conduits, wiring and the storage of materials not required for the operation of the elevator is prohibited in hoistways, control rooms, machine rooms and machine spaces. Sidewalk elevators in public places are also subject to the requirements of Title 15, Seattle Municipal Code, Street and Sidewalk Use, as amended. See Part 5.5 of ASME A17.1/CSA B44 for requirements for operation and maintenance.

SECTION 3011
RETROACTIVE REQUIREMENTS FOR EXISTING INSTALLATIONS

3011.1 Scope. Existing electric elevators, direct plumber and roped hydraulic elevators, escalators, electric and hand-powered dumbwaiters, hand-powered elevators and other conveyances shall comply with the provisions of this section.

3011.2 Key boxes and keys required. Key retainer boxes and keys shall be provided for all conveyances. *

3011.3 Key retainer box compliance. The key retainer box shall comply with Section 3011.3.1 or 3011.3.2,

3011.3.1 Conveyances installed between March 1, 1956 and August 14, 2004. A key retainer box locked and keyed to the standard City access key for elevator access and operation keys shall be provided. The key retainer box shall meet the following standards:

1. Dimensions – 8 inches high, 6 inches wide, 1 inch deep.
2. Material – 16 gauge steel welded.
3. Color – red (unless located in the main lobby above the hall call button, 6 feet nominal above the floor).
4. Labeling – "FOR FIRE DEPARTMENT USE."
5. Lock – Ace one-inch cylinder cam lock key #39504.

The key retainer box is to be installed at the designated recall floor above the Phase I recall switch or in the main lobby above the hall call button when no recall feature exists. The key retainer box is to be mounted 6 feet nominal above the floor. The *building official* is permitted to approve other locations upon request.

Key retainer boxes are permitted to comply with Section 3011.3.2 or 3016.12 as an alternative to complying with this section.

3011.3.2 Conveyances installed between August 15, 2004 through November 5, 2016. A key retainer box locked and keyed to the secure city access key for elevator and other conveyance access and operation keys shall be provided. The key retainer box shall meet the following standards:

1. Minimum dimensions – 6-1/2 inches high, 6 inches wide, 2 inches deep.
2. Material – at least 16 gauge steel welded.
3. Color – red (unless located in the main lobby above the hall call button, 6 feet above the floor).
4. Labeling – "For Emergency Use".
5. Lock – high security Medeco lock specified by the *building official*. Use of the key shall be restricted to fire, emergency response and elevator inspection personnel.

The key retainer box shall be flush or surface mounted, installed at the designated recall floor above the Phase I recall switch or in the main lobby above the hall call button if no recall feature exists. The key retainer box is to be mounted approximately 6 feet above the floor. The key retainer box shall be attached to the building so as to be able to withstand a force of 300 lbf/square foot applied horizontally at any point. In buildings with more than one elevator, the key retainer box shall be large enough to accommodate all required keys. The building official may approve other locations and custom box types upon request.

Key retainer boxes are permitted to comply with Section 3016.12 as an alternative to complying with this section.

3011.4 Elevator access keys. Keys for access to and for the operation of elevating equipment shall be tagged and retained in the key retainer box. The key retainer box shall contain fire emergency service keys (Phase I and II, one key for each switch) and keys for any of the following that are in the building:

1. Doors to the control room, machine room and machine space;
2. Secondary level door;
3. Pit door;
4. Roof door;
5. Independent, hospital emergency and/or attendant operation;
6. Hoistway access;
7. Mechanical hoistway access devices (broken arm, lunar, etc.);
8. Miscellaneous switches with locks;
9. Fire alarm panel room;
10. Sprinkler valve control room.

* **3011.5 Hoistways and related construction for electric and hydraulic elevators.** This section shall apply to all electric and hydraulic elevators.

3011.5.1 Hoistways.

3011.5.1.1 Hoistways enclosures.

1. Fire-resistive requirements found in the Seattle Building and Fire Codes apply to hoistway enclosures.
2. Where doors and hoistway enclosures are not required to be fire resistant, the hoistway shall be enclosed:
   2.1. With material, which may be solid or with openings that will reject a 1/2-inch diameter ball;
   2.2. To a height of 6 feet above each floor or landing and above the treads of adjacent stairways.
3. Enclosures shall be supported and braced as to deflect not over one inch when subjected to a 100 pound force perpendicularly applied at any point.
4. Enclosures adjacent to the counterweights shall extend the full height of the floor and extend 6 inches past the counterweight raceway.

3011.5.1.2 Windows in hoistway enclosures.

1. Guards are required on outside hoistway windows if the windows are located:
   1.1. Ten stories or less above a thoroughfare; or
   1.2. Three stories or less above the roof of an adjacent building.
2. Hoistway windows can be guarded by one of the following methods:
   2.1. By vertical bars at least 5/8 inch in diameter or equivalent, spaced no more than 10 inches apart, permanently and securely fastened in place; and

2.2. By metal-sash windows having solid section steel muntins of no less than 1/8 thickness spaced no more than 8 inches apart.

3. Exterior hoistway windows shall be identified with 4-inch-high letters marked "Elevator."

3011.5.1.3 Pipes conveying gases, vapors, or liquids in hoistways.

1. All steam and hot water pipes in hoistway shall be covered to prevent direct spray onto the elevator car if ruptured to comply with ASME A17.1, Rule 102.2 1990.
2. All other pipes or ducts currently in the hoistway shall be securely fastened to prevent excessive vibration.
3. No future pipes or ducts may be installed in the hoistway unless they directly pertain to the operation of the elevator.

3011.5.1.4 Access for maintenance and inspection.

1. Overhead sheave spaces requiring inspection and maintenance shall be provided with suitable access and decking to provide a safe space for personnel.
2. Guardrails shall be installed where decking does not cover the complete hoistway.
3. Guardrail and deck supports shall be similar to those required for the top of the elevator car and may be made of either wood or metal compatible with the existing hoistway construction.
4. Inspections and maintenance may be performed from the top of an elevator car if a ladder is not required to perform these functions.

3011.5.1.5 Traction elevator car top handrails. A standard railing shall be installed on the top of all traction elevators where the perpendicular distance between the edges of the car top and the adjacent hoistway enclosure exceeds 12 inches horizontal clearance. The railing shall be substantially constructed of metal and shall consist of a top rail, intermediate rail and post. The top rail shall have a smooth surface and the upper surface shall be located at a vertical height of 42 inches. The intermediate rail shall be located approximately halfway between the top rail and the car top. There shall be a minimum of 4 inches of clearance above the top rail when the car is at its furthest point of travel. If the vertical clearance from the car top to the hoistway enclosure, including gravity stopping distance, is less than 48 inches away, the top handrail height may be reduced to 42 inches plus or minus 3 inches. If the clearances will not allow a 39-inch handrail, do not install the top of car railing, instead provide signage required by 3011.5.1.7.

3011.5.1.6 Hydraulic elevator car top handrails. A standard railing shall be installed on the top of hydraulic elevators installed in unenclosed hoistways. The railing shall be substantially constructed of metal and shall consist of a top rail, intermediate rail and post. The top rail shall have a smooth surface and, the upper surface shall be located at a vertical height of 42 inches plus or minus 3 inches. The intermediate rail shall be located approximately halfway between the top rail and the car top. There shall be a minimum of 4 inches of clearance above the top rail when the car is at its furthest point of travel on the mechanical stop. If the vertical clearance of 4 inches cannot be achieved, do not install car top railing, instead provide signage required by 3011.5.1.7.

3011.5.1.7 Signage requirements for traction elevators with minimal overhead clearances. Elevators that do not have a minimum of 24 inches of clearance from the crosshead, or any equipment mounted on the crosshead, to the lowest member of the overhead structure in the hoistway when the car has reached its maximum upward movement shall have signage. A sign shall be located near the top of car inspection station. An additional sign shall be posted on the hoistway wall. This sign shall be visible when accessing the car top. The sign shall consist of alternating 4-inch diagonal red and white stripes and shall clearly state "danger low clearance" in lettering not less than 4 inches in height.

3011.5.2 Machine rooms and machinery spaces.

3011.5.2.1 Doors to elevator and dumbwaiter machine rooms and machinery spaces. Doors to elevator and dumbwaiter machine rooms, control rooms and machinery spaces shall be self-closing and self-locking. The lock shall be a spring-type lock arranged to permit the door to be opened from the inside without a key, incapable of being left in the unlocked position, and accessible only by a key from the outside. **

3011.5.2.2 Machine rooms and machinery spaces: lighting and receptacles. **

1. Provide and maintain a clear, permanent and safe means of access to machine rooms and machinery spaces.
2. Permanent electric lighting shall be provided in all machine rooms and machinery spaces. The illumination shall be not less than 10 foot-candles (108 lux) at the floor level on installations prior to August 15, 2004. The lighting control switch shall be located within easy reach of the access to the room or space. Where practicable, the control switch shall be located on the lock-jamb side of the access door.
3. Where provided, duplex and simplex receptacles for machine rooms and machinery spaces shall be permanently grounded.
4. Provide a sign on the elevator machine room door in 1 inch high stating Elevator Machine Room.

3011.5.2.3 Pipes conveying gases, vapors, or liquids in machine rooms and machinery spaces.

1. Pipes conveying gases, vapors or liquids are not permitted to be installed in machinery spaces, machine rooms and control rooms unless necessary for operation or maintenance of the elevator and not used for any other purpose.
2. All other pipes or ducts currently in the machine rooms and machinery spaces shall be securely fastened to prevent excessive vibration.
3. No future pipes or ducts shall be installed in the machine rooms and machinery spaces.

3011.5.2.4 Protection from weather. Elevator machines and control equipment shall be protected from the weather.

3011.5.2.5 Guards. In hoistways, machine rooms and machinery spaces.

1. Where feasible, gears, sprockets, sheaves, cables, tapes, belts and chains shall be fitted with suitable guards to prevent accidental contact.
2. Openings in machine room floors above the hoistway shall be guarded to prevent tools from falling into the hoistway below.
3. Open grating in machine room floors shall reject a ball 1/2 inch in diameter.
4. Ventilation grids where exposed to the hoistway below shall be firmly fastened to prevent accidental removal and shall be fitted with 1/2 inch wire mesh under the grid.

** **3011.5.2.6 Anchorage for elevator equipment.** All elevator equipment, hydraulic or cable type shall be anchored.

[W] 3011.5.2.7 Missing data tags. In the event an existing data tag cannot be located, a replacement tag shall be created specifying the date of verification of known information.

3011.5.3 Pits.

** **3011.5.3.1 Access to pits.**

1. A safe means of access for authorized personnel shall be provided to all pits.
2. Access doors, if provided, shall be kept closed and locked.
3. Access ladders shall be installed in elevator pits 3 feet or deeper.

[W] Where constraints prohibit the installation of a pit ladder, a retractable ladder shall be permitted to be installed in accordance with 2.2.4.2.7 and 2.2.4.2.8 of ASME A17.1/CSA B44 -2019.

3011.5.3.2 Drains.

1. Pit drains connected directly to sewers are prohibited.
2. Sumps, with or without pumps, are permitted.

** **3011.5.3.3 Illumination of pits.** For installations prior to August 15, 2004, a permanent lighting fixture shall be provided in all pits which shall provide an illumination of not less than 5 foot-candles at the pit floor. A light switch shall be provided inside the hoistway and be so located as to be accessible from the pit access door and adjacent to the pit ladder if provided. Light bulbs shall be guarded to prevent contact and accidental breakage. A permanent grounded outlet shall be provided in all pits.

3011.5.3.4 Counterweight pit guards.

1. Where feasible, unperforated metal guards shall be installed in the pit on the open side, or sides, on all counterweights where spring or solid-type buffers are used or where oil buffers attached to the counterweight are used.

   Exception: Where compensating chains or ropes are attached to the counterweight the guard may be omitted on the side facing the elevator or to which the chains or ropes are attached.
2. Guards shall extend from a point not more than 12 inches above the pit floor to a point not less than 7 feet nor more than 8 feet above such floor; and be fastened to a metal frame properly reinforced and braced to be at least equal in strength and stiffness to a No. 14 U.S. gauge sheet steel.

3011.5.4 Protection of space below hoistways.

3011.5.4.1 Spaces below hoistways. Where the space below the hoistway is not permanently secured against access, the following requirements shall be conformed to:

1. Counterweights shall be provided with safeties.
2. The cars and counterweight shall be provided with spring or oil buffers.
3. Car and counterweight buffer supports shall be of sufficient strength to withstand, without permanent deformation, the impact resulting from buffer engagement at the following speeds.
4. Governor tripping speed where the safety is governor operated.
5. 125% of the rated speed where the safety is not governor operated.

3011.5.5 Hoistway entrances.

3011.5.5.1 Doors or gates required.

1. Passenger elevators. Hoistway landing openings for passenger elevators shall be provided with entrances which guard the full width and height of the openings. The panels of entrances used with automatic-operation passenger elevators shall have no hand latches or other hand operated door fastening devices, nor shall such panels;
2. Freight Elevators. Hoistway landing openings for freight elevators shall be provided with entrances which guard the full width of the opening. Gates and doors shall conform to the following requirements:
    2.1. Balanced type vertically sliding hoistway gates shall extend from a point not more than 2 inches from the landing threshold to a point not less than 66 inches above the landing threshold.
    2.2. Gates shall be solid or shall be openwork of a design to reject a 2 inches in diameter ball and be located so that the distance from the hoistway face of the gate to the hoistway edge of the landing sill is no more than 2-1/2 inches.
    2.3. Gates shall be constructed of metal or wood and shall be so designed and guided that they will withstand a lateral pressure of 100 pounds applied at approximately their center without breaking or being permanently deformed and without displacing the gate from its guides or tacks.
    2.4. At the top landing, a gate 66 inches (1.65 M) high may be used if there is not sufficient clearance for a 6 foot (1.83 m) high gate. When the requirements of 3011.5.1.1 allow nonfire-resistive hoistway enclosures, a gate may be used.
    2.5. Gates shall be constructed of either metal or wood.
    2.6. Gates shall withstand a lateral pressure of 100 pounds, applied at approximately their center, without braking, be permanently deformed of be displaced from their guides or tracks.
    2.7. The maximum vertical opening between a landing sill and a door or gates is 2 inches.
    2.8. The distance between the gate's hoistway face and the hoistway landing edge shall not exceed 2-1/2 inches.

3011.5.5.2 Closing of hoistway doors.

1. Horizontally sliding doors of automatic-operation elevators shall be provided with door closers arranged to close an open door automatically if the car for any reason leaves the landing zone.
2. Horizontal swinging single or center-opening doors of automatic-operation elevators shall be self-closing.
3. Door closers are not required for the swinging portion of combination horizontally sliding and swinging doors
4. On center-opening doors that utilize relating cables if the cabling fails or when the cabling is replaced, a method shall be provided to ensure that both doors automatically close if the car for any reason leaves the landing zone.

3011.5.5.3 Hoistway door vision panels.

1. Manually operated or self-closing doors of the vertically or horizontally sliding type, for elevators with automatic or continuous-pressure operation, shall be provided with a vision panel except at landings of automatic-operation elevators where a hall position indicator is provided.
2. In multisection doors, the vision panel is required in one section only, but may be placed in all sections.
3. All horizontally swinging doors shall be provided for with vision panels.
4. Vision panels may be provided for any type of hoistway door regardless of the type of operation of the elevator. Where provided, vision panel shall meet the following requirements:
    4.1. The area of any single vision panel shall be at least 25 square inches, with the total area of one or more vision panels in any hoistway door shall be not more than 80 square inches.
    4.2. Each clear panel opening shall reject a ball 6 inches (152 mm) in diameter.
    4.3. Muntins between panel sections shall be of noncombustible material and of substantial construction. If located on the landing side, they shall be flush with the surface of the landing side of the door.
    4.4. Panel openings shall be glazed with clear wire glass not less than 1/4 inch (6.3 mm) thick.
    4.5. A panels center shall be located not less than 54 inches (1.37 m) but nor more than 66 inches (1.68 m) above the landing except, that for vertically sliding, biparting counterbalanced doors, it shall be located to conform with the dimensions specified to the extent that the door design will permit.
    4.6. The vision panels in horizontally swing doors shall be located for convenient vision when opening the door from the car side.
    4.7. Wire-glass panels in power-operated doors shall be substantially flush with the surface of the landing side of the door.

4.8. Vision panel frames shall be secured by means of nonreversible screws or other tamper proof fasteners.

4.9. Vision panels which do not meet the requirements of subsections 4.1 through 4.8 of this section shall be protected by protective grilles made of number 15 gauge stainless or galvanized steel in accordance with the following specifications.

(i) Grilles shall be sized to fit within or over the vision panel frame and completely cover the vision panel opening in the hoistway door.

(ii) Grilles shall be secured by means of nonreversible screws or other tamper-proof fasteners.

(iii) Grilles shall contain openings which shall not be larger than 3 inches (19.1 mm) by 3/4 inches (19.1 mm) or 3 inches (19.1 mm) in diameter.

(iv) All edges shall be beveled and free of burrs.

(v) Grilles shall be installed on the hoistway side of the door.

3011.5.5.4 Door hangers. Door hangers for horizontal slide type entrances shall conform to the following:

1. Means shall be provided to prevent the hangers from jumping the track.
2. Stops shall be provided in the entrance assembly to prevent hangers from overrunning the end of the track.
3. Power-operated doors shall be constructed to withstand, without damage or appreciable deflection, an imposed static load equal to four times the weight of each panel as applied successively downward and upward at the vertical centerline of the panel.

3011.5.5.5 Nonshearing astragals. On a vertically sliding, biparting, counterbalanced hoistway door, a fire-resistive, nonshearing, an noncrushing member of either the meeting or overlapping type shall be provided on the upper panel to close the distance between the rigid door sections when in contact with the stops. Rigid members which overlap the meeting edge, and center-latching devices are prohibited.

3011.5.5.6 Pull straps. Manually operated vertical slide biparting elevators doors which can be operated from the landings shall be provided with pull straps on the inside and outside of the upper panel where the lower edge of the upper panel is more than 6 feet 6 inches (1.98 m) above the landing when the panel is in the fully open position. The length of the pull straps shall be as follows:

1. The bottom of the strap shall be not more than 6 feet 6 inches (1.98 m) above the landing when the panel is in the fully opened position.
2. The length of the strap shall not be extended by means of ropes or other materials.
3. Where pull straps are provided on the car side of doors of elevators which can be operated from the car only, the length of the pull straps shall conform to the requirements specified in 1 and 2 of this section.

3011.5.5.7 Landing sill clearances. The clearance between the car-platform sill and the hoistway edge of any landing sill, or the hoistway side of any vertically sliding counterweighted, or of any vertically sliding counterbalanced biparting hoistway door, shall be:

1. At least 1/2 inch (13 mm) where side car guides are used.
2. At least 3/4 inch (19 mm) where corner car guides are used.
3. In all cases the maximum clearance shall be not more than 1-1/2 inch (38 mm).

3011.5.5.8 Threshold clearance. The maximum dimension from the hoistway door or gate face to the hoistway edge of the threshold shall not exceed 2-1/4 inches.

** **3011.5.5.9 Floor number.** Elevator hoistways shall have floor numbers, not less than 2 inches high, placed on the walls and/or doors of hoistways.

** **3011.5.5.10 Additional doors other than hoistway and car doors installed between January 1992 and November 5, 2016.** Doors other than the hoistway door and the elevator car door are prohibited at the point of access to or from an elevator car.

Exception: Doors that are readily openable from the car side without a key, tool, or special knowledge or effort.

3011.5.6 Hoistway door locking devices, parking devices, and access.

3011.5.6.1 Hoistway door or gate locking devices.

1. Hoistway doors or gates for passenger elevators shall be equipped with hoistway-unit system hoistway-door interlocks.
2. Hoistway doors or gates for freight elevators shall be equipped with hoistway-unit system hoistway-door interlocks, or an approved type combination electric contact and mechanical lock.
3. Combination locks and electric contacts, or interlocks shall be so located that they are not accessible from the landing side when the hoistway doors or gates are closed.

3011.5.6.2 Elevator parking devices.

1. Elevators that are operated from within the car only, shall have elevator parking devices installed at every landing that is equipped with an unlocking device.
2. On elevators that are not operated from within the car only, a parking device shall be provided at one landing and may be provided at other landings. This device shall be located at a height not greater than 6 feet 11 inches (2.11 m) above the floor.
3. Parking devices are not required for elevators having hoistway doors that are automatically unlocked when the car is within the landing zone.
4. Parking devices shall conform to the following specifications:
    4.1. They shall be mechanically or electrically operated.
    4.2. They shall be designed and installed so that friction or sticking or the breaking of any springs used in the device will not permit opening or unlocking a door when the car is outside the landing zone of that floor.
    4.3. Where springs are used, they shall be of the restrained compression type which will prevent separation of the parts in case the spring breaks.

3011.5.6.3 Access to hoistway. Hoistway door unlocking devices or hoistway access switches shall be provided on all elevators at the upper landing to permit access to the top of the car and at the lowest landing if this landing is the normal point of access to the pit. Hoistway door unlocking devices may be provided at all landings for emergency purposes.

1. Hoistway door unlocking devices. Hoistway door unlocking devices shall conform to the following:
    1.1. The device shall unlock and permit the opening of the hoistway door from the access landing irrespective of the position of the car.
    1.2. The devices shall be designed to prevent unlocking the door with common tools.
    1.3. The operating means for unlocking the door shall be available to and used only by inspectors, elevator maintenance and repair personnel, and qualified emergency personnel.
    1.4. The unlocking-device keyway shall be located at a height no greater than 6 feet 11 inches above the floor.
2. Hoistway access switches. Hoistway access switches shall conform to the following:
    2.1. The switch shall be installed only at the access landings.
    2.2. The switch shall be installed adjacent to hoistway entrance at the access landing with which it is identified.
    2.3. The switch shall be of the continuous-pressure spring-return type, and shall be operated by a cylinder-type lock having not less than five-pin or five-disk combination with the key removable only when the switch is in the “off” position. The lock shall not be operable by any key which will operate locks or devices used for other purposes in the building. The key or combination shall be available to and used only by inspectors and elevator maintenance and repair personnel.
    2.4. The operation of the switch at either access landing shall permit, and may initiate and maintain, movement of the car with the hoistway door at this landing unlocked or not in the closed position, and with the car door or gate not in the closed position, subject to the following:
        (i) The operation of the switch shall not render ineffective the hoistway door interlock or electric contact at any other landing.
        (ii) The car cannot be operated at a speed greater than 150 fpm (0.76 m/s).
        (iii) For automatic and continuous-pressure operation elevators, provided: Landing operating devices of continuous-pressure operation elevators, and car and landing operating devices of automatic operation elevators shall first be made inoperative by means other than the access switch; and power operation of the hoistway door and/or car door or gate is inoperative.
        (iv) Automatic operation by a car-leveling device is inoperative.
        (v) The top-of-car operating device is inoperative.
        (vi) The movement of the car initiated and maintained by the upper access switch shall be limited in the down direction to a gravel not greater than the height of the car crosshead above the car platform, and limited in the up direction above the upper access landing to the distance the car apron extends below the car platform. Where electronically operated switches, relays, or contactors are used to render inoperative the hoistway-door interlock or electric contact or the car door or gate electric contact, the control circuits shall be arranged to conform to the requirements of 3011.6.3.5 and in addition, to render the normal car and hall operation ineffective if any such switch, relay, or contactor fails to function in the intended manner.

3011.5.7 Power operation of doors and gates.

3011.5.7.1 Reopening device for power-operated car doors or gates.

1. Where required a power-operated car door or gate shall be provided with a reopening device which will function to stop and reopen the car door or gate and the adjacent hoistway door in the event that the car door or gate is obstructed while closing. If the closing kinetic energy is reduced to a 2-1/2-ft-lbf (3.39 J) or less, the reopening device shall be rendered inoperative.
2. For center-opening doors or gates, the reopening device shall be so designed and installed that the obstruction of either door or gate panel when closing will cause the reopening device to function.

3011.5.7.2 Photo electric or electric eye devices. An elevator equipped with a photo electric or electric eye device for reopening of the car and hoistway doors shall be provided with a means that will automatically time-out and close the door if it has been obstructed for 20 seconds. The photo electric or electric eye device shall not be reestablished until the doors have fully closed. There are two exceptions to this requirement:

Exceptions:

1. The *building official* may authorize hospital or nursing homes to allow obstructed doors to close within 35 seconds after the expiration of the normal door open time.
2. When smoke detectors are used to bypass photo electric or electric eye devices, the doors are not required to time-out and close except under Phase I conditions in accordance

3011.6 Machinery and equipment for electric elevators.

3011.6.1 Scope. This section is a minimum standard for all existing electric elevators. It applies to other equipment only as referenced in the applicable part.

3011.6.1.1 Buffers and bumpers. Car and counterweight buffers or bumpers shall be provided. Solid bumpers may be used in lieu of buffers:

1. Where the rated speed is 50 fpm (0.25 m/s) or less; or
2. Where Type C safeties are used.

3011.6.1.2 Counterweights. On rod type counterweights, the rod nuts shall be cotter-pinned and the tie rods shall be protected so the head weight cannot crush the tie rods on buffer engagement.

1. The weights shall be protected so that they cannot be dislodged.
2. Compensating chains or ropes shall be fastened to the counterweight frame directly or to a bracket fastened to the frame and shall not be fastened to the tie rods.

3011.6.2 Car frames and platforms.

3011.6.2.1 Car platforms. Every elevator car shall have a platform consisting of a nonperforated floor a platform frame supported by the car frame and extending over the entire area within the car enclosure.

1. Holes in the floor for the safety plank wrench, etc., shall be covered and secured.
2. The platform frame members and the floor shall be designed to withstand the forces developed under the loading conditions for which the elevator is designed and installed.

3011.6.2.2 Platform guards (aprons). The entrance side of the platform of passenger and freight elevators equipped with leveling devices or truck-zoning devices shall be provided with smooth metal guard plates of not less than 0.0598 inch (1.519 mm) thick steel, or material of equivalent strength and stiffness, adequately reinforced and braced to the car platform and conforming with the following:

1. The guard plate shall extend not less than the full width of the widest hoistway door opening.
2. It shall have a straight vertical face, extending below the floor surface of the platform, of not less than the depth of the leveling of truck zone, plus 3 inches (76 mm).
3. If new guards are installed, the lower portion of the guard shall be bent back at an angle of not less than 60° nor more than 75° from the horizontal.
4. The guard plate shall be securely braced and fastened in place to withstand a constant force of not less than 150 lbf (667 N) applied at right angles to and at any position on its face without permanent deformation.

3011.6.2.3 Hinged platform sills. Hinged platform sills, where provided, shall be provided with electric contacts which will prevent operation of the elevator by the normal operating device unless the hinged sill is within 2 inches (51 mm) of its fully retracted position. The elevator will be operated by the leveling device in the leveling zone with the sill in any position.

3011.6.2.4 Floating (movable) platforms. Floating (movable) platforms which permit operation of the elevator when the car door or gate is not in the closed position are prohibited.

3011.6.3 Car enclosures.

3011.6.3.1 Car enclosures. Car enclosures for freight and passenger cars shall conform with the following:

1. Freight elevator cars:
   1.1. Cars shall be enclosed to a height of at least 6 feet from the floor on all sides, where there are no hoistway doors or gates, with solid panel or openwork which will reject a 2-inch diameter ball.
   1.2. On the side of the car adjacent to the counterweight runway and extending 6 inches each side of the counterweight runway, the enclosure shall extend to the car top or underside of car crosshead.
   1.3. If overhead protection is of openwork material, it shall reject a 1-1/2 inch ball and shall be sufficiently strong to support 300 pounds applied at any point. Simultaneous application of these loads is not required.
   1.4. Suitable overhead protection may be installed directly over the area where the operator runs the controls, providing the overhead protections covers sufficient area for save protection of operator.
2. Passenger elevator cars:
   2.1. Passenger elevator cars shall be fully enclosed on all sides and the top, except the opening for entrances.
   2.2. Enclosures shall be of metal or wood in conformity with local fire regulations.
   2.3. The car top shall be sufficiently strong to support a load of 300 pounds applied at any point. Simultaneous application of these loads is not required.

3011.6.3.2 Material for passenger car enclosure. All materials exposed to the car interior and the hoistway shall be metal or shall conform to the following: **

1. Materials in their end use configuration, other than those covered by paragraph (2) below, shall conform to the following requirements, based on the tests conducted in accordance with the requirements of ASTM E 84, ANSI/UL 723 or NFPA 252:
   1.1. flame spread rating of 0 to 75;
   1.2. smoke development of 0 to 450.
2. Napped, tufted, wove, looped, and similar materials in their end use configuration on car enclosure walls shall have a flame spread rating of 0 to 25.
3. Padded protective linings, for temporary use in passenger cars during the handling of freight, shall be of materials conforming to either paragraph 1. or (2) above. The protective lining shall clear the floor by not less than 4 inches (102 mm).
4. Floor covering, underlayment, and its adhesive shall have a critical radiant flux of not less than 0.45 W/ cm2 as measured by ASTM E 648. Floor finish materials of a traditional type such as wood, vinyl, linoleum and terrazzo are permitted to be used.
5. Carpeting without padding may be used for interior finishes provided that it has a Class I rating, a flame spread of 25 or less which shall include all assembly components except the adhesive.

   Exception: Handrails, operating devices, ventilating devices, signal fixtures, audio and visual communication devices, and their housings are not required to comply with this Section 3011.6.

3011.6.3.3 Interior alteration. Alterations or modifications of elevator car interiors shall comply with ASME A17.1/CSA B44 8.7.2.15.2 increase or decrease in deadweight of car). *Seattle Building Code* requirements concerning flame spread rating for wall coverings (See Chapter 8) and lighting requirements of ASME A17.1/CSA B44. **

3011.6.3.4 Car doors and gates. Car doors or gates shall be required at each entrance to the elevator car.

1. Car doors or gates may be horizontal or vertical sliding.
2. Gates, except collapsible, may be solid or may be openwork of a design to reject a ball 2 inches in diameter ball. Gates shall be:
   2.1. Constructed of metal or wood; and
   2.2. Designed shall be so designed that they will withstand a lateral pressure of 100# applied at approximately their center without breaking or being permanently deformed and without displacing the gate from its guides or tracks.
3. Collapsible gates shall reject a 3-inch diameter ball when fully extended (closed position) when installed on passenger cars and reject a 4-1/2 ball when fully extended (closed position) when installed on freight cars. Such gates shall not be power-opened for more than one-third of their clear opening distance or for a maximum power opening distance not to exceed 10 inches. Collapsible gates shall have at least every fourth vertical member guided at the top and every second vertical member guided at the bottom.

4. Handles of manually operated collapsible gates nearest the car operating device on elevators operated from the car only shall be so located that the nearest handle is not more than 48 inches (1.22 m) above the car floor. Gate handles shall be provided with finger guards.
5. Car doors and gates when in the fully closed position shall conform to the following specifications:
    5.1. For passenger cars they shall protect the full width and height of the car entrance opening provided that vertically sliding gates may extend from a point not more than 1 inch above the car floor to a point not less than 6 feet above the floor.
    5.2. For freight elevators they shall protect the full width of the car entrance opening. Car doors shall extend from the car floor to a height of not less than 6 feet above the car floor. Vertically sliding gates shall extend from a point not more than 1 inch above the car floor to a point not less than 6 feet above the car floor.
6. Car doors and gates of electric and electro-hydraulic elevators shall be equipped with approved car door or gate electric contacts which will prevent operation of the elevator by the normal operating device unless the car door or gate is in the closed position.

3011.6.3.5 Location of car doors and gates. All elevators, except freight elevators equipped with horizontally swinging doors which are not accessible to the general public and located in factories, warehouses, garages, and similar buildings, shall conform to the following:

1. Location. Doors or gates for automatic or continuous-pressure operation elevators shall be so located that the distance from the face of the car door or gate to the face of the hoistway door shall be not more than the following:
    1.1. Where a swinging-type hoistway door and a car gate are used, 4 inches (102 mm);
    1.2. Where a swinging-type hoistway door and a card door are used 5-1/2 inches (140 mm);
    1.3. Where a sliding-type hoistway door and a car gate or door are used, 5-1/2 inches (140 mm).
2. Measurement of distances. The distances specified shall be measured as follows:
    2.1. Where a multisection car door and multisection hoistway door are used or where one of these doors is multisection and the other is single section, between the sections of the car door and the hoistway doors nearest to each other;
    2.2. Where a multisection car door and a swinging-type hoistway door are used, between the hoistway door and the section of the car door farthest from it. Where space conditions require the use of three speed car doors, the distance shall be measured from the intermediate speed panel;
    2.3. Where a car gate is used, between the car gate and the section of the hoistway door nearest to the car gate.
3. Where existing distances are greater than specified by paragraphs 1 and 2 of this section, a space guard of sheet metal shall be provided, attached to the hoistway door and/or car door.
    3.1. The guard is to be mounted to the door by a tamper-proof means.
    3.2. The bottom of the guard shall be not less than 1/8 (3.2 mm) nor more than 1/2 inch (13 mm) from the edge of the sill.
    3.3. The face of the guard shall run vertically not less than 40 inches (1.01 m) nor more than the height of the lower edge of the vision panel.
    3.4. The guard shall extend the full width of the door.
    3.5. The top of the guard shall be inclined toward the face of the door at angle of not less than 60° nor more than 75° from the horizontal.
    3.6. Exposed edges shall be beveled or rolled to eliminate sharp edges.
    3.7. The guard shall be sufficiently rigid or reinforced to prevent collapsing or denting.
    3.8. Mounting of the guard shall have proper clearances at the bottom and sides to permit easy closing of the door and shall not interfere with the self-closing.
    3.9. On multisection horizontally sliding doors only the leading or fast panel shall be fitted with the space guard. For swinging doors, the sides of the guard shall be closed if the depth exceeds 5 inches (127 mm).
4. On horizontally sliding hoistway doors where existing clearances are greater than specified by subsections 1 and 2 of this section, a vertical sight guard shall be mounted to the leading edge of the hoistway door. The sight guard shall
    4.1. Be mounted with a vertical clearance of not more than 1/2 inch (13 mm) to the sill, to a height of not less than 6 feet (1.8 m); and
    4.2. Project from the door, a distance to not more than 1/2 inch (13 mm) nor less than 1/8 inch (3.2 mm) from the hoistway edge of the sill.

5. Only the following devices may be used to render inoperative hoistway door interlocks, the electric contacts of hoistway door combination mechanical locks and electric contacts, or car door or gate electrical contacts:

   5.1. Leveling devices

   5.2. Truck-zoning devices;

   5.3. Hoistway access switch.

   5.4. Existing devices which do not conform to the above shall be removed.

3011.6.3.6 Control and operating circuit requirements. The failure of any single magnetically operated switch, contactor, or relay to release in the intended manner, or the occurrence of a single accidental ground, shall not permit the car to start or run if any hoistway door interlock is unlocked or if any hoistway door or car door or gate electric contact is not in the closed position.

3011.6.3.7 Emergency exits.

1. Top emergency exits.

   1.1. Cars provided with a car top emergency exit. Top emergency exit covers shall be hinged or otherwise attached to the car top so that the cover can be opened from the top of the car only and opens outward.

   1.2. The exit cover of the lower compartment of a multideck elevator car shall be openable from either compartment.

2. Side emergency exits.

   2.1. Side emergency exit doors or panels, where provided, shall have a lock arranged so that the door may be opened from the inside of the car only by a special shaped removable key and outside the car by means of a nonremovable handle.

   2.2. All side emergency car exits shall be equipped with electric contacts to prevent the movement of the car if the exit door or panel is not closed, see 3011.6.10.5(16). Side emergency exit door panels shall open only into the car.

3011.6.3.8 Car illumination. **

1. Interiors of cars shall be provided with not less than 2 electric lights.
2. The minimum illumination at the car threshold, with the door closed, shall not be less than:

   2.1. For passenger elevators: 5 footcandle (54 lux);

   2.2. For freight elevators 2-1/2 footcandle (27 lux).

3. Light control switches are not required, but if provided, they shall be located in or adjacent to the car's onboard operating device.
4. In elevators having automatic operation, the light control switch shall be of the key-operated type or located in a fixture with a locked cover.
5. Light fixtures mounted on car tops shall be equipped with a non-key operated switch located in or adjacent to the fixture.
6. A readily accessible and labeled toggle-type test switch shall be provided on the top of the car to cut lighting power manually to test the emergency lighting.

3011.6.3.9 Car top work light. A permanently wired work light and outlet shall be installed on the top of freight and passenger elevators to provide adequate illumination for inspection and work in the hoistway. The top of car light fixtures shall be provided with a non-keyed switch in or adjacent to the fixture. The fixture shall be protected from accidental breakage. **

3011.6.4 Safeties.

3011.6.4.1 Safeties. The car of every elevator suspended by wire ropes shall be provided with car safeties. The safety device shall be capable of stopping and sustaining the entire car with its rated load in the event of cable severance or overspeed. There shall be a switch provided on the car actuated by the setting of the safeties that will remove the electric power from the driving machine motor and brake. Car safeties are identified and classified on the basis of performance characteristics after the safety begins to apply pressure on the guide rails.

1. Type A safeties. Safeties which develop a rapidly increasing pressure on the guide rails during the stopping interval, the stopping distance being very short due to the inherent design of the safety. The operating force is derived entirely from the mass and motion of the car or the counterweight being stopped. These safeties apply pressure on the guide rails through eccentrics, rollers, or similar devices without any flexible medium purposely introduced to limit the retarding force and increase the stopping distance.

2. Type B safeties. Safeties which apply limited pressure on the guide rails during the stopping interval, and which provide stopping distances that are related to the mass being stopped and the speed at which application of the safety is initiated. Retarding forces are reasonably uniform after the safety is fully applied. Continuous tension in the governor rope may or may not be required to operate the safety during the entire stopping interval. Minimum and maximum distances are specified on the basis of governor tripping speed.
3. Type C safeties (Type A with oil buffers). Safeties which develop retarding forces during the compression stroke of one or more oil buffers interposed between the lower members of the car frame and a governor-operated Type A auxiliary safety plank applied on the guide rails. The stopping distance is equal to the effective stroke of the buffers.
4. Type G safeties. Safeties similar to Type B except having a gradually increasing retarding force. This safety may be either of the wedge clamp type or the flexible guide clamp type applied a cable which unwinds a drum below the car floor.
5. Slack rope safeties that are actuated by the slackening or breaking o the hoisting ropes. This type of safety is not actuated by an overspeed governor.

3011.6.4.2 Maximum permissible movement of governor rope to operate the safety mechanism. For all Type B safeties, the movement of the governor ropes relative to the car or the counterweight, respectively, required to operate the safety mechanism from its fully retracted position to a position where the safety jaws begin to exert pressure against the guide rails shall not exceed the following values based on rated speed:

1. For car safeties:
    1.1. 200 fpm (1.02 m/s) or less: 42 inches (1.07 m)
    1.2. 202 fpm (1.03 m/s) to 375 fpm (1.90 m/s): 36 inches (914 mm).
    1.3. Over 375 fpm (1.91 m/s): 30 inches (762 mm).
2. For counterweight safeties: 42 inches (1.07 m) for all speeds.
3. Drum-operated car and counterweight safeties, requiring continual unwinding of the safety drum rope to fully apply the safety, shall be so designed that not less than tree turns of the safety rope will remain on the drum after the overspeed test of the safety has been made with the rated load in the car.

3011.6.4.3 Rail lubricants and lubrication plate. Rail lubricants or coatings which will reduce the holding power of the safety or prevent its functioning as required shall not be used.

1. A metal plate shall be securely attached to the car crosshead in an easily visible location and, where lubricants are to be used, shall carry the notation, “Consult manufacturer of the safety for the characteristics of the lubricant to be used.” If lubricants are not to be used, the plate shall so state.
2. If lubricants other than those recommended by the manufacturer are used, a safety test should be made to demonstrate that the safety will function as required.

3011.6.5 Speed governors.

3011.6.5.1 Governors. A speed governor or inertia trip safety or a slack cable operated safety shall be installed on all elevators and shall be so designed that it will actuate the car safeties before the car attains a speed of 140% of the rated speed. Governor ropes shall be not less than 3/8 inch in diameter, if iron or steel rope, and not less than 3/4 inch if manila rope. Tiller rope shall not be used.

3011.6.5.2 Speed governor overspeed and car safety mechanism switches.

1. A switch shall be provided on the speed governor and operated by the overspeed action of the governor when used with Type B and C car safeties of elevators having a rated speed exceeding 150 fpm (0.76 m/s).
2. A switch shall be provided on the speed governor when used with a counterweight safety for any car speed.
3. For static control, an overspeed switch shall be provided regardless of rated speed and shall operate in both directions of travel.
4. These switches shall, when operated, remove power from the driving-machine motor and brake before or at the same time of application of the safety.
5. Switches used to perform the function specified shall be positively opened and remain open until manually reset. (6) Switches operated by the car safety mechanism shall be of a type which will not reset unless the car safety mechanism has been returned to the “off” position.

3011.6.6 Capacity and loading.

3011.6.6.1 Minimum rated load for passenger elevators. The rated load in pounds (kilograms) for passenger elevators shall be based on the inside net platform areas, and shall be not less than shown in the table below. The inside net platform areas shall be determined as shown in the following table which shows the maximum inside net platform areas for the various common rated loads. If other rated loads are used, they shall be not less than as follows:

1. For an elevator having an inside net platform area of more than 50 feet squared (4.65 m squared), W = 0.667AA squared + 66.7A.
2. For an elevator with an inside net platform area of more than 50 feet squared (4.65 m squared), W = 0.0467A squared + 125A – 1367.

TABLE 3011.6.6.1
MAXIMUM* INSIDE NET PLATFORM AREAS FOR VARIOUS RATED LOADS

Rated Load, lbs	Inside Net Platform Area, ft.^{2}	Rated Load, lbs	Inside Net Platform Area, ft.^{3}
500	7	5,000	50
600	8.3	6,000	57.7
700	9.6	7,000	65.3
1,000	13.25	8,000	72.9
1,200	15.6	9,000	80.5
1,500	18.9	10,000	88
1,800	22.1	12,000	103
2,000	24.2	15,000	125.1
2,500	29.1	18,000	146.9
3,000	33.7	20,000	161.2
3,500	38	25,000	196.5
4,000	42.2	30,000	231
4,500	46.2		
*To allow for variations in cab designs, an increase in the maximum inside net platform area not exceeding 5% will be permitted for the various rated loads.			

NOTE:
A = inside net platform area, ft. squared
W = minimum rated load, lb.

3011.6.6.2 Use of partitions for reducing inside net platform area. When partitions are installed in elevator cars for the purpose of restricting the platform net area for passenger use, they shall be permanently fastened in place.

1. Gates, doors, or handrails shall not be used as partitions.
2. Partitions shall be installed to permit approximately symmetrical loading.
3. When conditions do not permit symmetrical loading, guide rails, car frames, and platforms shall be capable of sustaining the resulting stresses and deflections.

3011.6.6.3 Minimum rated load for freight elevators. The minimum rated load for freight elevators in pounds (kilograms) shall be based on the weight and class of the load to be handled, but shall in no case be less than the minimum specified in subsection (2) of this section for each class of loading based on the inside net platform area. Freight elevators shall be designed for one of the following classes of loading:

1. Class A – General freight loading: Where the load is distributed, the weight of any single piece of freight or of any single hand truck and its load is not more than one-quarter of the rated load of the elevator, and the load is handled on and off the car platform manually or by means of hand trucks. For this class of loading, the rated load shall be based on not less than 50 lbs./ft. squared of inside net platform area.
2. Class B – Motor vehicle loading: Where the elevator is used solely to carry automobile trucks or passenger automobiles up to the rated load of the elevator. For this class of loading, the rated load shall be based on not less than 30 pounds/foot squared of inside net platform area.
3. Class C – Industrial truck loading: Where the load is carried in transit or is handled on and off the car platform by means of power industrial trucks or by hand trucks having a loaded weight more than one-quarter the rated load of the elevator. For this class of loading the following requirements apply:
    3.1. The rated load shall be based on not less than 50 pound/foot squared (244 kg/m squared) of inside net platform area;
    3.2. The weight of the loaded industrial truck shall not exceed the rated load of the elevator;
    3.3. The weight of the loaded industrial truck plus any other material carried on the elevator shall not exceed the rated load when the industrial truck is also carried;

3.4. During loading and unloading, the load on the elevator shall in no case exceed 150% of the rated load, and where this load exceeds the rated load, the capacity of the brake and the traction relation shall be adequate to safely sustain and level at least 150% of the rated load.

Note: When the entire rated load is placed on the elevator by the industrial truck in increments, the load imposed on the car platform while the last increment is being loaded or the first increment unloaded will exceed the rated load by the weight of the empty industrial truck.

3011.6.6.4 Capacity Plates.

1. Every elevator shall be equipped with a capacity plate or painted sign that is permanently and securely fastened in place and located in a conspicuous position inside the car. It shall indicate the rated load of the elevator in pounds, and for freight elevators, this plate or sign shall indicate:
   1.1. The capacity for lifting one-piece loads;
   1.2. For freight elevators used for industrial truck loading where the truck is not usually carried by the elevator but used only for loading and unloading, the maximum load the elevator is designed to support while being loaded or unloaded.
2. Capacity plates shall be durable and readily legible. The height of the letters and figures shall be at least 1/4 inch for passenger elevators and 1 inch for freight elevators.

3011.6.6.5 Signs on freight elevators. In addition to the capacity plate or painted sign on freight elevators, two other signs shall be installed or painted inside the car in a conspicuous place and permanently and securely fastened to the car enclosure. They shall be durable and easy to read with 1/2-inch letters, as follows:

1. In elevators not permitted to carry passengers, the sign shall read, "This is not a passenger elevator; no persons other than the operator and freight handlers are permitted to ride on this elevator."
2. In elevators permitted to carry employees, the sign shall read, "No passengers except employees permitted."

3011.6.7 Driving machines and sheaves.

3011.6.7.1 General requirements.

1. Sheaves and drums shall be made of cast iron or steel and shall have finished grooves for ropes.
2. Set screws fastenings shall not be used in lieu of keys or pins on connections subject to torque or tension.
3. Friction gearing or a clutch mechanism shall not be used to connect a driving-machine drum or sheave to the main driving mechanism, other than in connection with a car leveling device.

3011.6.7.2 Winding drum machines.

1. Winding drum machines shall be equipped with a slack-rope device with an enclosed switch of the manually reset type which shall cause the electric power to be removed from the elevator driving machine motor and brake if the hoisting ropes become slack or broken.
2. Winding drum machines shall be equipped with adjustable machine automatic terminal stop mechanisms set to directly open the main line circuit final terminal stopping switch. Chain, belt, or rope-driven mechanisms shall not be used.

3011.6.7.3 Indirect drive machines.

1. Indirect drive machines, utilizing V-belts, toot drive belts, or chain drives, shall have at least three belts or chains operating together in parallel as a set. Belt and chain drive sets shall be pre-loaded and matched for length.
2. Belt set selection shall be based upon the manufacturer's rated breaking strength and a safety factor of 10. Chain and sprocket set selection shall be based upon the recommendations in the supplementary information section of ASME/ANSI B29.1, using a service factor of 2.0. Offset links in a chain are permitted. Chain drives and belt drives shall be guarded to protect against accidental contact and to prevent foreign objects from interfering with drives.

   Sprockets in a chain drive set and also in a driven set shall be assembled into a common hub, with the teeth cut in line after assembly to assure equal load distribution on all chains. Tooth sheaves for a belt drive shall be constructed in a manner to assure equal load distribution on each belt in the set.

   Load determination for both the belt and chain sets shall be based on the maximum static loading on the elevator car (full load on the car and the car at rest at a position in the hoistway which creates the greatest load, including either the car or counterweight resting on its buffer).
3. Each belt or chain in a set shall be continuously monitored by a broken belt or chain device of the manually reset type which shall function to automatically interrupt power to the machine and apply the brake in the event any belt or chain in the set breaks or becomes excessively slack. The driving machine brake shall be located on the traction sheave or winding drum assembly side of the driving machine so as to the fully effective in the event the entire belt set or chain set should break.

4. If one belt or chain of a set is worn, stretched, or damaged so as to require replacement the entire set shall be replace. Sprockets and toothed sheaves shall also be inspected on such occasion and replaced if noticeably worn.

3011.6.8 Driving machine brakes.

3011.6.8.1 Drive machine friction brakes. The drive machine shall be equipped with a friction brake applied by a spring or springs, and released electrically.

The brake shall be designed to have a capacity sufficient to hold the car at rest with its rated load. For passenger elevators and freight elevators permitted to carry employees, the brake shall be designed to hold the car at rest with an additional load up to 25% in excess of the rated load.

3011.6.8.2 Driving and release of driving machine brakes. Driving machine brakes shall not be electrically released until power has been applied to the driving machine motor. All power feed lines to the brake shall be opened and the brake shall apply automatically when:

1. The operating device of a car switch or continuous pressure operation elevator is in the stop position;
2. A floor stop device functions;
3. Any of the electrical protective devices in 3011.6.10.5 functions;

Under conditions described in subsection 1 and 2 of this section, the application of the brake may occur on or before the completion of the slowdown and leveling operations.

The brake shall not be permanently connected across the armature of field of a direct current elevator driving machine motor.

3011.6.9 Terminal stopping devices.

3011.6.9.1 Normal terminal stopping devices. Enclosed upper and lower normal terminal stopping devices shall be provided and arranged to slow down and stop the car automatically, at or near the top and bottom terminal landings. Such devices shall function independently of the operation of the normal stopping means and of the final terminal stopping device.

1. Normal stopping devices shall be located on the car, in the hoistway, or in the machine room or machinery space and shall be operated by the movement of the car.
2. Broken rope, tape, or chain switches shall be provided in connection with normal terminal stopping devices located in the machine room or machinery spaces of traction elevators. These switches shall be opened by a failure of the rope, tape, or chain and shall cause the electrical power to be removed from the driving machine motor and brake.

3011.6.9.2 Final terminal stopping devices. Enclosed upper and lower final terminal electro-mechanical stopping devices shall be provided and arranged to prevent movement of the car by the normal operating devices in either direction of travel after the car has passed a terminal landing. Final terminal stopping devices shall be located as follows:

1. Winding drum driving machines. Elevators having winding drum machines shall have stopping switches on the machines and also on the hoistway operated by the movement of the car.
2. Traction driving machines. Elevators having traction driving machines shall have stopping switches in the hoistway operated by the movement of the car.

3011.6.10 Operating devices and control equipment.

3011.6.10.1 Types of operating devices. The following types of operating devices shall not be used:

1. Rope (i.e., shipper rope);
2. Rod operating devices, actuated directly by hand; or
3. Rope operating devices actuated by wheels, levers, or cranks.

3011.6.10.2 Car-switch operation elevators. The handles of lever-type operating devices of car-switch operation elevators must be arranged so that they will return to the stop position and latch there automatically when the hand of the operator is removed.

3011.6.10.3 Passenger elevator emergency stop buttons. Where provided, elevator emergency stop buttons shall be connected to activate the elevator alarm when in the stop position. An optional door hold open switch may be provided, but such door hold open function shall automatically cancel upon activation of a Phase I recall.

3011.6.10.4 Top-of-car operating devices.

1. Elevators with automatic or continuous-operation shall have a continuous-pressure button operating switch mounted on the top of the car for the purpose of operating the car solely from the top of the car. The device shall operate the car at a speed not exceeding 150 fpm (0.76 m/s).
2. The means for transferring the control of the elevator to the top-of-car operating devices shall be on the car top and located between the car crosshead and the side of the car nearest the hoistway entrance normally used for access to the car top.

3. A top-of-car operating station shall be installed on all existing elevators which have more than fifteen feet of travel.

3011.6.10.5 Electrical protective devices. Electrical protective devices shall be provided in accordance with the following:

1. Slack-rope switch: Winding drum machines shall be accompanied by a slack-rope device equipped with a slack-rope switch of the enclosed manually reset type which will cause the electric power to be removed from the elevator driving machine motor and brake if the suspension ropes become slack.
2. Motor-generator running switch: Where generator-field control is used, means shall be provided to prevent the application of power to the elevator driving machine motor and brake unless the motor generator set connections are properly switched for the running condition of the elevator. It is not required that the electrical connections between the elevator driving machine motor and the generator be opened in order to removed power from the elevator motor.
3. Compensating rope sheave switch.: Compensating rope sheaves shall be provided with a compensating rope sheave switch or switches mechanically opened by the compensating rope sheave before it reaches its upper or lower limit of travel to cause the electric power to be removed from the elevator driving machine motor and brake.
4. Broken rope, tape or chain switches used in connection with machine room normal terminal stopping switches: Broken rope, tape or chain switches which meet the requirements of 3011.6.5.2 shall be provided in connection with normal terminal stopping devices located in machine rooms of traction elevators. These switches shall open when a rope, tape, or chain fails.
5. Stop switch on top-of-car: A stop switch shall be provided on the top of every elevator car, which shall cause the electric power to be removed from the elevator driving machine motor and brake, and shall:
   5.1. Be of the manually operated and closed type;
   5.2. Have red operating handles or buttons;
   5.3. Be conspicuously and permanently marked **"STOP"** and indicated the stop and run positions;
   5.4. Be positively opened mechanically (opening shall not be solely dependent on springs);
   5.5. Have red operating handles or buttons;
   5.6. Be conspicuously and permanently marked "stop';
   5.7. Indicate the "stop" and "run" positions; and
   5.8. Be positively opened mechanically and not solely dependent on springs.
6. Car-safety mechanism switch: A switch is required where a car safety is provided.
7. Speed governor overspeed switch: A speed governor overspeed switch shall be provided when required by 3011.6.5.2.
8. Final terminal stopping devices: Final terminal stopping devices shall be provided on every elevator.
9. Emergency terminal speed limiting device: Where reduced stroke oil buffers are provided, emergency terminal speed limiting devices are required.
10. Motor generator overspeed protection: Means shall be provided to cause the electric power to be removed automatically from the elevator driving machine motor and brake should a motor generator set, driven by a direct current motor, overspeed excessively.
11. Motor field sensing means: Where direct current is supplied to an armature and shunt field of an elevator driving machine motor, a motor field current sensing means shall be provided, which shall cause the electric power to be removed from the motor armature and brake unless current is lowering in the shunt field of the motor.

    A motor field current sensing means is not required for static control elevators provided with a device to detect an overspeed condition prior to, and independent of, the operation of the governor overspeed switch. This device shall cause power to be removed from the elevator driving machine motor armature and machine brake.
12. Buffer switches for oil buffers used with Type C car safeties: Oil level and compression switches shall be provided for all oil buffers used with Type C safeties.
13. Hoistway door interlocks or hoistway door electric contacts: Hoistway door interlocks or hoistway door electric contacts shall be provided for all elevators.
14. Car door/gate electric contacts: Car door or gate electric contacts shall be provided on all elevators.
15. Normal terminal stopping devices: Normal terminal stopping devices shall be provided on all elevators.
16. Car side emergency exit electric contacts: An electric contact shall be provided on every car side emergency exit door.

17. Electric contacts for hinged car platform sill: Hinged car platform sills, where provided, shall be equipped with electric contacts.
18. Stop switch in the elevator pit: A stop switch shall be installed in all elevator pits and shall be located adjacent to the normal pit access.

3011.6.10.6 Power supply line disconnecting means.

1. A disconnect switch or a circuit breaker shall be installed and connected into the power supply line to each elevator motor or motor generator set and controller. The power supply line shall be equipped with overcurrent protection inside the machine room or machinery space.
2. The disconnect switch or circuit breaker shall be of the manually closed multipole type and be visible from the elevator driving machine or motor generator set. When the disconnecting means is not within sight of the driving machine, the control panel, or the motor generator set, and additionally manually operated switch shall be installed adjacent to the remote equipment and connected in the control circuit to prevent starting.
3. No provision may be made to close the disconnect switch from any other part of the building.
4. Where there is more than one driving machine in a machine room, disconnect switches or circuit breakers shall be numbered to correspond to the number of the driving machine which they control.

3011.6.10.7 Phase reversal and failure protection. Elevators having polyphase alternating current power supply shall be equipped with a means to prevent the starting of the elevator motor if the phase rotation is in the wrong direction or if there is a failure of any phase.

This protection may be considered to be provided in the case of generator field control having alternating current motor-generator driving motors, provided a reversal of phase will not cause the elevator driving machine motor to operate in the wrong direction. Controllers on which switches are operated by polyphase torque motors provide inherent protection against phase reversal or failure.

3011.6.10.8 Grounding and overcurrent protections.

1. Control and operating circuit requirements shall comply with Article 621-61 of the 1990 Seattle Electrical Code.
2. Grounding methods shall comply with Articles 620-81 through 620-85 of the 1990 Seattle Electrical Code.

3011.6.10.9 Absorption of regenerated power. When a power source is used which, in itself, is incapable of absorbing the energy generated by an overhauling load, means for absorbing sufficient energy to prevent the elevator from attaining governor tripping speed or a speed in excess of 125% of rated speed, whichever is lesser, shall be provided on the load side of each elevator power supply line disconnecting means.

3011.6.10.10 Door bypass system. Door bypass systems, where used, shall conform with the requirements of ASME A17.1-1990 Rule 210.1e.

3011.6.10.11 Restricted opening of doors. All existing passenger elevators in Group R-1 hotels and dormitory buildings shall comply with the following. **

1. When a car is outside the unlocking zone, the hoistway doors or car doors shall be so arranged that the hoistway doors or car doors cannot be opened more than 4 inches (102 mm) from inside the car.
2. When the car doors are arranged that they cannot be opened when the car is outside the unlocking zone, the car doors shall be openable from outside the car without the use of special tools.
3. The doors shall be unlockable when the car is within 3 inches (76 mm) above or below the landing and are permitted to be configured to be unlockable up to 18 inches (457 mm) above or below the landing.

3011.6.11 Emergency operation and signaling devices.

3011.6.11.1 Car emergency devices in buildings. Where provided, elevators with an audible signaling device, operable from a switch or button marked "ALARM" which shall be located in or adjacent to each car operating panel. The signaling device shall be located inside the building and audible inside the car and outside the hoistway. One signaling device may be used for a group of elevators.

3011.6.12 Suspension systems and their connections.

3011.6.12.1 Suspension means. Cars shall be suspended by steel wire ropes attached to the car frame or passing around sheaves attached to the car frame. Only iron (low carbon steel) or steel wire ropes, having the commercial classification "elevator wire rope," or wire rope specifically constructed for elevator used may be used for the suspension of elevator cars and for the suspension of counterweights. The wire material for ropes shall be manufactured by the open-hearth or electric furnace process or its equivalent.

3011.6.12.2 Rope data tag. At each rope renewal, a new metal tag shall be securely attached to one of the wire rope fastenings. Rope data tags shall be durable and readily legible. The height of letters and figures shall be no less than 1/16 inch. This data tag shall bear the following information:

1. The diameter in inches;

2. The manufacturer's rated breaking strength;
3. The grade of material used;
4. The month and year the ropes were installed;
5. Whether non-preformed or preformed;
6. Construction classification;
7. Name of the person or firm that installed the ropes;
8. Name of the manufacturer of the ropes;
9. Number of ropes; and
10. The date on which the rope was re-socketed or other types of fastening changed.

3011.6.12.3 Factor of safety. The factor of safety of the suspension wire ropes shall not be less than shown on the following table. The factor of safety shall be based on the actual rope speed corresponding to the car's rated speed. The factor of safety shall be calculated by the following formula:

$$F = \frac{(S \times N)}{W} \qquad \textbf{(Formula 3011-1)}$$

where:

N = Number of runs of rope under load. (2:1 roping, twice the number of ropes used; 3:1 roping, three times, etc.).

S = Manufacturer's rated breaking strength of one rope.

W = Maximum static load imposed on all car ropes with the car and its rated load at any position in the hoistway.

TABLE 3011.6.12.3
Minimum Factors of Safety for Suspension Wire Ropes

Rope Speed (fpm)	Minimum Factor of Safety		Rope Speed (fpm)	Minimum Factor of Safety	
	Passenger	Freight		Passenger	Freight
50	7.60	6.65	605	10.85	9.65
75	7.75	6.85	700	11.00	9.80
100	7.95	7.00	750	11.15	9.90
125	8.10	7.15	800	11.25	10.00
150	2.25	7.30	850	11.35	10.10
175	8.40	7.45	900	11.45	10.15
200	8.60	7.65	950	11.50	10.20
225	8.75	7.75	1000	11.55	10.30
250	8.90	7.90	1050	11.65	10.35
300	9.20	8.20	1100	11.70	10.40
350	9.50	8.45	1150	11.75	10.45
400	9.75	8.70	1200	11.80	10.50
450	10.00	8.90	1250	11.80	10.50
500	10.25	9.15	1300	11.85	10.55
550	10.45	9.30	1350	11.85	10.55
600	10.70	8.50	1400-2000	11.90	10.55

3011.6.12.4 Minimum number and diameter of suspension ropes. All elevators, except freight elevators that do not carry passengers or freight handlers and have no means of operation in the car, shall conform to the following requirements:

1. The minimum number of hoisting ropes used is three for traction elevators and two for drum-type elevators. Where a car counterweight is used, the number of counterweight ropes used shall not be less than two.
2. The minimum diameter of hoisting and counterweight ropes is 3/8 inch (9.5 mm). Outer wires of the ropes shall be no less than 0.024 inch (0.61 mm) in diameter. The term "diameter" where used in this section refers to the nominal diameter as given by the rope manufacturer.

3011.6.12.5 Suspension rope equalizers. Suspension rope equalizers, where provided, shall be of the individual-compression spring type.

Equalizers of other types may be used with traction elevators provided the equalizers and fastenings are approved by the authority having jurisdiction on the basis of adequate tensile and fatigue tests made by a qualified laboratory. Such

tests shall show the ultimate strength of the equalizer and its fastenings in its several parts and assembly, which shall be no less than 10% in excess of the strength of suspension ropes, provided that equalizers of the single-bar type, or springs in tension, shall not be used to attach suspension ropes to cars or counterweights or to dead-end hitch plates.

Exception: The requirements of this section do not apply to rope equalizers that meet rule 2.20.5 in ASME A17.1-2000/CSA B44:00.

3011.6.12.6 Securing of suspension wire ropes to winding drums. Suspension wire ropes of winding drum machines shall have the drum ends of the ropes secured on the inside of the drum by clamps or by tapered babbitted sockets, or by other means approved by the *building official.*

3011.6.12.7 Spare rope turns on winding drums. Suspension wire ropes of winding drum machines shall have not less than one turn of the rope on the drum when the car is resting on the fully compressed buffers.

3011.6.12.8 Suspension rope fastenings. Spliced eyes by return loop may continue in service. Suspension rope fastening shall conform to the requirements of ASME A17.1 Rule 212.9 1996 when the ropes are replaced.

3011.6.12.9. Auxiliary rope fastening devices. Auxiliary rope fastening devices, designed to support cars or counterweights if any regular rope fastenings fail, may be provided subject to approval by the *building official.*

[W] 3011.6.12.10 Compensating means. Compensating chains or ropes shall be fastened to the counterweight frame directly or to a bracket fastened to the frame and shall not be fastened to the tie rods.

3011.7 Hydraulic elevators.

3011.7.1 Scope. This section shall be the minimum standard for existing direct plunger and roped hydraulic elevators.

3011.7.1.1 All hoistways, hoistway enclosures, and related construction shall conform to the applicable requirements of Hoistways and Related Construction for Electric and Hydraulic Elevators. See Section 3011.5.

3011.7.1.2. Hydraulic elevators without safety bulkheads.

1. Oil levels shall be monitored and tracked in a log.
2. The log shall contain the date the oil was added, the reason for the loss of oil, and the amount of oil added.
3. If the reason for the loss of oil cannot be determined, the unit shall be immediately taken out of service and the tests specified in 8.6.5.14.1 and 8.6.5.14.2 ASME A17.1-2019/CSA B44:19 shall be performed.

3011.7.2 Mechanical equipment.

3011.7.2.1 Buffers and bumpers. Car buffers or bumpers shall be provided. Solid bumpers may be used in lieu of buffers where the rated speed is 50 fpm (0.25 m/s) or less.

3011.7.2.2 Car frames and platforms. Car frames and platforms shall conform to the requirements of 3011.6.2.

3011.7.2.3 Car enclosures. Car enclosures shall conform to the requirements of 3011.6.3.

3011.7.2.4 Capacity and loading. Capacity and loading shall conform to the requirements of 3011.6.6.

3011.7.3 Driving machines.

3011.7.3.1 Connection to driving machines. The driving member of a direct plunger driving machine shall be attached to the car frame or car platform with fastenings of sufficient strength to support that member.

The connection to the driving machine shall be capable of withstanding, without damage, any forces resulting from a plunger stop.

3011.7.3.2 Plunger stops. Plungers shall be provided with solid metal stops and/or other means to prevent the plunger from traveling beyond the limits of the cylinder. Stops shall be designed and constructed so as to stop the plunger from maximum speed in the up direction under full pressure without damage to the connection to the driving machine, plunger, plunger connection, or any other parts of the hydraulic system. For rated speeds exceeding 100 feet per minute where a solid metal stop is provided, means other than the normal terminal stopping device (i.e., emergency terminal speed limiting device) shall be provided to retard the car to 100 feet per minute with retardation no greater than gravity, before striking the stop.

3011.7.4 Valves, supply piping, and fittings.

3011.7.4.1 Pump relief valve.

1. Each pump or group of pumps shall be equipped with a relief valve conforming to the following specifications, except as covered by subsection (2) of this section:
   1.1. The relief valve shall be located between the pump and the check valve and shall be of such a type and installed in the by-pass connection so that the valve cannot be shut off from the hydraulic system.
   1.2. The relief valve shall be preset to open at a pressure no greater than 150% of working pressure.

1.3. The size of the relief valve and bypass shall be sufficient to pass the maximum rated capacity of the pump without raising the pressure more than 25% above that at which the valve opens. Two or more relief valves may be used to obtain the required capacity.

1.4. Relief valves having exposed pressure adjustments, if used, shall have their means of adjustment sealed after being set to the correct pressure.

2. No relief valve is required for centrifugal pumps driven by induction motors, provided the shutoff, or maximum pressure which the pump can develop, is not greater than 135% of the working pressure at the pump.

3011.7.4.2 Check valve. A check valve shall be provided and shall be so installed that it will hold the elevator car with rated load at any point when the pump stops, or the maintained pressure drops below the minimum operating pressure.

3011.7.4.3 Supply piping and fittings. Supply piping and fittings shall be in sound condition and secured in place.

3011.7.4.4 Flexible hydraulic connections. When flexible hydraulic connections are replaced, the requirements of ASME A17.1, Rule 303.1d 1996 shall be met in all respects. Where flexible connections pass through walls, the replacement shall be made with steel piping.

3011.7.5 Pressure tanks.

3011.7.5.1 General requirements.

1. Capacity. All tanks shall be of sufficient capacity to provide for an adequate liquid reserve to prevent the entrance of air or other gas into the system.
2. Minimal liquid level indicator. The permissible minimum liquid level shall be clearly indicated.

3011.7.5.2 Pressure tanks.

1. Vacuum relief valves. Tanks which may be subjected to vacuum sufficient to cause collapse shall be provided with one or more vacuum relief valves with openings of sufficient size to prevent collapse of the tank.
2. Gauge glasses. Tanks shall be provided with one or more gauge attached directly to the tank and equipped to shut off the liquid automatically in case of failure of the glass. The gauge glass or glasses shall be located so as to indicate any level of the liquid between permissible minimum and maximum levels and be equipped with a manual cock at the bottom of the lowest glass.
3. Pressure gauge. Tanks shall be provided with a pressure gauge which will indicate the pressure correctly to no less than 1-1/2 times the pressure setting of the relief valve. The gauge shall be connected to the tank or water column by pipe and fittings with a stop cock in such a manner that it cannot be shut off from the tank except by a stop cock. The stop cock shall have a "T" or level handle set in line with the direction of flow through the valve when open.
4. Inspector's gauge connection. Tanks shall have a 1/4 inch pipe size valve connection for attaching an inspector's pressure gauge when the tank is in service.
5. Liquid level detector. Tanks shall be equipped with a means to render the elevator inoperative if, for any reason, the liquid level in the tank falls below the permissible minimum.
6. Handholes and manholes. Tanks shall be equipped with means for internal inspection.
7. Piping and fittings for gauges. Piping and fittings for gauge glasses, relief valves, and pressure gauges shall be of a material that will not be corroded by the liquid used in the tank.

3011.7.6 Terminal stopping devices.

3011.7.6.1 Terminal stopping devices. Terminal stopping devices shall conform to the requirements of 3011.6.9.

3011.7.7 Operating devices and control equipment.

3011.7.7.1 Operating devices. Operating devices shall conform to the requirements of 3011.6.10.2.

3011.7.7.2 Top-of-car operating devices. Top-of-car operating devices shall be provided and shall conform to the requirements of 3011.6.10.1 and 3011.6.10.2, except for uncounterweighted elevators having a rise of no more than 15 feet.

3011.7.7.3 The bottom normal terminal stopping device may be made ineffective while the elevator is under control of the top-of-car operating system.

3011.7.7.4 Anti-creep leveling devices. Each elevator shall be provided with an anti-creep leveling device conforming to the following specifications:

1. It shall maintain the car within 3 inches of the landing regardless of the position of the hoistway door.
2. For electrohydraulic elevators, it shall operate the car only in the up direction.
3. For maintained pressure hydraulic elevators, it shall operate the car in both directions.
4. Its operation may depend on the availability of the electric power provided that:

4.1. The power supply line disconnecting means required by 3011.6.10.6 is kept in the closed position at all times except during maintenance, repairs, and inspections.

4.2. The electrical protective devices required by 3011.7.7.5 shall not cause the power to be removed from this device.

3011.7.7.5 Electrical protective devices. Electrical protective devices, if provided, shall conform with the requirements of 3011.6.10.5 and operate as follows:

1. The following devices shall prevent operation of the elevator by the normal operating device and also the movement of the car in response to the anti-creep leveling devices.

   1.1. Stop switches in the pit;

   1.2. Stop switches on top of the car; and

   1.3. Car side emergency exit door electric contacts, where such doors are provided.

2. The following devices shall prevent the operation of the elevator by the normal operating device but the anti-creep leveling device required by 3011.7.7.4 shall remain operative:

   2.1. Emergency stop switches in the car;

   2.2. Broken rope, tape, or chain switches on normal terminal stopping devices when such devices are located in the machine room, machinery space or overhead space;

   2.3. Hoistway door interlocks or hoistway door electric contacts;

   2.4. Car door or gate electric contacts; and

   2.5. Hinged car platform sill electric contacts.

3011.7.7.6 Power supply line disconnects. Power supply line disconnects shall conform to the requirements of 3011.6.10.6.

3011.7.7.7 Devices for making hoistway door interlocks or electric contacts, or car door or gate electric contacts inoperative. The installation shall conform to the requirements of 3011.6.3.5.

3011.7.7.8 Control and operating circuit requirements. Control and operating circuits shall conform to the requirements of 3011.6.3.6.

3011.7.7.9 Emergency operation and signaling devices. Emergency operation and signaling devices shall conform to the requirements of 3011.6.11.1.

3011.7.7.10 Additional requirements for counterweighted hydraulic elevators. Counterweighted hydraulic elevators shall be roped so that the counterweight shall not strike the overhead when the car is resting on its fully compressed buffer.

Where counterweights are provided, counterweight buffers shall be provided.

3011.7.7.11 Roped horizontal hydraulic elevators. Roped horizontal elevators are permitted to continue in service but once taken out of service shall not be reactivated. **

3011.8 Escalators. *

3011.8.1 Scope. This part is a minimum standard for all escalators used to transport passengers.

3011.8.2 Construction.

3011.8.2.1 Balustrades. The balustrade shall be totally closed except where the handrail enters the newel base. Gaps between interior panels are permitted provided that they are no wider than 3/16 inch (4.8 mm) and the edges are rounded or beveled.

3011.8.2.2 Clearance between skirt and step. The clearance on each side of the steps between the step tread and the adjacent skirt panel shall not be more than 3/16 inch (4.8 mm).

3011.8.2.3 Guards at ceiling or soffit intersections.

1. Guard required. A solid guard shall be provided in the intersection of the angle of the outside balustrade (deck board) and the ceiling or soffit, except as indicated in subsection (2) of this section. The vertical edge of the guard shall be a minimum of 8 inches. The escalator side of the vertical face of the guard shall be flush with the face of the wellway. The exposed edge of the guard shall be rounded and have a minimum width of 1/4 inch (6.4 mm).
2. Guards are not required under the following conditions:

   2.1. On high decks where the clearance of the outside edge of the deck and the ceiling or soffit is more than 12 inches (305 mm) or where the projected intersection of the outside deck and the ceiling or soffit is more than 24 inches (610 mm) from the centerline of the handrail.

   2.2. On low decks where the centerline of the handrail is more than 14 inches (356 mm) from the ceiling or soffit.

3011.8.2.4 Antislide device. On high deck balustrades, antislide devices shall be provided on decks or combination of decks when the outer edge of the deck is greater than 12 inches (305 mm) from the centerline of the handrail or on adjacent escalators when the distance between the centerline of the handrails is greater than 16 inches (406 mm).

These devices shall consist of raised objects fastened to the decks, not closer than 4 inches (102 mm) to the handrail and spaced not greater than 6 feet (1.83 m) apart. The height shall be no less than 3/4 inch (19 mm). There shall be no sharp corners or edges.

3011.8.2.5 Handrails. Each escalator shall be provided with a handrail moving in the same direction and at substantially the same speed as the steps.

3011.8.2.6 Handrail guards. Hand or finger guards shall be provided at the point where the handrail enters the balustrade.

3011.8.2.7 Slotting of step risers. Escalators with smooth curved surface risers shall have either:

1. Steps having cleated risers provided with vertical cleats which mesh with slots on the adjacent step tread as the steps make the transition from the incline to the horizontal; or
2. Means to cause the opening of the power circuits to the escalator driving machine motor and brake should a step be displaced against the upthrust track at the upper and lower curves in the passenger carrying line of the track system.

3011.8.2.8 Slotting of step treads. The tread surface of each step shall be slotted in a direction parallel to the travel of the steps.

3011.8.2.9 Combplates. There shall be a combplate at the entrance and at the exit of every escalator. The combplate teeth shall be meshed with and set into the slots in the tread surface so that the points of the teeth are always below the upper surface of the treads.

3011.8.3 Brakes.

3011.8.3.1 General requirements. Escalators shall be provided with a brake capable of stopping the up or down traveling escalator with any load up to brake rated load. The brake shall be mechanically or magnetically applied. If the brake is magnetically applied, a ceramic permanent magnet shall be used.

3011.8.3.2 Main drive shaft brake. If the escalator brake is separated from the main drive shaft by a chain used to connect the driving machine to the main drive shaft, a mechanically or magnetically applied brake capable of stopping a down running escalator with brake rated load shall be provided on the main drive shaft. If the brake is magnetically applied, a ceramic permanent magnet shall be used.

3011.8.4 Operating and safety devices.

3011.8.4.1 Starting switches. Starting switches shall be of the key-operated type and shall be located so that the escalator steps are within sight.

** **3011.8.4.2 Escalator starting switches.** "Up" and "Down" positions shall be clearly indicated on all starting switches.

3011.8.4.3 Emergency stop buttons. There shall be a red stop button in an accessible location at the top and bottom landings of each escalator. The operation either one of these buttons shall cause the interruption of power to the escalator. It shall be impossible to start an escalator by means of these buttons. These buttons shall be marked **"Escalator Stop Button."**

3011.8.4.4 Speed governor.

1. A speed governor shall be provided, except as specified in subsection (2) of this section. Its operation shall cause the interruption of power to the driving machine if the speed of the steps exceeds a predetermined value, which shall be no more 40% above the rated speed.
2. The speed governor is not required where an alternating current squirrel induction motor is used and the motor is directly connected to the driving machine. (Note: The governor may be omitted in such case even though a chain is used to connect the sprocket on the driving machine to the sprocket on the main drive shaft.)

3011.8.4.5 Broken step-chain device. A broken step-chain device shall be provided to cause the interruption of power to the driving machine if a step chain breaks, and, where no automatic chain tension is provided, if excessive sag occurs in either step chain.

3011.8.4.6 Application of brake. The brake shall automatically stop the escalator when any of the safety devices function.

3011.8.4.7 Broken drive-chain device. When the driving machine is connected to the main drive shaft by a chain, a device shall be provided which will cause the application of the brake on the main drive shaft and also stop the drive machine if the drive chain parts.

3011.8.4.8 Skirt obstruction device. Means shall be provided to stop the escalator if an object becomes accidentally caught between the step and the skirt as the step approaches the upper or lower combplate. The device shall be located so that the escalator will stop before that object reaches the combplate.

3011.8.4.9 Rolling shutter device. Rolling shutters, if used, shall be equipped with a device which will be activated as the shutters begin to close to cause the opening of the power circuit to the escalator driving machine motor and brake.

3011.8.4.10 Reversal stop device. Means shall be provided to cause the opening of the power circuit to the driving machine motor and brake in case of accidental reversal of travel while the escalator is operating in the ascending direction.

3011.8.4.11 Tandem operation. Tandem operation escalators shall be electrically interlocked where traffic flow is such that bunching will occur if the escalator is carrying passengers away from the intermediate landing stops.

The electrical interlocks shall stop the escalator carrying passengers into the common intermediate landing if the escalator carrying passengers away from the landing stops. These escalators shall also be electronically interlocked to assure that thy run in the same direction.

3011.8.4.12 Caution signs. A sign shall be located at the top and bottom landings of each escalator, readily visible to the boarding passengers. The sign shall be of the standard design recognized by the elevator industry and include the following:

1. Caution;
2. Passenger Only;
3. Hold Handrail;
4. Attend Children; and
5. Avoid sides.

3011.8.5 Lighting of step treads.

3011.8.5.1 Lighting of step treads. Step treads shall be illuminated throughout. The light intensity on the treads shall not be less than 5 foot candles (54 lux).

The illumination shall be uniform intensity and shall not contrast materially with that of the surrounding area.

3011.8.5.2 Comb and step distinction. There shall be a visual contrast between the comb and step, achieved by color, pattern, or texture.

3011.8.5.3 Safety zone. The entry and exit zone shall be kept clear of all obstacles. The width of the zone shall be not less than the width between the centerlines of the handrails plus 8 inches. The length of the zone, measured from the end of the newel, shall be not less than twice the distance between the centerlines of the handrails.

Exception: On the entrance side, the safety zone distance may be reduced, when cart restriction devices are installed, with prior written permission from the *building official.*

3011.8.5.4 Landing access plates. Access plates at the top and bottom landings shall be properly located and securely fastened in place when no more than 70 lbf effort is required to open the access plate.

3011.9 Dumbwaiters, hand-powered dumbwaiters, and hand-powered elevators.

3011.9.1 Scope. This is a minimum standard for existing electric and hand-powered dumbwaiters and hand-powered elevators.

3011.9.2 Electric and electro-hydraulic dumbwaiters.

1. Dumbwaiter cars may be constructed of metal or wood and shall be in compliance with local ordinances as to fire resistance providing it is constructed to carry its rated load without distortion. The dumbwaiter car shall be fully enclosed except for the landing sides. The car floor shall not exceed 9 square feet in area, the total inside height shall not exceed 4 feet, and the maximum capacity shall not exceed 500 pounds.
2. Electrically operated machines shall be equipped with brakes that are electrically released and applied automatically by springs in conformity with the requirements set forth in 3011.6.8.1.
3. Dumbwaiters equipped with winding drum machines having a travel of more than 20 feet and a rated load of more than 100 pounds shall be equipped with a slack rope switch which will automatically remove the power from the motor and brake when the hoisting ropes become slack.

3011.9.3 Hand-power elevators and dumbwaiters.

1. Cars of hand-power elevators and dumbwaiters shall be enclosed on all sides not used for entrance. Elevator cars upon which an operator is permitted to ride shall have no more than one compartment.
2. Hand-powered elevators having a travel of more than 15 feet shall have a car safety capable of stopping and sustaining the car and rated load. The car safety device need not be operated by a speed governor and may be of the instantaneous type operated as a result of the breaking and slackening of the suspension members.
3. Hoistway doors for hand-powered elevators shall be designed so that they will ensure protection at each landing.
4. Doors for hand-powered dumbwaiters shall be designed so that they will ensure protection at all landings.

5. Every hoistway door, gate, or entrance of hand-powered elevators and hand-powered dumbwaiters shall have conspicuously displayed on the landing side in letters no less than 2 inches high, the words, "Danger – Elevator – Keep Closed" or "Danger – Dumbwaiter – Keep Closed."

** **3011.9.4 Dumbwaiter machinery access.** Access doors to dumbwaiter machinery spaces shall be provided with electric contacts and labeled on the exterior side "DANGER-DUMBWAITER" in one-inch letters.

3011.10 Conveyance identification designation and labeling.

** **3011.10.1 Conveyance identification designation.** In any building with more than one elevator, dumbwaiter, escalators or other conveyances a designating numeric, or alphanumeric identification, at least two inches in height identifying each conveyance, shall be located at the main lobby entrance, inside the car, on the machine, on the governor if provided, and on the disconnect switch, or stop switch, in the elevator pit, and if the conveyance has a walk-in pit, the buffer stands and on escalator upper and lower front plates.

** **3011.10.2 Conveyance labeling.** All equipment (disconnect switches, machines, and controllers) operating on a voltage in excess of 250 volts shall be labeled for the voltage used in letterings 3/4 inches high.

3011.11 Requirements for all conveyances for repairs, maintenance, alterations, testing, and periodic inspection.

3011.11.1 Repairs, maintenance, alterations, testing, and periodic inspections. Repairs, maintenance, alterations, testing, and periodic inspections shall be performed in accordance with ASME A17.1/CSA B44 Sections, 8.6, 8.7, 8.10 and 8.11.

3011.11.1.1 Firefighters' emergency operation quarterly testing. Firefighters' emergency operation quarterly testing requirements and documentation see 3028.5.

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SECTION 3012
RETROACTIVE REQUIREMENTS FOR EXISTING MATERIAL LIFTS

3012.1 General. Existing material lifts shall be made to comply with the following requirements. (Note: New material lifts shall comply with Section 3013).

3012.2 Hoistway enclosure gates and doors. The openings at each material lift landing shall have gates or doors that guard the full width of the opening. A hoistway door shall be vertically sliding, bi-parting, counter-balanced, or horizontally swinging or sliding. Gates and doors shall meet the following requirements:

1. A balanced-type, vertically sliding hoistway gate shall extend from not more than 2 inches from the landing threshold to not less than 66 inches above the landing threshold.
2. A gate shall be solid or openwork of a design that will reject a ball 2 inches in diameter. A gate shall be located so that the distance from the hoistway face of the gate to the hoistway edge of the landing sill is not more than 2-1/2 inches. A gate shall be designed and guided so that it will withstand a lateral pressure of one hundred pounds applied at approximately its center without breaking or being permanently deformed and without displacing the gate from its guides or tracks.
3. Hoistway gates or doors shall have a combination mechanical lock and electric contact, which shall prevent operation of the material lift by the normal operating devices unless the door or gate is closed.

3012.3 Controls.

1. The control station shall be remotely mounted so that it is inaccessible from the material lift car.
2. Controls shall be clearly marked or labeled to indicate the function of control.
3. All control stations shall have a stop switch. When opened, the stop switch shall remove the electrical power from the driving machine and brake. The stop switch shall:
   - 3.1. Be manually operated;
   - 3.2. Have red operating handles or buttons;
   - 3.3. Be conspicuously and permanently marked "STOP";
   - 3.4. Indicate the stop and run positions; and
   - 3.5. Be arranged to be locked in the open position.

3012.4 Capacity posting and no-riders sign. Each material lift shall have a capacity sign permanently and securely fastened in place in the material lift car and on the landings. The sign shall indicate the rated load of the material lift in pounds. The sign shall be metal with black letters two inches high on yellow background.

A sign stating "NO PERSONS PERMITTED TO RIDE THIS DEVICE" shall be conspicuously and securely posted on the landing side of all hoistway gates and doors and in the enclosure of each material lift car. The sign shall be metal with black letters 2 inches high on red background.

SECTION 3013
REQUIREMENTS FOR NEW MATERIAL LIFTS

[W] 3013.1 All new material lifts. All new material lifts and standard application material lifts, as defined in Section 3004, shall comply with ASME A17.1, Sections 2.7, 2.8 and 3.7 and with one of the following:

1. WAC 296-96 Part C1, Standard Application Material Lifts, or
2. ASME A17.1/CSA B44, Material Lifts 7.4, 7.5, or 7.6.

SECTION 3014
EMERGENCY SERVICE FOR ELEVATORS IN EXISTING BUILDINGS – PHASE I RECALL

3014.1 General. All existing elevators requiring Phase I recall when installed or under Chapter 93 of the *Seattle Fire Code* shall comply with this section.

Exceptions:

1. Elevators that comply with the standards for new installations provided in Section 3018;
2. Elevators with less than 25 feet of travel if the *building official* and the *fire code official* give written approval; and
3. Elevators that comply with ASME A17.1, Rule 211.3a 1984 edition or later and Sections 3014.10 and 3014.11.

3014.2 Phase I recall keyed switch. A three-position ("on," "off" and "bypass") key cylinder switch shall be provided at each designated level within easy line of sight of the elevator controlled by the switch. If additional switches are provided in a central control station they shall be two position ("off" and "on") key-operated switches.

3014.3 Keyed cylinder-type switches. Keyed cylinder-type switches shall comply with the following:

1. Keys shall be removable only in the emergency ("on") and normal ("off") positions. Keys shall not be removable in the by-pass position.
2. One key shall be provided for each Phase I switch or key cylinder.
3. All emergency operation cylinders (Phases I and II) shall be keyed alike but such key shall not be a part of a building master key system.

3014.4 Key location.

1. A key box meeting the standards of Section 3011.3 shall be provided at the designated recall floor above the Phase I recall switch. The key box is to be mounted approximately 6 feet above the floor. The *building official* is permitted to approve other locations upon request.
2. When a central control station is provided, an additional set of keys shall be provided and hung in the control station in a location designated by the fire chief. The keys shall be identified by a ring or paddle.

3014.5 Key switch functions.

1. The three positions of the switch shall be marked "bypass," "off" and "on."
2. If the switch is in the "off" position, normal elevator service shall be provided and smoke detectors, if required, shall be functional.
3. If the switch is in the "bypass" position, normal elevator service shall be restored independent of any required smoke detectors.
4. If the switch is in the "on" position, the elevators are in Phase I elevator recall mode.

3014.6 Phase I automatic recall operation. If the Phase I recall switch is in the emergency ("on") position:

1. All cars controlled by this switch that are on automatic service shall return nonstop to the designated level and power-operated doors shall open and remain open.
2. A car traveling away from the designated level shall reverse at or before the next available floor without opening its doors.
3. A car stopped at a landing shall have the in-car emergency stop switch or in-car stop switch rendered inoperative as soon as the doors are closed, and the car starts toward the designated level. A moving car, traveling to or away from the designated level, shall have the in-car emergency stop or in-car stop switch rendered inoperative immediately.
4. A car standing at a floor other than the designated level, with doors open and in-car emergency stop switch or in-car stop switch in the run position, shall conform to the following:
   - 4.1. Elevators having automatic power-operated horizontally sliding doors shall close the doors without delay and proceed to the designated level;
   - 4.2. Elevators having power-operated vertically sliding doors provided with automatic or momentary pressure closing operation in accordance with ASME A17.1 Rule 112.3d 1984 or later edition shall have the closing sequence initiated without delay in accordance with ASME A17.1 Rule 112.3d (1), (2), (3), and (5) 1984 or later edition, and the car shall proceed to the designated level;

4.3. Elevators having power-operated doors provided with continuous pressure closing operation per ASME A17.1 Rule 112.3b 1984 or later edition or elevators having manual doors shall conform to the requirements of Section 3014.7. Sequence operation, if provided, shall remain effective

5. Door reopening devices for power-operated doors that are sensitive to smoke or flame shall be rendered inoperative. Mechanically actuated door reopening devices not sensitive to smoke or flame shall remain operative. Car door open buttons shall remain operative. Door closing shall conform to the requirements of ASME A17.1 Rule 112.5 1984 or later edition. Door hold open switches shall be rendered inoperative.
6. All car and corridor call buttons and all corridor door opening and closing buttons shall be rendered inoperative. All call register lights, and directional lanterns shall be extinguished and remain inoperative. Position indicators, if provided, shall remain in service. All prior registered calls shall be canceled.
7. The activation of a smoke detector installed in accordance with Article 93 of the Seattle Fire Code in any elevator lobby or associated elevator machine room, other than the designated level, shall cause all cars in all groups that serve that lobby to return nonstop to the designated level. The fire code official is permitted to approve the connection of other detection devices to activate recall. The operation shall conform to the requirements of Phase I emergency recall operation. Whenever new elevator controllers are installed, they shall meet all provisions of the then current building and elevator codes. Newly installed controllers shall have the capability of selecting alternate recall floors.

3014.7 Attendant-operated recall operation. Attendant-operated elevators shall be provided with visible and audible signals that alert the operator to return to the lobby when the car has been recalled under Phase I control.

3014.8 Dual recall operation. Elevators arranged for dual operation shall conform to all requirements for automatic operation and attendant operation as applicable.

3014.9 Inspection/maintenance recall operation. During inspection operation the audible and visible signals required in Section 3014.7 will be actuated when the car has been recalled under Phase I control. The car shall remain under the control of the operator and/or car top station until the car is returned to service.

3014.10 Nurses' preemption. Nurses' preemption (hospital service) is permitted to commandeer up to one-half of the cars in a particular bank of elevators. At least one-half of the cars shall respond to Phase I and all cars not preempted shall respond.

3014.11 Operation instruction. Instructions for operation of elevators under Phase I shall be incorporated with or adjacent to the Phase I switch at the designated level. Instructions for operation of elevators under Phase II shall be incorporated with or adjacent to the switch, in or adjacent to the operating panel in each car. In addition, Phase I operating instructions shall be adjacent to the Phase I switch in the fire control center and other *approved* locations.

Instructions shall be in letters not less than 1/8 inch (3.2 mm) in height and shall be permanently installed and protected against removal or defacement.

3014.12 Latching. All cars responding to Phase I Recall, activated by a smoke detector or other *approved* detection device, shall return to the appropriate recall floor as determined by the first detector recall signal received. No device other than the Phase I switch is permitted to override the first recall signal received. A later detection signal shall not change the recall floor. Smoke detector activation shall only be reset manually.

SECTION 3015
EMERGENCY SERVICE FOR ELEVATORS IN EXISTING BUILDINGS – PHASE II HIGH RISE IN-CAR OPERATION

3015.1 General. Existing elevators in buildings having floors used for human occupancy located more than 75 feet above the lowest level of fire department vehicle access, or buildings having floors used for human occupancy 35 feet above grade, which lack fire department vehicle access to at least one side shall have Phase II in-car operation and shall comply with this section.

Exceptions:

1. Elevators that comply with the standards for new installations as provided in Section 3019;
2. Elevators with less than 25 feet of travel when the *building official* and *fire code official* give written approval; and
3. Elevators that comply with ASME A17.1 Rule 211.3c 1984 or later edition.

3015.2 Phase II in-car operation key switch.

1. A two-position ("off" and "on") key cylinder switch shall be provided in each elevator car.
2. The switch shall become effective only when the designated level Phase I switch is in the "on" position or a smoke detector has been activated and the car has returned to the designated level. The "on" position shall place the elevator in Phase II in-car operation.
3. The elevator shall be removed from Phase II operation only by moving the switch to the "off" position with the car at the designated level.
4. The switch shall be operable by the Phase I key and such key shall not be part of a building's master key system.

5. The key shall be removable only in the "off" position.
6. One key shall be provided for each Phase II switch or key cylinder.

3015.3 Key location. See Section 3014.4 for the location of the keys.

3015.4 Designated operator. The operation of elevators on Phase II emergency in-car operation shall be by trained emergency service personnel only.

3015.5 Car operation only. An elevator shall be operable only by a person in the car.

3015.6 Corridor call buttons and directional lanterns. All corridor call buttons, and directional lanterns shall remain inoperative.

3015.7 Car and Hoistway Door Operation. The operation of car and hoistway doors shall comply with the following:

1. The opening of power-operated doors shall be controlled only by constant-pressure open buttons or switches.
2. If the constant-pressure open button or switch is released prior to the doors reaching the fully open position, the doors shall automatically reclose. Once doors are fully open, they shall remain open until signaled to close.
3. The closing of power-operated doors shall be by constant pressure of either the call button or door-close button. If a door-close button is supplied, it shall be operable.
4. If the constant-pressure close button or car call button is released prior to the doors reaching the fully closed position, the doors shall automatically reopen. Once doors are fully closed, they shall remain closed until signaled to open.

   Exception: Momentary pressure control of doors using the sill trip-type operator may be permitted as existing; however, the doors shall not open automatically upon arrival at a floor.

3015.8 Door reopening devices. Smoke-sensitive door reopening devices and door hold-open switches shall be rendered inoperative. Non-smoke-sensitive door reopening devices required to be operative under all other conditions may be rendered inoperative under Phase II in-car operation only if the doors are closed by constant pressure.

3015.9 Car call cancellation. All registered calls shall cancel at the first stop.

3015.10 Direction of travel. Direction of travel and start shall be by the car call buttons. With doors in the closed position, actuation of the car call button shall select the floor and start the car to the selected floor. If no door-close button is available, constant pressure of the car call button shall select the floor, close the door, and start the car to the selected floor.

Exception: On proximity-type car call buttons or any other type subject to false firing (calls being placed by line spikes, intermittent loss of power, etc.), the doors shall be closed by a door-close button. Floors may be selected either before or after closing of the doors. The car will start only on the call button or door close button depending on which is the last device to be actuated.

3015.11 Motor generator time out. The motor generator shall not time out automatically.

3015.12 Car position indicators. The car position indicators, when provided, shall be operative.

3015.13 Phase II priority. Phase II operation shall override any floor calls keyed out for security reasons. Floor selection buttons shall be provided in the car to permit travel to all floors served by the car. Means that prevent the operation of these buttons shall be rendered inoperative.

3015.14 False starts. The elevator shall not start if no calls registered.

3015.15 Terminal runs. The elevator shall not make unprogrammed terminal runs.

3015.16 Loss of power. Elevators on fire emergency Phase II car operation shall remain in their respective locations and in Phase II mode upon loss of power. They shall not move unless the elevator is under the control of the operator and power has been restored.

SECTION 3016
NEW INSTALLATIONS – CONSTRUCTION STANDARDS

3016.1 General. All new elevators, escalators, moving walks, dumbwaiters and other conveyances and their installation shall conform to the requirements of ASME A17.1/CSA B44 as amended by this chapter.

3016.2 Wall covering material for passenger cars. Wall covering material for passenger cars shall comply with the following:

1. ASME A17.1/CSA B44 Section 2.14.
2. *Seattle Building Code* requirements concerning flame spread ratings for wall coverings and use of plastics. (See Chapter 8.)

3016.3 Seismic considerations. New installations shall comply with ASME A17.1/CSA B44 Section 8.4. The provisions for Seismic Design Category D shall apply.

3016.4 Accessibility. All new passenger elevators required to be accessible or to serve as part of an *accessible* means of egress shall comply with Sections 1009, 1109.7, and ICC A117.1.

[W] 3016.5 Handrails. Handrails in elevator cabs are not required. Where handrails are provided in elevator cars, their configuration shall comply with ICC A117.1.

3016.6 Emergency elevator communication systems for the deaf, hard of hearing and speech impaired. An emergency two-way communication system shall be provided that:

1. Is a visual and text-based and a video-based 24/7 live interactive system.
2. Is fully accessible by the deaf, hard of hearing and speech impaired, and shall include voice-only options for hearing individuals.
3. Has the ability to communicate with emergency personnel utilizing existing video conferencing technology, chat/text software or other approved technology.
4. Conform with ASME A17.1, 2.27.1.

Exception: Private residence elevators are not required to comply with this section.

[W] 3016.7 Inclined stairway chairlifts.

3016.7.1 Inclined commercial stairway chairlifts. Governor overspeed testing shall be verified by manufacturer documentation.

3016.7.2 Private residence inclined stairway chairlifts. Battery operated private residence include stairway chairlifts are not required to be permanently wired or installed on an individual branch circuit as required by NEC 620.51 (A) Exception 2. These conveyances shall be permitted to use a cord and plug that will act as the equipment disconnecting means. The circuit which is used for the equipment shall have overcurrent protection that will protect the circuit and the equipment. The circuit shall have sufficient capacity to support the additional load of the stairway chairlift. Units that are operated by line voltage shall comply with NEC 620.51 (A) Exception 2.

A free passage width of not less than seventeen inches shall be provided. IF the chair can be folded when not in use the distance can be measured from the folded chair. When in use there shall be a minimum of two inches between any body part and the nearest obstruction.

3016.8 Hoistway pressurization. The requirements of Section 3016.8 apply in addition to ASME A17.1/CSA B44, 2.1.4 and Section 713.14.

Note: See Section 909.21, Elevator hoistway pressurization alternative for other requirements.

1. When pressurization is installed in elevator hoistways, the pressurization of the hoistway shall be measured with all elevator systems in recall mode, Phase I, and all cars at the designated recall level with the doors in the open position.
2. Activation of the fan serving the hoistway pressurization system may be delayed by up to 30 seconds so that elevator recall can be initiated prior to pressurizing the hoistway.
3. Unless specifically installed to serve that space only, environmental air systems and pressurization systems shall not be located in hoistways, elevator mechanical rooms and elevator machinery spaces.

   Exceptions:

   1. Pressurization ducts serving a hoistway that are separated from the room or space by construction equal to the rated construction of the room or space and so located that all required clearances are maintained.
   2. Pressurization duct openings, dampers and grilles are permitted to be located in hoistway shaft walls if the pressurization air does not impair the operation of the elevator.
   3. Hoistways shall not be pressurized through pressurization of elevator control rooms or machine rooms. The machine room floor between the hoistway and overhead control rooms or machine room shall contain as few penetrations as possible. All penetrations for cable drops, etc., shall be held to a minimum size.
   4. Elevator doors shall operate properly when hoistway pressurization is in effect.
   5. Ventilation louver operating motors shall not infringe on any elevator machinery or controller working clearances.

3016.9 Elevator operation on emergency power. All elevators required to be supplied with emergency power shall comply with the following:

1. Each elevator shall be transferable to the emergency power supply system.
2. Emergency power supply systems capable of handling all elevators on the premises need no sequencing or switching other than the possibility of staggering the restarting of the generators.
3. Emergency power supply systems, whose capacity can only handle one elevator of a duplex or one elevator in each elevator group, shall comply with the following.

   3.1. All elevators on automatic operation shall be automatically assigned emergency power in sequence and returned to the Phase I recall or lobby floor, where they shall open their doors and then time out of service.

3.2. The last car down will generally be the selected car of a duplex or an elevator group to remain in service. The service shall continue to be automatic.

3.3. The assignment of emergency power will skip or rotate past cars that are out of service (emergency stop switch pulled, malfunction, car top operation, etc.). If assignment is made to a manual or attendant-operated car and the car is unattended, the system shall rotate past the car as though it is out of service.

4. The lights for the car, control room, machine room and machine space shall be activated on the emergency system.
5. A manual emergency power assignment switch or switches shall be in an elevator status panel located in the fire department central control station. Each elevator shall be capable of being assigned emergency power from this location. The manual switching shall be effective at all times other than when the cars are automatically sequencing to the lobby or when the selected car is traveling. The switch shall not remove power in midflight or with doors closed
6. Elevators on Phase II car operation shall remain in their respective locations upon loss of power. They shall remain in Phase II mode and shall not move unless the elevator is under the control of the operator and normal power has been restored or emergency power has been assigned to the car by either automatic or manual means.
7. Loss of power and initiation of emergency power immediately after Phase I recall operation has occurred shall not cause any cars to be stranded in the building. Upon the application of emergency power to the equipment, the cars shall follow the normal sequencing to the lobby, open their doors and time out of service. When all cars have been bypassed (out of service) or returned to the lobby, the assigned car shall then become available for firefighter's use on Phase II in-car operation.
8. Each elevator operating on emergency power shall be tested in accordance with applicable ASME A17.1/CSA B44, 2.16.8, 2.26.10 and 2.27.2, and ASME A17.2 2017, Part 6.
9. If the elevator cars are recalled to the alternate floor by Phase I recall and a loss of power occurs, the cars shall be sequenced to the alternate floor upon assignment of emergency power. The cars shall not go to the primary designated recall floor under these conditions. The alternate floor shall be provided with a means of identifying the elevator that is supplied with emergency power.
10. The elevator position indicator system, if provided, shall not become disoriented due to the loss of power or any other reason. However, upon the resumption of power, the car may move to reestablish absolute car position.
11. Communications to the car shall remain in service and shall be tested in accordance with applicable ASME A17.1/CSA B44, 2.27.1.

3016.10 Multiple hoistways. The number of elevators permissible in a hoistway is as follows. See ASME A17.1/CSA B44, 2.1.1.4.

1. No more than four elevators shall be in a single hoistway.
2. No more than three elevators serving all or the same portion of a building are permitted to be in a single hoistway.

   Exception: Four elevators serving all or the same portions of a building are permitted to be in a common hoistway under the following conditions:

   1. The hoistway is pressurized; and
   2. Emergency generator power is available to serve both the elevators and pressurization equipment.

3016.11 Additional doors. Doors other than the hoistway door and the elevator car door are prohibited at the point of access to an elevator car except in accordance with applicable provisions in ASME A17.1/CSA B44, 2.11.6.

3016.12 Knox box 1400 series key retainer box. A key retainer box that meets the requirements of this section shall be provided.

1. The box shall be locked and keyed to the secure city access key for elevator and other conveyance access and operation keys.
2. The box shall be located at the designated recall floor above the Phase I recall switch or in the main lobby above the hall call button if no recall feature exists.
3. The box shall be flush or surface mounted approximately 6 feet above the floor.
4. The box shall be attached to the building so as to be able to withstand a force of 300 psf applied horizontally at any point.
5. The box shall be large enough to accommodate all required keys.
6. The box shall be labeled "For Emergency Use."
7. The lock shall be high security Medeco lock specified by the building official.
8. The *building official* may approve other locations and custom box types upon request.

Key retainer boxes for accessibility lifts are permitted to comply with Section 3011.3.1 or 3011.3.2 as an alternative to complying with this section.

3016.13 Elevator access keys. Keys for access to and for the operation of elevator and other conveyance equipment shall tagged and retained in the key retainer box. The key retainer box shall contain fire emergency service keys (Phase I and II, one key for each switch) and keys to all of the following that are in the building:

1. Doors to the control room, machine room and machine space;
2. Doors preceding elevator control room, machine room, and machine space,
3. Secondary level door;
4. Pit door;
5. Roof door;
6. Independent, hospital emergency and attendant operation;
7. Hoistway access;
8. Mechanical hoistway access devices (broken arm, lunar, etc.);
9. Lighting and fan;
10. Fob or card reader for secured car calls and or hall call buttons;
11. Miscellaneous switch keys;
12. Fire alarm panel room;
13. Sprinkler valve control room;
14. Fire command center;
15. Elevator central control station panel and fire command center.

3016.14 Escalator and moving walk conveyance number designation. In any building with more than one escalator or moving walk, a designating numeric or alphanumeric number, at least two inches in height shall be located on the upper and lower front plates.

[W] 3016.15 Elevator car to accommodate ambulance stretcher. In buildings provided with an elevator, at least one elevator shall provide fire department emergency access to all floors served in:

1. Buildings four or more *stories* above or below *grade plane,* and
2. Any R-1, R-2 or I occupancy building regardless of the number of *stories.*

The elevator car shall be of a size and arrangement to accommodate a 24-inch by 84-inch (610 mm by 2134 mm) ambulance stretcher with not less than 5-inch (127 mm) radius corners, in the horizontal, open position. The elevator shall be identified by the international symbol for emergency medical services (star of life). The symbol shall not be less than 3 inches (76 mm) in height and shall be placed inside on both sides of the hoistway door frame on both the designated level and the alternate level.

Exception: Private residence elevators are not required to comply with this section.

Note: The stretcher-sized elevator car may also serve as an *accessible means of egress* as required by Section 1009.2.1 of the *Seattle Building Code.*

3016.16 Signs. A sign complying with ASME A17.1/CSA B44, 2.27.9 shall be posted in the elevator lobby of every elevator equipped for firefighters' emergency operation. The signs shall be located above each hall call fixture noting that the elevators will be recalled to the building lobby on fire alarm.

Exception: If *approved* by the *building official,* signs need not be posted in lobbies at the main egress level if the means of egress are obviously identifiable.

A sign indicating a designating numeric or alphanumeric number of each elevator shall be posted and maintained in the elevator lobby at the designated recall level and at alternate recall floors, if provided.

3016.17 Fire service access elevators and occupant evacuation elevators. See Section 403 and ASME A17.1/CSA B44 for provisions related to fire service access elevators and occupant evacuation elevators.

3016.18 Energy efficiency. Elevator systems shall comply with the *Seattle Energy Code.*

Note: The *Seattle Energy Code* includes the following provisions for energy efficiency of elevators and escalators:

C405.9.1 Elevator cabs. For the luminaires in each elevator cab, not including signals and displays, the sum of the lumens divided by the sum of the watts shall be no less than 35 lumens per watt. Ventilation fans in elevators that do not have their own air conditioning system shall not consume more than 0.33 watts/cfm at the maximum rated speed of the fan. Controls shall be provided that will de-energize ventilation fans and lighting systems when the elevator is stopped, unoccupied and with its doors closed for over 15 minutes. accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.

C405.9.2 Escalators and moving walks. Escalators and moving walks shall comply with ASME A17.1/ CSA B44 and shall have automatic controls configured to reduce speed to the minimum permitted speed in

Exception: A power factor controller that reduces operating voltage in response to light loading conditions ((~~may~~)) is permitted to be provided in lieu of the variable speed function.

C405.9.3 Regenerative drive. An escalator designed either for one-way down operation only or for reversible split shall have a variable frequency regenerative drive that supplies electrical energy to the building electrical system when the escalator is loaded with passengers whose combined weight exceeds 750 pounds.

3016.19 Elevator landing illumination. Elevators shall comply with ASME A17.1/CSA B44, 2.11.10.2 Illumination at Landing Sills, as amended below.

ASME 2.11.10.2 Illumination at Landing Sills. The building corridors shall be so lighted that the illumination at the landing sills, when an elevator is in service, shall be not less than 100 lx (10 fc). Illumination under emergency power shall comply with Section 1008.

SECTION 3017
NEW INSTALLATIONS – GENERAL EMERGENCY OPERATION REQUIREMENTS

3017.1 General. All elevators shall conform to the requirements of this section and the specific requirements of Sections 3018, 3019, and ASME A17.1/CSA B 44, 2.27.2.

3017.2 Central control stations or Fire Command Center. The following criteria shall be met if buildings provide a central control station or fire command center in accordance with Section 911:

1. An additional two-position ("off" and "on") Phase I recall switch for each elevator or elevator group shall be installed when the control station is not within easy line of sight of the lobby Phase I recall switches; the switch(es) shall be rotated clockwise to go from "off" to "on" positions;
2. A car position indicator shall be permanently installed, which shall be of a positive type that will not lose the car position nor need resetting on loss of power. Reading of the indicator shall not require special knowledge;
3. Firefighter's phone jacks shall be provided that allow each elevator car to be connected to the fire control center;

   Exception: Fire department radio systems may be provided in lieu of phone jacks if approved by the fire department.
4. A manual emergency power assignment switch;
5. A Phase I indicator;
6. A Phase II indicator.

3017.3 Nurses' preemption. Nurses' preemption (hospital service) may be allowed to commandeer up to one-half of the cars in a particular bank of elevators. At least one-half of the cars shall respond to Phase I and all cars not preempted shall respond.

3017.4 Phase I and II operation instructions. Operation instructions shall be available in accordance with ASME A17.1/CSA B44, 2.27.7. In addition, Phase I operating instructions shall be adjacent to the Phase I switch in the fire command center and other *approved* locations. The Phase II operation instructions shall identify the location of the elevator machine rooms and control rooms.

3017.5 Fireman's visual signal, ASME A17.1/CSA B44, 2.27.3.2.6. Elevators requiring Phase I or Phase II operation shall comply with ASME 2.27.3.2.6 as amended below:

When ((~~Phase I Emergency Recall Operation is initiated by a fire alarm initiating device~~)) a smoke or heat detector for any location listed in 2.27.3.2.6(a) through (e) ((~~,~~)) is activated during Phase I Emergency Recall Operation as required by 2.27.3.2.3 or 2.27.3.2.4, or Phase II Emergency In-Car Operation as required by 2.27.3.3, the visual signal [see 2.27.3.1.6(h) and Fig. 2.27.3.1.6(h)] shall illuminate intermittently only in a car(s) with equipment in that location, as follows:

(a) machine room

(b) machinery space containing a ((~~motor controller~~)) driving machine

(c) control room

(((~~d) control space~~))

(e) hoistway

SECTION 3018
NEW INSTALLATIONS – PHASE I

3018.1 Phase I recall requirements.

3018.1.1 ASME A17.1, 2.27.3 General. ASME A17.1/CSA B44, 2.27.3, Firefighters' Emergency Operation: Automatic Elevators, is superseded by the following.

Phase I emergency recall operation shall be provided for all elevators with fully automatic open and close power- operated doors.

3018.1.2 ASME A17.1, 2.27.3.1 Phase I emergency recall operation. Elevators requiring Phase I recall emergency operation shall comply with ASME A17.1/CSA B44, 2.27.3.1 Phase I Emergency Recall Operation, and the following:

Elevator groups containing four or more cars shall be provided with two, three-position key switches per group. Two-position ("off" and "on") switches shall be provided in the fire command center if this code requires such a center. The switch(es) shall be rotated clockwise to go from "off" to "on" position. Hall call buttons common to an elevator group shall remain in service unless both Phase I recall switches of a four-car or larger group are placed in the recall mode, or a fire alarm recall signal is initiated.

Note: See 3028.5 for Phase I and Phase II quarterly testing requirements.

Note: For occupant evacuation elevators see ASME/CSA B44, 2.27.11.

SECTION 3019
NEW INSTALLATIONS – PHASE II IN-CAR REQUIREMENTS

3019.1 Phase II In-car Operation. Elevators requiring Phase II in-car operation shall comply with ASME A17.1/CSA B44, 2.27.8 Switch Keys, as amended below.

ASME 2.27.8 Switch Keys. The key switches required by 2.27.2 through 2.27.5, and 2.27.11 for all elevators in a building shall be operable by the FEO-K1 key. The keys shall be Group 3 Security (see 8.1). A separate key shall be provided for each switch. These keys shall be kept in the key retainer box required by Section 3016.12 or 3016.19. ((~~on the premises in a location readily accessible to firefighters and emergency personnel, but not where they are available to the public.~~)) This key shall be of a tubular, 7 pin, style 137 construction and shall have a bitting of 6143521 starting at the tab sequenced clockwise as viewed from the barrel end of the key; cutting depths shall be in accordance with Fig. 2.27.8. The key shall be coded "FEO-K1." The possession of the "FEO-K1" key shall be limited to elevator personnel, emergency personnel, elevator equipment manufacturers, and authorized personnel during checking of Firefighters' Emergency Operation (see 8.1). ((~~and 8.6.11.1).~~))

((~~Where provided, a lock box, including its lock and other components, shall conform to the requirement of UL 1037 (see Part 9).~~

~~NOTE (2.27.8): Local authorities may specify additional requirements for a uniform keyed and its location to contain the necessary keys.~~))

Note: See 3028.5 for Phase I and Phase II quarterly testing requirements.

SECTION 3020
NEW INSTALLATIONS – CONSTRUCTION OF HOISTWAYS, MACHINE ROOMS AND CONTROL ROOMS

3020.1 Construction of hoistways. All new elevator hoistways shall comply with ASME/CSA B44 A17.1, section 2.1 as amended below.

SECTION 2.1
CONSTRUCTION OF HOISTWAYS AND HOISTWAY ENCLOSURES

2.1.1 Hoistway Enclosures

((~~Hoistway enclosures shall conform to 2.1.1.1, 2.1.1.2, or 2.1.1.3.~~))

Hoistways that penetrate a floor/ceiling assembly shall be protected by a fire-resistance-rated enclosure complying with this section.

Exceptions:

1. In other than Group H occupancies, an enclosure is not required for elevators located within atriums complying with Section 404. The elevator is required to comply with 2.1.1.3.
2. Hoistway enclosures are not required to be fire-resistance rated as provided in items 2.1 and 2.2.
   - 2.1 In parking garages, hoistway enclosures that serve only the parking garage are not required to be rated.
   - 2.2 In other than Groups I-2 and I-3, hoistway enclosures are not required to be rated, if the hoistway:
     - 2.2.1 Does not connect more than two stories.
     - 2.2.2 Does not open to a corridor in Group I and R occupancies.

2.2.3 Does not open to a corridor on nonsprinklered floors in any occupancy.

2.2.4 Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

2.2.5 Is limited to one smoke compartment.

2.1.1.1 Fire-Resistive Construction

2.1.1.1.1 Where rated hoistway enclosures are required the enclosure shall be of fire-resistance rated construction as required for shafts by Section 713.4. ((~~Where fire resistive construction is required, hoistways shall be enclosed in conformance with the requirements of the building code (see 1.3).~~))

2.1.1.1.2 Partitions between hoistways and machine rooms and control rooms

(((~~(a) machinery spaces outside the hoistway~~

~~(b) machine rooms~~

~~(c) control spaces outside the hoistway~~

~~(d) control rooms that have~~)) shall be fire partitions complying with Section 708 having a fire-resistive rating of at least one hour, or shall be of noncombustible solid ((~~or openwork~~)) construction ((~~that meets the requirements of 2.1.1.2.2(d)(1), (2), and (3)~~)). Partitions ((~~of solid construction~~)) shall be permitted to have openings essential for ropes, drums, sheaves, and other elevator equipment.

((~~Openwork construction shall reject a ball 25 mm (1 in.) in diameter, except where there are openings essential for ropes, drums, sheaves, and other elevator equipment.~~))

2.1.1.1.3 Hoistway enclosure openings shall be protected in accordance with Section 716 as required for fire partitions. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 716.2.6.6 and ASME A17.1, 2.11.6.3. ((~~with entrances or access doors having a fire protection rating conforming to the requirements of the building code.~~))

2.1.1.2 Non-Fire-Resistive Construction

2.1.1.2.1 Where fire-resistive construction is not required by 2.1.1, ((~~the building code,~~)) hoistway construction shall conform to 2.1.1.2.2 or 2.1.1.3.

2.1.1.2.2 The hoistway shall be fully enclosed ((~~conforming to (a) through (d); (a), (b), and (e).~~

~~(a) Enclosures and doors shall be unperforated to a height of 2 000 mm (79 in.) above each floor or landing and above the treads of adjacent stairways. The enclosure shall be unperforated, adjacent to, and for 150 mm (6 in.) on either side of any moving equipment that is within 100 mm (4 in.) of the enclosure.~~))

(b) Partitions between hoistways and machine rooms and control rooms

(((~~(1) machinery spaces outside the hoistway~~

~~(2) machine rooms~~

~~(3) control spaces outside the hoistway~~

~~(4) control rooms~~)) shall be of solid ((~~or open work~~)) construction ((~~that meets the requirements of (d) (1 through (d), and (3)~~)). Partitions of solid construction shall be permitted to have openings essential for ropes, drums, sheaves, and other elevator equipment. ((~~Openwork construction shall reject a ball 25 mm (1 in.) in diameter, except where there are openings for ropes, drums, sheaves, and other elevator equipment.~~

~~(c) Openwork enclosures, where used above the 2 000 mm (79 in.) level, shall reject a ball 25 mm (1 in.) in diameter.~~

~~(d) Openwork enclosures shall be~~

~~(1) at least 2.2 mm (0.087 in.) thick wire, if of steel wire grille~~

~~(2) at least 2.2 mm (0.0 in.) thick, if of expanded metal~~

~~(3) supported and braced as to deflect not over 15 mm (0.6 in.) when subjected to a force of 450 N (100 lbf) applied horizontally at any point~~))

(e) Enclosures shall be permitted to be glass, provided it is laminated glass conforming to ANSI Z97.1, 16 CFR Part 1201 ((~~CAN/CGSB-12.1, whichever is applicable~~)) (see Part 9). Markings as specified in the applicable standard shall be on each separate piece of glass and shall remain visible after installation.

2.1.1.2.3 Entrances shall be in conformance with 2.11, except 2.11.14 through 2.11.16, and 2.11.18.

2.1.1.3 Partially Enclosed Hoistways. For elevators that are not required to be fully enclosed by 2.1.1, protection at least 2 400 mm (94.5 in.) high shall be provided on the hoistway sides that are located 1 500 mm (59 in.) or less from elevator equipment to areas accessible to other than elevator personnel. Such protection shall comply with 2.1.1.2.

2.1.1.4 Multiple Hoistways. The number of elevators permissible in a hoistway shall be in conformance with the *Seattle Building Code.*

2.1.1.5 Strength of Enclosure. The hoistway enclosure adjacent to a landing opening shall be of sufficient strength to maintain, in true lateral alignment, the hoistway entrances. Operating mechanisms and locking devices shall be supported by the building wall, if load-bearing, or by other building structure. Adequate consideration shall be given to pressure exerted on hoistway enclosures as a result of windage and elevator operation. In *high-rise buildings* in Risk Category III or IV in accordance with Section 1604.5, for fire service access elevators according to Section 403.6.1, and in all buildings that are more than 420 feet (128 m) in *building height*, hoistway enclosures shall comply with Section 403.2.3.

3020.2 Private residence elevator hoistways. Hoistways for private residence elevators shall comply with Section 3020.1. ASME A17.1/CSA B44, 5.3.1.1, 5.3.1.1.1 and 5.3.1.1.2 do not apply.

3020.3 Location of equipment. Motor controllers, motion controllers and drives shall not be located in hoistways.

3020.4 Construction requirements—machine rooms, control rooms and private resident machine and control rooms.

3020.4.1 Elevator machine rooms and control rooms.

[W] 3020.4.1.1 Maintain access. Provide and maintain a clear, permanent and safe access to elevator machine rooms and control rooms. Panels or doors for the purpose of accessing nonelevator equipment are not permitted in elevator machine rooms. Passage through the machine room may not be used to gain access to other parts of the building that do not contain elevator equipment.

3020.4.1.2 Location of elevator controls and machinery. Elevator controls and machinery, other than driving machines and governors shall be located in a room dedicated exclusively to elevator equipment. Listed electrical equipment that serves the machine room is permitted to be installed in machine rooms. Air conditioning equipment is permitted to be installed in machine rooms in accordance with ASME A17.1/CSA B44, 2.8.5.

3020.4.2 Fire-resistance rating of machine and control rooms. Elevator machine rooms and control rooms that are adjacent to the hoistway with unprotected openings into the hoistway shall be enclosed by fire partitions and horizontal assemblies with a fire-resistance rating of at least one-hour but not less than the rating of the hoistway. The separation between the room and the hoistway is permitted to be nonrated. Exterior walls and roofs are not required to have a fire-resistance rating unless required by other sections of this code.

ASME A17.1/CSA B44 sections 2.7.1.1 and 2.7.1.2 are superseded by this section.

3020.4.3 Machine rooms and control rooms for electric elevators. All machine rooms and control rooms for electric elevators shall comply with ASME A17.1 Section 2.7, Enclosure of Machine Rooms and Machinery Spaces, except 2.7.1.1 and 2.7.1.2.

3020.4.4 Machine rooms and control rooms for hydraulic elevators. All machine rooms and control rooms for hydraulic elevators shall have fire-resistive construction as required by Section 3020.4. Hydraulic elevator machine and control rooms are permitted to be located overhead, adjacent to, underneath the hoistway, or at a remote location. They shall not be located in the hoistway. Where hydraulic machines and electrical control equipment are located in spaces separated from the hoistway enclosure (see ASME/CSA B44 2.1.1 and 3020.1), such spaces shall be separated from other parts of the building by enclosures conforming to ASME/CSA B44 2.7.1.2 as amended by this code. ASME/CSA B44 A17.1 Section 3.7 is superseded by this section.

3020.5 Working clearances. The following working clearances shall be provided inside the machine room or control room for all elevators.

1. The width of working space in front of controllers shall be the width of the controller or 30 inches, whichever is greater. The depth of the working space in the direction of access shall be not less than 48 inches.
2. The minimum clear space working clearances for freestanding equipment shall be 18 inches on two sides and between units of controllers, selectors and/or walls or other building obstructions. The 18 inch side clearance is permitted to be combined to permit 36 inches clear on one side only.
3. The minimum space at the rear of controllers with back-wiring, terminals or other elements requiring access shall be 36 inches.
4. The working space shall be free of pipes, vents, storage, ducts or any other obstruction.
5. The lighting control switch shall be located inside the machine room, and where practical, within twenty-four inches of the lock jamb side of the machine room door.

Exception: If approved by the *building official,* space outside elevator control rooms and machine rooms is permitted to be used to provide working clearance required for the front of controllers for rooms containing only elevator controls. If the space outside the room serves as a means of egress, not more than one-half the required egress width shall overlap the working clearance. If space outside the control room or machine room is used to provide working clearance, means shall be provided for protection of the working clearance during alteration, repair and maintenance of elevator equipment. The working

clearance shall be located in conditioned space. The room where the controls or machines are located shall comply with all other requirements for control rooms or machine rooms.

Note: See additional electrical and working clearance requirements in *Seattle Electrical Code* 620.5.

[W] 3020.6 Location of main line disconnects. In addition to *Seattle Electrical Code* sections 620.5 and 620.51, the following apply:

1. The main line disconnect switch(es) or circuit breaker shall be located inside the machine room door on the lock jamb side of the machine room door and not more than twenty-four inches from the jamb to the operating handle; and it shall be at a height of not more than sixty-six inches above the finish floor.
2. For multicar machine rooms the switches shall be grouped together as close as possible to that location.
3. For machine rooms with double swing doors, the doors shall swing out and the switch(es) shall be on the wall adjacent to the hinge side of the active door panel.
4. The switch(es) shall be designed so that they may be locked out and tagged in the open position.

Exception: Special purpose, residential elevators and residential inclined elevators are exempt from this section.

3020.7 Machine rooms or control rooms for private residence elevators. Private residence elevators shall be provided with a machine room or control room. No fire resistance rating is required for private residence elevator equipment or machine rooms. Where the machine and brake are located at the top of the hoistway, a minimum 8-inch by 10-inch access panel shall be provided. The panel shall be lockable.

Exception: A separate machine room or control room is not required for private residence elevators which conform with ASME/CSA B44 A17.1, CSA B44 5.3.1.6 Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms as amended below:

5.3.1.6.1 Where elevator equipment is located in a room ((~~or space~~)) that contains other machinery and equipment

(a) the elevator equipment shall be guarded in conformance with 2.10.1. Where the guarding can be removed, a sign in conformance with the reequipments of ANSI Z535.2 or CAN/CSA-Z321, whichever is applicable, shall be located on or adjacent to the guarding warning of the potential hazards.

(b) pipes conveying steam, gas, or liquids shall be guarded or located to prevent discharge onto the equipment.

5.3.1.6.2 The motor controller and operation controller shall be located in a cabinet(s). The cabinet(s) shall be

(a) readily accessible for maintenance and inspection at all times.

(b) provided with a cabinet door(s) or panel(s) that is not self-closing and shall be kept closed.

5.3.1.6.3 In machine rooms, machinery spaces, and control rooms, ((~~and control spaces,~~)) all sheaves and sprockets shall be guarded to protect against accidental contact.

5.3.1.6.4 Maintenance Path and Clearance. A permanent and unobstructed path shall be provided to machinery spaces. ((~~and control spaces.~~)) The path shall provide a clear width 450 (18 in.) minimum. Where elevator equipment is located in a room or space containing other machinery and equipment

(a) the elevator equipment shall be located to eliminate any obstructions that prohibit operating or servicing the equipment.

(((~~(b) if an obstruction does not prohibit the operation or servicing of the equipment but creates an interference with servicing the equipment, a sign in conformance with the requirements of ANSI Z535.2 or CAN/CSA-Z321, whichever is applicable, shall be prominently posted at the entrance to the work space warning of the obstruction.~~))

5.3.1.6.5 Temperature and Humidity in Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms. Temperature and humidity shall comply with 2.7.9.2.

3020.8 Labeling. Elevator machine and control rooms shall be provided with sign that reads "Elevator Equipment Room or Machine Room, Authorized Personnel Only, No Storage." In buildings with more than one machine room or control room, the label shall identify which cars are served by the equipment in the room(s). Where the room sign is separated from normally occupied areas or normal paths of travel by additional door(s), the additional door(s) shall be provided with signage indicating that the elevator machine or control room or equipment room is on the other side of the door(s). All lettering shall not be less than 1 inch high and shall contrast with the background.

Exception: Private residence elevators are not required to comply with this section.

SECTION 3021
NEW INSTALLATIONS – FLOORS

3021.1 Floors. All new elevator hoistways, machine rooms and control rooms shall comply with ASME A17.1/CSA B44, 2.1.3.3, Construction of Floors, as amended below. ASME A17.1/CSA B44, 2.1.3.4 is not adopted.

ASME 2.1.3.3 Construction of Floors. Floors of hoistways, control rooms and machine rooms shall ((~~be of concrete or metal construction with or~~)) have a coated concrete or metal surface without perforations that will resist absorption of oil, grease and similar materials. Control rooms and machine rooms shall have floors that cover the entire area of the room. ((~~Metal floors shall conform to the following:~~

~~(a) If of bar type grating, the openings between bars shall reject a ball 20 mm (0.8 in.) in diameter.~~

~~(b) If of perforated sheet metal or of fabricated open work construction, the openings shall reject a ball 2 mm (1 in.) in diameter.~~))

SECTION 3022
EQUIPMENT IN HOISTWAYS, MACHINE ROOMS AND CONTROL ROOMS
(ASME A17.1 Section 2.8)

3022.1 Prohibited wiring, pipes and ducts. In accordance with ASME A17.1/CSA B44 Section 2.8 non-elevator electric wiring, pipes and ducts are prohibited in elevator machine rooms, control rooms and hoistways except as otherwise provided in this section. The use of false ceilings and furring does not remove such items from the elevator spaces and shall not be acceptable except as allowed by ASME A17.1, 2.8.2 as amended below.

3022.2 Amendment to ASME A17.1/CSA B44 2.8.3 All elevator hoistways, machine rooms and control rooms shall comply with ASME A17.1/CSA B44 2.8.1 and 2.8.3, as amended below.

ASME 2.8 Equipment in Hoistways, Machinery Spaces, Machine Rooms, ((~~Control Spaces,~~)) and Control Rooms

2.8.1 Equipment Allowed. Only machinery and equipment used directly in connection with the elevator shall be permitted in elevator hoistways, ((~~machinery spaces,~~)) machine rooms, ((~~control spaces,~~)) and control rooms.

2.8.3 Pipes, Ducts, Tanks, and Sprinklers

2.8.3.1 ((~~Steam and hot water pipes shall be~~)) Pipes conveying gases, vapors or liquids are not permitted to be installed in hoistways, machinery spaces, machine rooms, ((~~control spaces,~~)) and control rooms unless necessary for operation or maintenance of the elevator and not used for any other purpose. ((~~for the purpose of heating these areas only, subject to 2.8.3.1.1 through 2.8.3.1.3.~~))

Exception: Subject to the approval of the *building official*, pipes that are not necessary for operation or maintenance of the elevator are permitted in machinery spaces, machine rooms and control rooms if they are protected with double containment and the joints within the machine space, machine room or control room are threaded, soldered or welded. Pipes shall not be located less than 7 feet above the floor in machine rooms.

((~~2.8.3.1.1~~ ~~Heating pipes shall convey only low pressure steam [100 kPa (15 psi) or less] or hot water [100° C (212° F) or less].~~

~~2.8.3.1.2~~ ~~All risers and return pipes shall be located outside the hoistway. When the machinery space, machine room, control space, or control room is located above the roof of the building, heating pipes for the machinery space, machine room, control space, or control room shall be permitted to be located in the hoistway between the top floor and the machinery space, machine room, control space, or control room.~~

~~2.8.3.1.3~~ ~~Traps and shutoff valves shall be provided in accessible locations outside the hoist way.~~))

2.8.3.1.4 The means used for air-sampling smoke detection systems shall be permitted to be installed in hoistways, machinery spaces, machine rooms, ((~~control spaces,~~)) and control rooms for the purpose of detecting smoke in accordance with 2.27.3.2, Phase I Emergency Recall Operation by Fire Alarm Initiating Devices, and shall not encroach upon required clearances. Sensing elements penetrating the hoistway enclosure shall have a fire resistance rating conforming to the requirement of the building code.

2.8.3.2 Ducts shall be permitted to be installed in the hoistway, ((~~machinery space,~~)) machine room, ((~~control space,~~)) or control room for the purpose of heating, cooling, ventilating, and venting these areas only and shall not encroach upon the required clearances.

Ducts and electrical conduit are permitted to pass through an elevator machine room or control room if they are separated from the room by construction equal to the rated construction of the room and so located that all required clearances are maintained.

2.8.3.3 Sprinkler systems conforming to NFPA 13 ((~~or the NBCC, whichever is applicable~~)) see Part 9 shall be permitted to be installed in the hoistway, ((~~machinery space,~~)) machine room, ((~~control space,~~)) or control room subject to rules promulgated by the *building official.* ((~~2.8.3.3.1 through 2.8.3.3.4~~))

Note: Also see joint DPD Director's Rule 7-2014/SFD Administrative Rule 9.06.14 for sprinkler requirements.

((~~2.8.3.3.1~~ ~~All risers shall be located outside these spaces. Branch lines in the hoistway shall supply sprinklers at not more than one floor level. When the machinery space, machine room, control space, or control room is located~~

~~above the roof of the building, risers and branch lines for these sprinklers shall be permitted to be located in the hoistway between the top floor and the machinery space, machine room, control space, or control room.~~

~~**2.8.3.3.2** In jurisdictions not enforcing the NBCC, where elevator equipment is located or its enclosure is configured such that application of water from sprinklers could cause unsafe elevator operation, means shall be provided to automatically disconnect the main line power supply to the affected elevator and any other power supplies used to move the elevator upon or prior to the application of water.~~

~~(a) This means shall be independent of the elevator control and shall not be self resetting.~~

~~(b) Heat detectors and sprinkler flow switches used to initiate main line elevator power shut down shall comply with the requirements of NFPA 72.~~

~~(c) The activation of sprinklers outside of such locations shall not disconnect the main line elevator power supply. See also 2.27.3.3.6.~~

~~(d) The activation of sprinklers outside of such location shall not disconnect the mainline elevator power supply. See also 2.27.3.3.6.~~

~~(e) This means shall only be provided for elevators that are equipped with Phase I Emergency Recall Operation (see 2.27.3).~~

~~**2.8.3.3.3** Smoke detectors shall not be used to activate sprinklers in these spaces or to disconnect the main line power supply.~~))

2.8.3.3.4 ((~~In jurisdictions not enforcing the NBCC, when~~)) Where sprinklers are installed not more than 600 mm (24 in.) above the pit floor, (a) and (b) apply to elevator electrical equipment and wiring in the hoistway located less than 1200 mm (48 in.) above the pit floor, except earthquake protective devices conforming to 8.4.10.1.2(e); and on the exterior of the car at the point where the car platform sill is level with the sill at the bottom terminal landing.

(a) Elevator electrical equipment shall be weatherproof (Type 4 as specified in NEMA 250).

(b) Elevator wiring, except traveling cables, shall be identified for use in wet locations in accordance with the requirements in the ((~~NFPA 70~~)) *Seattle Electrical Code*.

2.8.3.4 Other pipes or ducts conveying gases, vapors, or liquid and not used in connection with the operation of the elevator shall not be installed in any hoistway, machinery space, machine room, ((~~control space,~~)) or control room. Where a machinery space, machine room, ((~~control space,~~)) control room, or hoistway extends above the roof of a building, pipes shall be permitted from roof drains to the closest point where they can be diverted out of this space. Pipes shall be covered to prevent leakage or condensate from entering the ((~~machinery space,~~)) machine room, ((~~control space,~~)) control room, or hoistway.

2.8.3.5 Where permitted and provided, pipes, drains, and tanks, or similar equipment that contains liquids, shall not be located directly above the elevator equipment and shall not encroach upon the required clearances in the hoistway, ((~~machinery space,~~)) machine room, ((~~control space,~~)) or control room.

SECTION 3023 PITS (ASME A17.1/CSA B44, 2.2.2)

3023.1 Access to Pits. All pits shall comply with ASME A17.1/CSA B44, 2.2.4 as amended below:

ASME 2.2.4 Pit Access. Safe and convenient access shall be provided to all pits and shall conform to 2.2.4.1 through 2.2.4.6.

2.2.4.1 Access shall be by means of the lowest hoistway door or by means of a separate pit access door.

2.2.4.2 There shall be installed in the pit of each elevator, where the pit extends more than 900 mm (35 in.) below the sill of the pit access door (lowest hoistway door or separate pit access door), a fixed vertical ladder of noncombustible material, located within reach of the access door, a fixed vertical ladder of noncombustible material, located within reach of the access door. The ladder is permitted to be retractable or nonretractable. Nonretractable ladders, where provided, shall conform to 2.2.4.2.1 through 2.2.4.2.6. Retractable ladders, where provided, shall conform to 2.2.4.2.1 through 2.2.4.2.3 and 2.2.4.2.5 through 2.2.4.2.8. When in the extended position, retractable ladders shall conform to 2.2.4.2.4.

2.2.4.2.1 The ladder shall extend not less than 1 200 mm (48 in.) above the sill of the access door or handgrips shall be provided to the same height.

2.2.4.2.2 The ladder rungs, cleats, or steps shall be a minimum of 400 mm (16 in.) wide. When obstructions are encountered, the width shall be permitted to be decreased to less than 400 mm (16 in.). The reduced width shall be as wide as the available space permits, but not less than 225 mm (9 in.).

2.2.4.2.3 The ladder rungs, cleats, or steps shall be spaced 300 mm (12 in.) ± 13 mm (± 0.5 in.) on center, shall be provided to not less than the height of access door sill, and shall be designed to minimize slipping (e.g. knurling, dimpling, coating with skid- resistant material).

2.2.4.2.4 A clear distance of not less than 115 mm (4.5 in.) from the centerline of the rungs, cleats, or steps to the nearest permanent object in back of the ladder shall be provided.

2.2.4.2.5 Side rails, if provided, shall have a clear distance of not less than 115 mm (4.5 in.) from their centerline to the nearest permanent object.

2.2.4.2.6 The ladder and its attachments shall be capable of sustaining a load of 135 kg (300 lb.)

2.2.4.2.7 Retractable ladders that are in the line of movement of the car or counterweight when not fully retracted, shall operate a retractable ladder electrical device (see 2.26.2.38) that shall cause the power to be removed from the elevator driving-machine motor and brake unless the ladder is in its fully retracted position.

2.2.4.2.8 Retractable ladders shall be capable of being extended, mechanically secured and unsecured, and retracted from the access door, and

(a) the force(s) required to extend a retractable ladder from the fully retracted position to the extended and mechanically secured position shall not exceed 220 N (50 lbf)

(b) after being extended and mechanically secured, a retractable ladder shall remain secured in the extended position when subjected to a horizontal force not to exceed 2 220 N (500 lbf)

(c) the force(s) required to retract a retractable ladder from its extended position to its fully retracted position, after being unsecured, shall not exceed 220 N (50 lbf)

(d) the ladder shall be mechanically secured when in the retracted position.

2.2.4.3 Pit access by a ladder shall not be permitted when the pit floor is more than 3 000 mm (120 in.) below the sill of the access door, except where there is no building floor below the bottom terminal landing, this height shall be permitted to be greater but not more than 4 200 mm (165 in.).

2.2.4.4 Pits shall be accessible only to elevator personnel.

2.2.4.5 A separate pit access door, when provided, shall be subject to the following requirements:

(a) If the door swings into the pit, it shall be located so that it does not interfere with moving equipment.

(b) If the door swings out, and the lowest structural or mechanical part, equipment, or device installed beneath the car platform, except guide shoes or rollers or safety jaw assemblies, projects below the top of the separate pit access door opening when the car is level with the bottom terminal landing

(1) an electric contact conforming to 2.26.2.26 shall be provided to prevent operation of the elevator when the door is open

(2) the door shall be provided with a vision panel(s) that is glazed with clear wired glass not less than 6 mm (0.25 in.) thick, will reject a ball 150 mm (6 in.) in diameter, and have an area of not more than 0.03 m^2 (47 $in.^2$).

(c) The door shall provide a minimum opening of 750 mm (29.5 in.) in width and 1 825 mm (72 in.) in height.

(d) The door shall be equipped with a barrier conforming to 2.11.1.2(i), where the door sill is located more than 300 mm (12 in.) above the pit floor.

(e) The door shall be self-closing and provided with a spring-type lock arranged to permit the door to be opened from inside of the pit without a key. Such doors shall be kept closed and locked. A key shall be required to unlock the lock from outside the hoistway. The key shall be of Group 1 Security (see 8.1).

(f) Separate pit access doors shall not be located where a person, upon entering the pit, can be struck by any part of the car or counterweight when either is on its fully compressed buffer, or provided with an electrical contact conforming to 2.26.2.26 shall be provided to prevent operation of the elevator when the door is open.

(g) In hoistways with more than one elevator, a sign shall be provided on the pit access door identifying which cars are served by that hoistway. Lettering shall not be less than 1 inch high and shall contrast with the background of the sign. The sign shall identify which car is to be taken out of service if an electric contact is provided.

2.2.4.6 Means to unlock the access door from inside the pit shall be provided. The means shall be located

(a) when no pit ladder is provided, not more than 1 825 mm (72 in.) vertically above the pit floor, or

(b) when a pit ladder is provided, not more than 1 825 mm (72 in.) vertically above a rung, cleat, or step. The minimum distance from the top rung, cleat, or step to the top of the pit ladder or handhold shall not be less than 1 200 mm (48 in.) (see 2.4.2.1 and Nonmandatory Appendix J, Fig. J-1), and

(c) with the door in the closed position, in a plane not more than 1 000 mm (39 in.) horizontally from a rung, cleat, or step of the pit ladder (see Nonmandatory Appendix J, Fig. J-1).

3023.2 Access to underside of cars. Access to the underside of cars shall comply with ASME A17.1/CSA B44, 2.2.8 as amended below:

2.2.8 Access to Underside of Car. Where the distance from the pit floor to the underside of the plank channels or slings exceeds 2 100 mm (83 in.), with the car at the lowest landing, a means shall be permanently installed or permanently stored in the pit to provide access to the equipment on the underside of the car. When access is provided by means of a working platform it shall conform to the requirements of 2.7.5.3.2 through 2.7.5.3.6.

When working platform inspection operation is provided according to 2.7.5.3.6, in hoistways containing a single elevator

(a) a pit access door is required, or

(b) an additional elevator personnel shall be present outside the hoistway when the pit inspection operation is in effect.

SECTION 3024
SHUTOFF VALVE (ASME A17.1/CSA B44, 3.19.4.1)

3024.1 Hydraulic elevator shutoff valve. All hydraulic elevators shall comply with ASME A17.1, 3.19.4.1, Shutoff Valve, as amended below:

ASME 3.19.4.1 Shutoff Valve. A manually operated shutoff valve shall be provided between the hydraulic machines and the hydraulic jack.

~~((**3.19.4.1.1** When the hydraulic machine is located outside the hoistway, the shutoff valve shall be located adjacent to the hydraulic machine (see Section 8.1).~~

~~**3.19.4.1.2** Where the hydraulic machine is located in the hoistway, the manually operated shutoff valve shall be permitted to be located inside the hoistway, provided that it is accessible from outside the hoistway to elevator personnel only (see 8.1). The shutoff valve shall have a means to indicate the fully opened and fully closed positions at the location of the operation.~~))

[W] 3024.2 Shut-off valves for hydraulic elevators. Two shut-off valves may be required.

(1) ASME requires that a shut-off valve be installed in the machine room.

(2) When the pit is lower than the machine, a shut-off valve shall be installed in the pit.

A separate shut-off valve is not required in the pit for hydraulic elevators equipped with a overspeed valve that rotates no more than 180 degrees to stop the flow of hydraulic fluid and has a safety shut-off handle capable of being grasped.

SECTION 3025
GUARD AT CEILING INTERSECTION (ASME A17.1/CSA B44, 6.1.3.3.11)

3025.1 Escalator guards. All escalators shall comply with ASME A17.1/CSA B44, 6.1.3.3.11, Guard at Ceiling Intersection, and the following:

Guards shall be provided at any pinching, snagging or wedging points between the handrail, balustrade and adjacent building components or equipment if such points are within the clearances delineated in 6.1.3.3.11.

SECTION 3026
TEST REPORTS

3026.1 Test reports. For tests required by Section 3028 and ASME 17.1/CSA B44, Part 8, as amended in this code, immediately after tests are completed all test results shall be submitted to the *building official* for approval on forms furnished by the *building official*. The submitted results shall be signed by the person performing the tests and shall identify the testing firm. Copies of the completed forms shall be provided to the owner or to the owner's authorized agent.

SECTION 3027
ACCEPTANCE INSPECTIONS AND TESTS

3027.1 Acceptance inspections and tests. Inspections and tests shall comply with ASME A17.1/CSA B44, 8.10, Acceptance Inspection and Tests, as amended below.

ASME 8.10.1 General Requirements for Acceptance Inspections and Tests

8.10.1.1 Persons Authorized to Make Acceptance Inspections and Tests

8.10.1.1.1 The acceptance inspection shall be made by an inspector employed by the ((~~authority having jurisdiction, or by a person authorized by the authority having jurisdiction~~)) *building official*.

8.10.1.1.2 The person installing or altering the equipment shall perform all of the tests required by 8.10.2 through 8.10.5 in the presence of the inspector specified in 8.10.1.1.1.

((~~**8.10.1.1.3** The inspector shall meet the qualification requirements of the ASME QEI-1. Inspectors and inspection supervisors shall be certified by an independent, accredited, certifying organization as specified in 8.10.1.2 (see Section 1.3).~~))

SECTION 3028
PERIODIC INSPECTIONS AND TESTS

3028.1 Persons authorized to make periodic inspections and witness tests. Periodic inspection and tests shall comply with ASME A17.1/CSA B44, 8.11 as amended below.

8.11.1 General Requirements for Periodic Inspections and Witnessing of Tests

((~~**8.11.1.1 Persons Authorized to Make Periodic Inspections and Witness Tests.** The inspector shall meet the qualification requirements of the ASME QEI- 1. Inspectors and inspection supervisors shall be certified an independent, accredited, certifying organization as specified in 8.10.1.2 (see 1.3).~~))

8.11.1.1.1 Periodic Inspections

(a) Periodic inspections shall be made by an inspector employed by the ((~~authority having jurisdiction~~)) *building official* or by a person authorized by the ((~~authority having jurisdiction~~)) *building official*.

(((~~(b) The inspector shall submit a signed written report to the authority having jurisdiction containing the following information:~~

~~(1) date of inspection(s)~~

~~(2) components or systems that have not been inspected~~

~~(3) Code deficiencies noted during the inspection and a statement as to corrective action taken, if any~~))

8.11.1.1.2 Periodic tests

(a) Periodic tests as required in 8.6 shall be performed by elevator personnel that are qualified to perform such tests. These tests shall be witnessed by an inspector (see 8.11.1.1) employed by the ((~~authority having jurisdiction~~)) *building official*, or by persons authorized by the ((~~authority having jurisdiction~~)) *building official*.

(((~~(b) The inspector shall submit a signed written report to the authority having jurisdiction containing the following information:~~

~~(1) date of inspection(s)~~

~~(2) type of test(s) performed~~

~~(3) detailed results of the test(s) including but not limited to, speed, governor trip speed, safety slide distance, relief valve setting, escalator/moving walk brake torque setting, etc.~~

~~(4) Code deficiencies noted during the test~~

~~(5) statement as to any corrective action taken~~))

8.11.1.2 Applicability of Inspection Requirements. Inspections required by 8.11.2 through 8.11.5 are to determine that the existing equipment conforms with the following applicable Code requirements:

(a) the Code at the time of installation

(b) the Code effective as applicable to and for each alteration

(((~~(c) the ASME A17.3 Code, if adopted by the authority having jurisdiction~~

~~NOTES (8.11.1.2):~~

~~(1) The ASME A17.2 Guide for Inspection of Elevators, Escalators, and Moving Walks (see Preface, ASME Elevator Publications) is a guide for inspections.~~

~~(2) References to "Items" of the ASME A17.2 Guide for Inspection of Elevators, Escalators, and Moving Walks and to the requirements of this Code are indicated in parentheses as a convenient reference to the applicable inspection procedures and requirements. It is important to understand that suggested test and inspection methodologies represent an approach but are neither exclusive nor comprehensive.~~))

8.11.1.3 Periodic Inspection and Test Frequency. The equipment listed in Table 3028 shall be inspected and tested at the intervals specified in Table 3028. ((~~The frequency of periodic inspections and tests shall be established by the authority having jurisdiction.~~))

NOTE: Recommended intervals for periodic inspections and tests can be found in ((~~Nonmandatory Appendix N~~)) Table 3028.

8.11.1.4 Installation Placed Out of Service. Periodic inspections and tests shall not be required when an installation is placed "out of service":

(a) as defined by the ((~~authority having jurisdiction~~)) *building official;* or

(b) when an installation whose power feed lines have been disconnected from the mainline disconnect switch; and

(1) an electric elevator, dumbwaiter, or material lift whose suspension ropes have been removed, whose car and counterweight rest at the bottom of the hoistway, and whose hoistway doors have been permanently barricaded or sealed in the closed position on the hoistway side;

(2) a hydraulic elevator, dumbwaiter, or material lift whose car rests at the bottom of the hoistway; when provided with suspension ropes and counterweight, the suspension ropes have been removed and the counterweight rests at the bottom of the hoistway; whose pressure piping has been disassembled and a section removed from the premises and whose hoistway doors are permanently barricaded or sealed in the closed position on the hoistway side; or

(3) an escalator or moving walk whose entrances have been permanently barricaded.

8.11.1.5 Making Safety Devices Ineffective. No person shall at any time make any required safety device or electrical protective device ineffective, except where necessary during tests and inspections. Such devices shall be restored to their normal operating condition in conformity with the applicable requirements prior to returning the equipment to service (see 2.26.7).

8.11.1.7 Unique or Product-Specific Procedures or Methods. Where unique or product-specific procedures or methods are required to maintain, repair, replace, inspect, or test equipment, such procedures or methods shall be provided by the manufacturer or installer. These procedures and any unique devices required by the procedures for inspection and testing shall be accessible on site to elevator personnel [see 8.6.1.2.2(b)].

8.11.1.8 Maintenance Control Program. The Maintenance Control Program complying with 8.6.1.2.1 shall be available. On-site equipment documentation complying with 8.6.1.2.2 and maintenance records complying with 8.6.1.4 shall be available.

8.11.1.9 Devices Not Coved in Section 8.11. When any device on which the safety of users is dependent is installed that is not specifically covered in Section 8.11, it shall be inspected and tested in accordance with the requirements of the manufacturer's or the altering company's procedures (see 8.6.1.6.1 and 8.7.1.2). Documentation that contains the testing procedures of these devices shall remain with the equipment and be available in the on-site documentation (see 8.6.1.2.2). The removal or disabling of such devices shall be considered an alteration and shall comply with 8.7.1.2.

TABLE 3028
INSPECTION AND TEST INTERVALS
Note: Intervals are specified in months; sections reference ASME A17.1 unless otherwise specified

Section	Equipment Type	Periodic Inspections		Periodic Tests							
				Category One		Category Three		Category Five		Other	
		Requirement	Interval	Requirement	Interval	Requirement	Interval	Requirement	Interval	Requirement	Interval
8.6.11.1	Firefighter's emergency operation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.6.11.1	3
8.11.2	Electric elevators	8.11.2.1	12	8.6.4.19	12	N/A	N/A	8.6.4.20	60		
8.11.3	Hydraulic elevators	8.11.3.1	12	8.6.5.14	12	8.6.5.15	36	8.6.5.16	60		
8.11.4; SBC 3028	Escalators & moving walks	8.11.4.1	12	8.6.8.15	12	N/A	N/A	N/A	N/A	SBC 3028	12
8.11.5.3	Hand elevators	8.11.2.1	12	8.6.4.19	12	N/A	N/A	8.6.4.20, 8.6.5.16	60		
8.11.5.4	Dumbwaiters	8.11.2.1, 8.11.3.1	12	8.6.4.19, 8.6.5.14	12	8.6.5.15	36	8.6.4.20, 8.6.5.16	60		
8.11.5.5	Material lifts and dumbwaiters with automatic transfer devices	8.11.2.1, 8.11.3.1	12	8.6.4.19, 8.6.5.14	12	8.6.5.15		8.6.4.20, 8.6.5.16	60		

TABLE 3028—continued
INSPECTION AND TEST INTERVALS
Note: Intervals are specified in months; sections reference ASME A17.1 unless otherwise specified

Section	Equipment Type	Periodic Inspections		Periodic Tests							
				Category One		Category Three		Category Five		Other	
		Requirement	Interval	Requirement	Interval	Requirement	Interval	Requirement	Interval	Requirement	Interval
8.11.5.6	Special purpose personnel elevators	8.11.2.1, 8.11.3.1	12	8.6.4.19, 8.6.5.14		8.6.5.15		8.6.4.20, 8.6.5.16	60		
8.11.5.7	Inclined elevators	8.11.2.1, 8.11.3.1	12	8.6.4.19, 8.6.5.14		8.6.5.15		8.6.4.20, 8.6.5.16	60		
8.11.5.9	Screw-column elevators	8.11.2.1, 8.11.3.1	12	8.6.4.19, 8.6.5.14		8.6.5.15		8.6.4.20, 8.6.5.16	60		
8.11.5.10	Rooftop elevators	8.11.2.1, 8.11.3.1	12	8.6.4.19, 8.6.5.14		8.6.5.15		8.6.4.20, 8.6.5.16	60		
8.11.5.11	Rack & pinion elevators	8.11.2.1, 8.11.3.1	12	8.6.4.19, 8.6.5.14		8.6.5.15		8.6.4.20, 8.6.5.16	60		
8.11.5.12	Limited use/ limited application elevators	8.11.2.1, 8.11.3.1	12	8.6.4.19, 8.6.5.14		8.6.5.15		8.6.4.20, 8.6.5.16	60		

3028.2 Category Five tests. Elevators shall be subject to five-year inspection test requirements in accordance with Table 3028, Periodic Test Requirements – Category Five, except that safety and governor systems of cars operating on wood guide rails shall be tested by tripping the governor by hand with rated load in the car, and the car at rest.

All Category Five tests shall comply with ASME A17.1, 8.6 as amended below:

ASME 8.6.4.20 Periodic Test Requirements – Category 5.

NOTE: For test frequency, see ((~~8.11.1.3~~)) Table 3028.

8.6.4.20.1 Car and Counterweight Safeties. Type A, Type B, and Type C car and counterweight safeties shall be tested in accordance with 8.6.4.20.1(a) ((~~or subject to approval by the authority having jurisdiction with 8.6.4.20.1(b)~~)).

(a) *Rated Load and Rated Speed Test.* Car safeties, except those operating on wood guide rails, and their governors, shall be tested with rated load in the car. Counterweight safety tests shall be made with no load in the car. The car speed at which the governor trips shall be determined by means of a handheld tachometer or other device designed to measure car speed, such as controllers, service tools, and accelerometers. Tests shall be made by tripping the governor by hand at the rated speed. If the governor is equipped with a switch that operates when the governor is manually tripped, it must be rendered inoperative. The car safety mechanism switch shall not be rendered inoperative. The emergency brake required by 2.19.3 shall be disabled to prevent it from operating during this test. Since the counterweight safety does not have a safety mechanism switch, the circuit that would remove power from the driving-machine motor and brake must be opened as soon as the elevator stops to minimize slack rope and fallback of the car. The following operational conditions shall be checked (Item 2.29.2):

(1) Type B safeties shall stop the car with the rated load within the required range of stopping distances for which the governor is tripped (Item 2.29.2) and the level of the platform checked for conformance to 2.17.9.2.

(2) For Type A safeties and Type A safety parts of Type C safeties, there shall be sufficient travel of the safety rollers or dogs remaining after the test to bring the car and its rated load to rest on safety application at governor tripping speed. The level of the platform shall be checked for conformance to 2.17.9.2.

(((~~(b) *Alternative Test Method for Car Safeties.* The alternative test methods shall comply with 8.6.11.10 and the following:~~

~~(1) The testing of safeties with any load in the car, centered on each quarter of the platform symmetrically with relation to the centerlines of the platform from no load up to rated load, and at not less than rated speed shall be permitted provided that both~~

~~(a) when the alternative test is performed, the test shall stop the car and verify that the safe- ties will be capable of stopping an overspeeding car in accordance with the requirements of Section 2.17 applicable to the specific classification of safeties~~

~~(b) when applied, the method shall verify that the safeties perform or are capable of performing in compliance with (a) and the platform shall not be out of level more than 30 mm/m (0.36 in./ft) in any direction.~~))

(2) The "Periodic Test Record" shall be completed and installed as required by 8.6.1.7.2

8.6.4.20.2 Governors

(a) The tripping speed of the governor and the speed at which the governor overspeed switch, where provided, operates shall be tested to determine conformance with the applicable requirements and the adjustable means shall be sealed (Item 2.13.2.1).

(b) The governor rope pull-through and pull-out forces shall be tested to determine conformance with the applicable requirements, and the adjustment means shall be sealed (Item 2.13.2.1).

(c) After these tests in jurisdictions enforcing NBCC, a metal tag indicating the date of the governor tests, together with the name of the person or firm that performed the tests, shall be attached to the governor in a permanent manner.

8.6.4.20.3 Oil Buffers

(a) Car oil buffers shall be tested to determine conformance with the applicable requirements by either

(1) running the car onto the buffer with rated load at rated speed, or

((~~(2) subject to approval by the authority having jurisdiction~~

~~(a) running the car with any load, from no load up to rated load onto the buffer at rated speed when the requirements of 8.6.11.10 are com- plied with, provided that when applied the method verifies that the buffer performs or is capable of performing in compliance with 8.6.4.20.3(a), except as specified in 8.6.4.20.3(b) and (c) (Item 5.9.2.1). Counter- weight oil buffers shall be tested by running the counterweight onto its buffer at rated speed with no load in the car, except as specified in 8.6.4.20.3(b) and (c) (Item 5.9.2.1), or~~

~~(b) running the car onto the buffer with any load, from no load up to rated load, and at less than rated speed, when the requirements of 8.6.11.10 are complied with, provided that when applied, the method verifies that the buffer performs or is capable of performing in compliance with 8.6.4.20.3(a)~~))

(b) For reduced stroke buffers, this test shall be made at the reduced striking speed permitted (Item 5.9.2.1).

(c) This test is not required where a Type C safety is used (see 8.6.4.20.1).

(d) In making these tests, the normal and emergency terminal stopping devices shall be made temporarily inoperative. The final terminal stopping devices shall remain operative and be temporarily relocated, if necessary, to permit compression of the buffer during the test.

(e) After completion of the test, a metal tag, indicating the date of the test, together with the name of the person or firm who performed the test, shall be attached to the buffer [Item 5.3.2(b)].

(f) Counterweight oil buffers shall be tested by running the counterweight onto its buffer at rated speed with no load in the car, except as specified in 8.6.4.20.3(b) and (c) (Item 5.9.2.1), or at reduced speed if the requirements of 8.6.11.10 are met.

(g) A test tag as required in 8.6.1.7.2 shall be provided.

8.6.4.20.4 Driving-Machine Brake(s). For passenger elevators and all freight elevators, the driving-machine brake shall be tested for compliance with applicable requirements, in accordance with 6(a), ((~~or subject to approval by the authority having jurisdiction with 8.6.4.20.4(b).~~))

For elevators installed under ASME A17.1-2000/ CSA B44-00 and later editions, have the brake setting verified in accordance with the data on the brake marking plate.

Upon completion of the test, the means of adjusting the holding capacity shall be sealed to prevent changing the adjustment without breaking the seal. The seal shall bear or otherwise attach the identification of the person or firm that installed it. (See also 8.6.1.7.2, Periodic Test Tags.)

(a) Test with load per Table 8.6.4.20.4. Place the load as shown in Table 8.6.4.20.4 in the car. The driving-machine brake, on its own, shall hold the car with this load. With no load in the car the driving- machine brake shall hold the empty car at rest and shall decelerate an empty car traveling in the up direction from governor tripping speed. The driving- machine brake on freight elevators of Class C-2 loading, when loaded to their maximum design load, shall hold the elevator car at rest (Item 2.17.2.1).

((~~(b) *Alternative Test Method for Driving-Machine Brakes.* The alternative test methods shall comply with 8.6.11.10 and the following:~~

~~(1) Any method of verifying conformity of the driving machine brake with the applicable Code requirements (see 2.24.8.3 and Table 8.6.4.20.4) shall be permitted, including the testing method of the brakes with or~~

~~without any load in the car, provided that when applied the method verifies that the brake performs or is capable of performing in compliance with 8.6.4.20.4(a).~~))

(2) A test tag as required in 8.6.1.7.2 shall be provided.

((~~8.6.11.10 Category 5 Tests Without Load Via Alternative Test Methodologies~~

~~8.6.11.10.1 Where Permitted.~~ ~~Alternative test methods without load are permitted for Category 5 testing subject to approval by the authority having jurisdiction of~~

~~(a) car and counterweight safeties per 8.6.4.20.1~~

~~(b) oil buffers per 8.6.4.20.3~~

~~(c) driving-machine brakes per 8.6.4.20.4, and~~

~~(d) braking system, traction, and traction limits per 8.6.4.20.10~~

~~NOTE: See 8.10, Note (2).~~

~~8.6.11.10.2 Alternative Test Method and Tools~~

~~(a) An alternative test method shall be~~

~~(1) based on sound engineering principles~~

~~(2) validated and documented via engineering tests~~

~~(b) The method, measuring devices, and tools shall be capable of producing reliable and consistent measurements, suitable for the intended measurement. The monitoring and calibration of the measuring devices or tools shall be in accordance with the provider's guidelines.~~

~~8.6.11.10.3 Alternative Test Method Procedure.~~ ~~The alternative test method shall~~

~~(a) include requirements to obtain and verify car and counterweight masses if necessary for the test~~

~~(b) have a procedure document that~~

~~(1) defines the permissible equipment range and limitations regarding use~~

~~(2) establishes monitoring and calibration criteria for tools or measuring devices as appropriate~~

~~(3) defines the test set-up procedure~~

~~(4) provides instructions on how to interpret results and correlate the results to pass-fail criteria~~

~~(c) describe how to correlate no load test results with previously acquired full load and no-load results~~

~~(d) be included in the MCP [see 8.6.1.2.1(a)]~~

~~(e) include the information required by 8.6.1.2.2(b)(5) where applicable~~

~~(f) require a report conforming to 8.6.11.10.4.~~

~~8.6.11.10.4 Alternative Test Method Report.~~ ~~The alternative test method report shall~~

~~(a) identify the alternative test tool (make/model) used to perform the test~~

~~(b) identify the company performing the tests, names of personnel conducting and witnessing the tests, and testing dates~~

~~(c) contain all required printouts or record of tests required to demonstrate compliance to the testing requirement that were gathered during an acceptance test~~

~~(d) identify which results from the baseline test are to be used for future compliance evaluation~~

~~(e) record the car and counterweight masses that were obtained per 8.6.11.10.3(a) during the acceptance test and during any subsequent Category 5 test if required by test method~~

~~(f) contain all subsequent Category 5 results with pass-fail conclusions regarding Code compliance~~

~~(g) remain on site or shall be available to elevator personnel and the authority having jurisdiction.~~))

3028.3 Cleaning and testing of escalators and moving walks. In addition to the periodic inspection and tests specified in Table 3028, escalator and moving walk trusses and pans shall be cleaned every 12 months.

3028.4 Step/skirt test. The step/skirt performance index test specified in 8.6.8.15.19 is required for all periodic escalator tests at intervals specified in Table 3028. An escalator and moving walk step/skirt test shall be performed every 12 months by an elevator mechanic licensed in accordance with 70.87.240 RCW.

3028.5 Firefighters' emergency operation quarterly testing. Testing shall comply with ASME A17.1/CSA B44, 8.6.11.1 as amended below.

8.6.11.1 Firefighters' Emergency Operation. All elevators provided with Firefighters' Emergency Operation shall be subjected ((~~monthly~~)) quarterly, by authorized personnel, to Phase I recall by use of the key switch, and a minimum of one-floor

operation on Phase II. Deficiencies shall be reported to, and corrected by, elevator personnel. A record of findings shall be available to elevator personnel and the authority having jurisdiction.

((~~NOTE: See Nonmandatory Appendix AA for additional operation verification~~))

SECTION 3029
REQUIREMENTS FOR MAINTENANCE CONTROL PROGRAM AND REMOTE MONITORING

3029.1 ASME A17.1/CSA B44, 8.6.1 General Maintenance Requirements. Conveyances shall be maintained in accordance with ASME A17.1, 8.6.1 as amended below.

8.6.1.2.1 A written Maintenance Control Program [MCP] shall be in place to maintain the equipment in compliance with the requirements of 8.6. The MCP shall specify examinations, tests, cleaning, lubrication, and adjustments to applicable components at regular intervals (see Section 1.3 for the definition of ("maintenance") and shall comply with the following:

(a) An MCP for each unit (see 8.6.1.1.1) shall be provided by the person(s) and/or firm maintaining the equipment and shall be viewable on-site by elevator personnel at all times from time of acceptance inspection and test or from the time of equipment installation or alteration (see 8.10.1.5).

(b) The MCP shall include, but not be limited to, the Code required maintenance tasks, maintenance tasks, maintenance procedures, and examination and test listed with the associated requirement (see 8.6.4 through 8.6.11). Where maintenance tasks, maintenance procedures, or examinations or tests have been revised in 8.6, the MCP shall be updated.

(c) The MCP shall reference on-site Equipment documentation (see 8.6.1.2.2) needed to fulfill (b) and on-site maintenance records (see 8.6.1.4.1) that record the completion of all associated maintenance tasks specified in 8.6.1.4.1(a).

(((~~(d) Where the MCP is maintained remotely from the machine room, machinery space, control room, or control space (see 8.11.1.8), instructions for on-site locating or viewing the MCP either in hard copy or in electronic formal shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The instructions shall be permanently legible with characters a minimum of 3 mm (0.125 in.) high.~~)) <u>The MCP shall be posted in the machine room, machinery place or control room.</u>

(e) The specified scheduled maintenance intervals (see 1.3) shall, as applicable, be based on

(1) equipment age, condition, and accumulated wear

(2) design and inherent quality of the equipment

(3) usage

(4) environmental conditions

(5) improved technology

(6) the manufacturer's recommendations and original equipment certification for any SIL rated devices or circuits (see 8.6.3.12 and 8.7.1.9)

(7) the manufacturer's recommendations based on any ASME A17.7/CSA B44.7 approved components or functions

8.6.1.2.2 On-Site Documentation. The documents specified in (a), through (c) shall be written and permanently kept on-site in the machine room, machinery space, control room, ((~~control space, or the means necessary for test (2.7.6.4)~~)) in hard copy for each unit for elevator personnel.

The documentation specified in (d) shall be on-site and available to the specified personnel.

(a) Up-to-date wiring diagrams detailing circuits of all electrical protective devices (see 2.26.2) and critical operating circuits (see 2.26.3)

(b) Procedures for inspections and tests not described in ASME A17.2 and procedures or methods required for elevator personnel to perform maintenance, repairs, replacements, and adjustments, as follows:

(1) all procedures specifically identified in the Code as required to be written (e.g., 8.6.4.20.8, check out procedure for leveling; 8.6.5.16.5, check out procedure for overspeed valve; and 8.6.8.15.7, check out procedure for reversal stop switch)

(2) unique maintenance procedures or methods required for inspection, tests, and replacement of SIL rated E/E/PES electrical protective devices and circuits [See 2.26.4.3.2, 2.26.9.3.2(b), 2.26.9.5.1(b), and 2.26.9.6.1(b).]

(3) unique maintenance procedures or methods required for inspection, tests, and replacement of equipment applied under alternative arrangements (see 1.2.2.1) shall be provided by the manufacturer or installer

(4) unique maintenance procedures or unique methods required for inspection and test of equipment specified in an ASME A17.7/CSA B44.7, code compliance document (CCD)

(5) procedures for tests, periodic inspections, maintenance, replacements, adjustments, and repairs for traction-loss detection means, broken-suspension-member detection means, residual-strength detection means, and related circuits [See 2.20.8.1 through 2.20.8.3, 8.6.4.19.12, 8.6.11.11, 8.10.2.2(cc)(4)(-c)(-s), and 8.10.2.2.2(ss).]

(c) Written checkout procedures

(1) for elastomeric buffers (see 8.6.4.4.2)

(2) to demonstrate E/E/PES function as intended (see 8.6.4.19.10)

(3) for two-way communication means (see 8.6.4.19.15)

(4) for elevator leveling speed with open doors (see 8.6.4.20.8)

(5) for hydraulic elevator overspeed valve (see 8.6.5.16.5)

(6) for escalator reversal stopping device (see 8.6.8.15.7)

(7) for escalator handrail retarding force (see 8.6.8.15.13)

(d) Written procedures for the following:

(1) evacuation procedures for elevators by authorized persons and emergency personnel shall be available on-site (see 8.6.11.5.2 and ASME A17.4)

(2) the procedure for cleaning of a car and hoistway transparent enclosures by authorized persons (see 8.6.11.4.2)

(e) USI(s) of the executable software associated with the relevant functions in 2.26.1.7.1 and 3.26.11.1 [see also 2.26.1.7.3].

(f) The documentation for the engineering test of skirt panels deflection for units installed or altered under A17.1-2019 and later editions [see 8.3.15.3).

8.6.1.2.3 Where a detective part directly affecting the safety of the operation is identified, the equipment shall be taken out of service until the defective part has been adjusted, repaired, or replaced.

8.6.1.3 Maintenance Personnel. Maintenance, repairs, replacements, and tests shall be performed only by elevator personnel [see 1.3].

8.6.1.4 Maintenance Records. Maintenance records shall document compliance with 8.6. Instructions for locating the maintenance records of each unit, for viewing on-site, shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The provided instructions shall be permanently legible with characters a minimum of 3 mm (0.125 in.) high. These records shall be retained for the most recent 5 yr or from the date of installation or adoption of this Code edition, whichever is less or as specified by the authority having jurisdiction. Existing maintenance records up to 5 yr shall be retained.

8.6.1.4.1 On-Site Maintenance Records

(a) *Maintenance Control Program Records*

(1) A record that shall include the maintenance tasks listed with the associated requirements of 8.6 identified in the Maintenance Control Program (8.6.1.2.1), other tests (see 8.6.1.2.2), examinations and adjustments, and the specified scheduled intervals shall be maintained.

(2) The specified scheduled maintenance intervals (see 1.3) shall, as applicable, be based on the criteria given in 8.6.1.2.1(e).

(3) A hard copy of the MCP records shall be viewable on-site by elevator personnel ((~~in either hard copy or electronic format acceptable to the authority having jurisdiction~~)) and shall include, but ((~~are~~)) not be limited to the following:

(a) site name and address

(b) service provider name

(c) conveyance identification (I.D.) and type

(d) date of record

(e) a description of the maintenance task, interval, and associated requirements of 8.6

(f) indication of completion of maintenance task

NOTE: [8.6.1.4.1(a)]: The recommended format for documenting Maintenance Control Program (MCP) records can be found in Nonmandatory Appendix Y. This is only an example format. A specific maintenance MCP that includes all maintenance needs is required for each unit.

(b) *Repair and Replacement Records.* The following repairs and replacements shall be recorded and a hard copy of the repair and replacement record shall be kept on-site for viewing by elevator personnel. ((~~in either hard copy~~)) Records in electronic format may be provided if approved by the *building official.* ((~~or electronic format. Instructions for locating the records of each unit for immediate viewing shall be posted on the controller or at the means necessary for test (see 2.7.6.4).~~)) The provided instructions shall be permanently legible with characters a minimum of 3 mm (0.125 in) in height. The record shall include an explanation of the repair or replacement, date, and name of person(s) and/or firm performing the task. The record of repairs and replacements shall be retained by the owner of the equipment for the most recent 5 yr or from the date of installation or adoption of this Code edition, whichever is less or as specified by the authority having jurisdiction and shall be a permanent record for the installation. ((~~These records may be kept remotely from the site.~~))

(1) Repairs (8.6.2.1 through 8.6.2.5) including repairs of components and devices listed in 8.6.4 through 8.6.10.

(2) Replacements (8.6.3.1 through 8.6.3.11 except 8.6.3.7 and 8.6.3.10) including replacements of components and devices listed in 8.6.4 through 8.6.10.

(3) Where applicable, the USA(s) (2.26.1.7.3) and the associated functions in 2.26.1.7.1 or 3.26.11.1 that are affected.

(c) *Other Records.* The following written records shall be kept on-site for each unit. Instruction for locating the records of each unit. Instructions for locating the records for each unit for immediate viewing shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The provided instructions shall be permanently legible with characters a minimum of 3 mm (0.125 in.) high. These records shall be retained for the most recent 5 yr from of the date of installation or adoption of this Code edition, whichever is less or as specified by the authority having jurisdiction. The record shall include the date and name of person(s) and/or firm performing the task.

(1) A record of oil usage (8.6.5.7).

(2) A record of findings for firefighters' service operation required by 8.6.11.1 with identification of the person(s) that performed the operation.

(3) Periodic tests (see 8.6.1.7) shall be documented or recorded in accordance with 8.6.1.7.2.

(4) Written record to document compliance with replacement criteria specified in ASME A17.6 requirement 1.10.1.1(c).

(d) *Permanent Record.*

(1) A permanent record of the results of all acceptance tests as required by 8.10.1.1.4 and 8.10.1.1.5 shall be kept with the on-site records.

Test tags, complying with 2.16.3.3 for marking plates (except lettering shall be 1.6 mm [0.0625 in]), permanently attached to or adjacent to the controller, shall meet this requirement.

NOTE: This requirement does not apply to equipment installed under ASME A17.1-2010 and earlier editions.

(2) For escalators and moving walks installed or altered under ASME A17.1-2019/CSA B44:19 or later editions, a permanent record of verification of conformance with 6.1.3.3.6 or 6.2.3.3.6 as applicable, for a skirt panel or skirt panel supporting components shall be kept with the on-site maintenance records.

8.6.1.4.2 Call Backs (Trouble Calls). A hard copy record of call backs shall be maintained and shall include the description of reported troubles, dates, time, and corrective action(s) taken that are reported by any means to elevator personnel. These records shall be made available to elevator personnel when performing corrective action. For elevator personnel other than personnel performing the corrective action, records will be available upon request. Instructions on how to report any need for corrective action (trouble calls) to the responsible party shall be posted on the controller or at the means necessary for test (see 2.7.6.4). The instructions shall be permanently legible with characters a minimum of 3 mm (0.125 in.) high.

3029.2 Remote Monitoring and Operation. Elevators and other conveyances found operating with a device that can directly effect a change in its controls from a remote location is prohibited unless it is operated under the direct on-site supervision of a person who is a licensed elevator mechanic in accordance with Section 3003.2.

Note: Remote operation controls, operated by building personnel located within the building, may be installed for security purposes upon prior approval of the *building official.*

The following excerpt is from the 2018 Seattle Building Code Chapter 4 SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

SECTION 403
HIGH-RISE BUILDINGS

Note: High rise projects over 240 feet in structural height or using an alternative lateral force resisting system are subject to peer review, in accordance with Section 1613. Peer reviews require lengthy lead time prior to permit application and issuance. Applicants should contact the *building official* prior to the start of structural design.

[S] 403.1 Applicability. *High-rise buildings* shall comply with Sections 403.2 through ((~~403.6~~)) 403.8.

Exception: The provisions of Sections 403.2 through 403.6 shall not apply to the following buildings and structures:

1. Airport traffic control towers in accordance with Section 412.2.
2. *Open parking garages* in accordance with Section 406.5.
3. The portion of a building containing a Group A-5 occupancy in accordance with Section 303.6.
4. Special industrial occupancies in accordance with Section 503.1.1.

((~~5. Buildings containing any one of the following:~~

~~5.1. A Group H-1 occupancy.~~

~~5.2. A Group H-2 occupancy in accordance with Section 415.8, 415.9.2, 415.9.3 or 426.1.~~

~~5.3. A Group H-3 occupancy in accordance with Section 415.8.~~))

Interpretation I403.1a: Item 2 only includes buildings in which parking is the principal use.

Interpretation I403.1b: For the purpose of this section, occupied roofs are considered floors used for human occupancy if the occupant load of the roof is ten or more on a building not equipped with an *automatic sprinkler system* or where the occupant load is 50 or more on the roof of a building that is equipped with an *automatic sprinkler system*.

403.1.1 Presubmittal conferences. The applicant shall arrange two presubmittal conferences with the design team, the *building official* and the *fire code official* in accordance with Sections 403.1.1.1 and 403.1.1.2.

403.1.1.1 High rise presubmittal conference. The applicant shall arrange a high rise presubmittal conference at least 60 days prior to submittal of a building permit application that contains the construction documents for any structural component of the building. The purpose of this presubmittal conference is to obtain conceptual approval of the design team approach to compliance with key provisions of this code related to high rise construction, excluding smoke control. The documentation of the high rise presubmittal meetings shall be reflected on the plans for the building and become a permanent part of the records of the Department of Construction and Inspections.

403.1.1.2 Smoke control presubmittal conference. The applicant shall arrange a smoke control presubmittal conference in accordance with Section 909.1.1.

[S] 403.2 Construction. The construction of *high-rise buildings* shall comply with the provisions of Sections 403.2.1 through 403.2.4.

403.2.1 Reduction in fire-resistance rating. The *fire-resistance rating* reductions listed in Sections 403.2.1.1 and 403.2.1.2 shall be allowed in buildings that have sprinkler control valves equipped with supervisory initiating devices and water-flow initiating devices for each floor.

403.2.1.1 Type of construction. The following reductions in the minimum *fire-resistance rating* of the building elements in Table 601 shall be permitted as follows:

1. For buildings not greater than 420 feet (128 m) in *building height*, the *fire-resistance rating* of the building elements in Type IA construction shall be permitted to be reduced to the minimum *fire-resistance ratings* for the building elements in Type IB.

   Exception: The required *fire-resistance rating* of ((~~columns supporting floors~~)) structural frame and bearing walls shall not be reduced.

2. In other than Group F-1, H-2, H-3, H-5, M and S-1 occupancies, the *fire-resistance rating* of the building elements in Type IB construction shall be permitted to be reduced to the *fire-resistance ratings* in Type IIA.
3. The *building height* and *building area* limitations of a building containing building elements with reduced *fire-resistance ratings* shall be permitted to be the same as the building without such reductions.

403.2.1.2 Shaft enclosures. For buildings not greater than 420 feet (128 m) in *building height*, the required *fire-resistance rating* of the *fire barriers* enclosing vertical *shafts*, other than *interior exit stairway* and elevator hoistway enclosures, is permitted to be reduced to 1 hour where automatic sprinklers are installed within the *shafts* at the top and at alternate floor levels.

403.2.2 Seismic considerations. For seismic considerations, see Chapter 16.

[S][BS] 403.2.3 Structural integrity of interior exit stairways and elevator hoistway enclosures. For *high-rise buildings* of *Risk Category* III or IV in accordance with Section 1604.5, for fire service access elevators and for all buildings that are more than 420 feet (128 m) in *building height*, enclosures for *interior exit stairways* and elevator hoistway enclosures shall comply with Sections 403.2.3.1 through 403.2.3.4.

[BS] 403.2.3.1 Wall assembly. The wall assemblies making up the enclosures for *interior exit stairways* and elevator hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.

[BS] 403.2.3.2 Wall assembly materials. The face of the wall assemblies making up the enclosures for *interior exit stairways* and elevator hoistway enclosures that are not exposed to the interior of the enclosures for *interior exit stairways* or elevator hoistway enclosure shall be constructed in accordance with one of the following methods:

1. The wall assembly shall incorporate not fewer than two layers of impact-resistant construction board each of which meets or exceeds Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.
2. The wall assembly shall incorporate not fewer than one layer of impact-resistant construction material that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.
3. The wall assembly incorporates multiple layers of any material, tested in tandem, that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.

[BS] 403.2.3.3 Concrete and masonry walls. Concrete or masonry walls shall be deemed to satisfy the requirements of Sections 403.2.3.1 and 403.2.3.2.

[BS] 403.2.3.4 Other wall assemblies. Any other wall assembly that provides impact resistance equivalent to that required by Sections 403.2.3.1 and 403.2.3.2 for Hard Body Impact Classification Level 3, as measured by the test method described in ASTM C1629/C1629M, shall be permitted.

403.2.4 Sprayed fire-resistant materials (SFRM). The bond strength of the SFRM installed throughout the building shall be in accordance with Table 403.2.4.

TABLE 403.2.4
MINIMUM BOND STRENGTH

HEIGHT OF BUILDING[a]	SFRM MINIMUM BOND STRENGTH
Up to 420 feet	430 psf
Greater than 420 feet	1,000 psf

For SI: 1 foot = 304.8 mm, 1 pound per square foot (psf) = 0.0479 kN/m^2.
a. Above the lowest level of fire department vehicle access.

[S][F] 403.3 Automatic sprinkler system. Buildings and structures shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 403.3.3. See Section 903.3.1.1.3 for additional requirements for sprinkler systems in high-rise buildings.

Exception: An *automatic sprinkler system* shall not be required in spaces or areas of ((~~:~~

~~1. *Open parking garages* in accordance with Section 406.5.~~

~~2. Telecommunications~~)) telecommunications equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic fire detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour *fire barriers* constructed in accordance with Section 707 or not less than 2-hour *horizontal assemblies* constructed in accordance with Section 711, or both.

[S][F] ((~~403.3.1 Number of sprinkler risers and system design.~~ ~~Each sprinkler system zone in buildings that are more than 420 feet (128 m) in *building height* shall be supplied by not fewer than two risers. Each riser shall supply sprinklers on alternate floors. If more than two risers are provided for a zone, sprinklers on adjacent floors shall not be supplied from the same riser.~~))

[S][F] 403.3.1 Automatic sprinkler system design. High-rise building sprinkler systems shall be combination standpipe/sprinkler systems incorporating the following features:

1. Each floor sprinkler system shall be connected between standpipe risers.
2. Shut-off valves, water-flow devices and check valves (or pressure reducing valves) shall be provided on each floor at the sprinkler system connection to each standpipe.
3. Two four-way fire department connections serving the combination system shall be provided on separate streets well separated from each other.
4. When a mid-level fire pump is required to meet pressure requirements, two pumps with the same rating shall be installed.
5. Dry-pipe sprinkler systems serving parking garages may use a separate two-way fire department connection. The dry-pipe sprinkler system shall be supplied by the on-site water tank.
6. The standpipe risers in each required stair shall be a minimum pipe size of 6 inches (152 mm).
7. Two 2-1/2-inch (64 mm) hose connections shall be provided on every floor level landing in every required stairway. If pressure reducing valves (PRV) are required, each hose connection shall be provided with its own PRV.
8. The system shall be designed to provide a minimum flow of 300 gpm (19 L/s) at a minimum pressure of 150 psi 1034 kPa [maximum 205 psi (1379 kPa)] at each standpipe connection in addition to the flow and pressure requirements contained in NFPA 14.

[F] 403.3.1.1 Riser location. Sprinkler risers shall be placed in *interior exit stairways* and ramps that are remotely located in accordance with Section 1007.1.

[W][S][F] 403.3.2 Water supply to required fire pumps. In Type IV-A and Type IV-B buildings that are more than ((~~420~~)) 120 feet (((~~128~~)) 39 m) in *building height*, required fire pumps shall be supplied by connections to not fewer than two water mains located in different streets. Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

Exception: Two connections to the same main shall be permitted provided that the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through not fewer than one of the connections.

[S][F] 403.3.3 Secondary water supply. An automatic secondary on-site water supply having a capacity providing the lesser of a net volume of 33,000 gallons or a volume that is not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for *high-rise buildings* assigned to Seismic Design Category C, D, E or F as determined by Section 1613. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the *automatic sprinkler system.* The secondary water supply shall have a duration of not less than 30 minutes.

[F] 403.3.4 Fire pump room. Fire pumps shall be located in rooms protected in accordance with Section 913.2.1.

[S][F] 403.4 Emergency systems. The detection, alarm and emergency systems of *high-rise buildings* shall comply with Sections 403.4.1 through 403.4.8.

[F] 403.4.1 Smoke detection. Smoke detection shall be provided in accordance with Section 907.2.12.1.

[F] 403.4.2 Fire alarm system. A *fire alarm* system shall be provided in accordance with Section 907.2.12.

[F] 403.4.3 Standpipe system. A *high-rise building* shall be equipped with a standpipe system as required by Section 905.3.

[F] 403.4.4 Emergency voice/alarm communication system. An *emergency voice/alarm communication system* shall be provided in accordance with Section 907.5.2.2.

[F] 403.4.5 Emergency responder radio coverage. Emergency responder radio coverage shall be provided in accordance with Section 510 of the *International Fire Code*.

[F] 403.4.6 Fire command. A *fire command center* complying with Section 911 shall be provided in a location *approved* by the fire code official.

[F] 403.4.7 ((~~Smoke removal.~~)) No requirements. ((~~To facilitate smoke removal in post-fire salvage and overhaul operations, buildings and structures shall be equipped with natural or mechanical *ventilation* for removal of products of combustion in accordance with one of the following:~~

1. ~~Easily identifiable, manually operable windows or panels shall be distributed around the perimeter of each floor at not more than 50 foot (15 240 mm) intervals. The area of operable windows or panels shall be not less than 40 square feet (3.7 m^2) per 50 linear feet (15 240 mm) of perimeter.~~

   ~~Exceptions:~~

   1. ~~In Group R-1 occupancies, each *sleeping unit* or suite having an *exterior wall* shall be permitted to be provided with 2 square feet (0.19 m^2) of venting area in lieu of the area specified in Item 1.~~
   2. ~~Windows shall be permitted to be fixed provided that glazing can be cleared by fire fighters.~~

2. ~~Mechanical air-handling equipment providing one exhaust air change every 15 minutes for the area involved. Return and exhaust air shall be moved directly to the outside without recirculation to other portions of the building.~~
3. ~~Any other *approved* design that will produce equivalent results.~~))

[F] 403.4.8 ((~~Standby and emergency~~)) Emergency power. ((~~A standby power system complying with Section 2702 and Section 3003 shall be provided for the standby power loads specified in Section 403.4.8.3.~~)) An emergency power system complying with Section 2702 shall be provided for the emergency power loads specified in Section 403.4.8.4.

[F] 403.4.8.1 Equipment room. If the ((~~standby or~~)) emergency power system includes a generator set inside a building, the system shall be located in a separate room enclosed with 2-hour *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. System supervision with manual start and transfer features shall be provided at the *fire command center.*

Exceptions:

1. In Group I-2, Condition 2, manual start and transfer features for the critical branch of the emergency power are not required to be provided at the *fire command center*.
2. Where located within a sprinklered parking garage of Type I or II construction, emergency power and *legally required standby power systems* with fixed fuel quantities meeting the limits of Section 603.3 of the *International Fire Code*, and their transfer switches, are not required to be in a separate room. Other occupancies located in the *story* where the system is located shall be separated from the system by fire barriers with a minimum 1 hour fire-resistance rating.
3. Combustion and radiator intake air are permitted to be transferred from the adjacent garage. Radiator discharge air is permitted to be transferred to the adjacent garage. Radiator ventilation intake and discharge air locations shall be separated to maintain the radiator ventilation intake air temperature below the maximum temperature allowed to meet the emergency and *legally required standby power system* loads.

[F] 403.4.8.2 Fuel line piping protection. Fuel lines supplying a generator set inside a building shall be separated from areas of the building other than the room the generator is located in by an approved method or assembly that has a fire-resistance rating of not less than ((~~2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the required fire-resistance rating shall be reduced to~~)) 1 hour.

((~~**[F] 403.4.8.3 Standby power loads.** The following are classified as standby power loads:~~

~~1. *Ventilation* and automatic fire detection equipment for *smokeproof* enclosures.~~

~~2. Elevators.~~

~~3. Where elevators are provided in a *high-rise building* for *accessible means of egress*, fire service access or occupant self-evacuation, the standby power system shall also comply with Sections 1009.4, 3007 or 3008, as applicable.~~))

[F] 403.4.8.4 Emergency power loads. The following are classified as emergency power loads:

1. Exit signs and *means of egress* illumination required by Chapter 10.
2. Elevator car lighting.
3. *Emergency voice/alarm communications systems.*
4. Automatic fire detection systems.
5. *Fire alarm* systems.
6. Electrically powered fire pumps.
7. Power and lighting for mechanical equipment rooms and the fire command center required by Section 403.4.6.
8. Lighting for elevator cars, machine rooms, machine spaces and control rooms.
9. Ventilation and cooling equipment for elevator machine rooms, machine spaces and control rooms.
10. Ventilation and automatic fire detection equipment for pressurized stairways and elevator hoistways.
11. Smoke control system.
12. A selected elevator in each elevator group, in accordance with Section 3016.9. All elevators shall be transferable to an *emergency power system*.

Note: No more than four cars are permitted within a hoistway. See Section 3016.10.

13. For fire service access and occupant evacuation elevators:
    - 13.1 Operation of all fire service access elevator cars.
    - 13.2 Operation of all occupant evacuation elevators until they are recalled.
    - 13.3. Elevator controller cooling equipment.
    - 13.4. For fire service access elevators only, elevator hoistway lighting.
    - 13.5. Sump pumps in elevator pits, where provided.
14. Emergency responder radio coverage.

[S] 403.5 Means of egress and evacuation. The *means of egress* in *high-rise buildings* shall comply with Sections 403.5.1 through 403.5.6.

403.5.1 Remoteness of interior exit stairways. Required *interior exit stairways* shall be separated by a distance not less than 30 feet (9144 mm) or not less than one-fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the enclosure surrounding the *interior exit stairways*. In buildings with three or more *interior exit stairways,* not fewer than two of the *interior exit stairways* shall comply with this section. Interlocking or *scissor stairways* shall be counted as one *interior exit stairway.*

Exception: In buildings containing primarily Group R occupancies, required interior exit stairways are permitted to be separated by a distance not less than 15 feet (4572 mm).

403.5.2 Additional interior exit stairway. For buildings other than Group R-2 and their ancillary spaces that are more than 420 feet (128 m) in *building height*, one additional *interior exit stairway* meeting the requirements of Sections 1011 and 1023 shall be provided in addition to the minimum number of *exits* required by Section 1006.3. The stairway need only serve floors above the lowest level of exit discharge. The total capacity of any combination of remaining *interior exit stairways* with one *interior exit stairway* removed shall be not less than the total capacity required by Section 1005.1. *Scissor stairways* shall not be considered the additional *interior exit stairway* required by this section.

Interpretation I403.5.2 An additional interior exit stairway is not required when the building above the 420 foot level contains only Group R-2 occupancy. If the building above the 420 foot level contains a Group R-2 and another occupancy, or if the building does not contain a Group R-2 above the 420 foot level, then an additional interior exit stairway is required.

Exceptions:

1. ((~~An~~)) Subject to the approval of the *building official*, an additional *interior exit stairway* shall not be required to be installed in buildings having elevators used for occupant self-evacuation in accordance with Section ((~~3008~~)) 403.6.2.
2. An additional *interior exit stairway* shall not be required for other portions of the building where the highest occupiable floor level in those areas is less than 420 feet (128 m) in *building height.*

403.5.3 Stairway door operation. *Stairway* doors other than the *exit discharge* doors shall be permitted to be locked from the *stairway* side. *Stairway* doors that are locked from the *stairway* side shall be capable of being unlocked simultaneously without unlatching upon a signal from the *fire command center* and shall be capable of being unlocked simultaneously and automatically upon a signal from a fire alarm originating anywhere in the building. When stairway doors are installed that are not locked from the stairway side, wiring shall be installed to facilitate future installations of locking hardware.

403.5.3.1 Stairway communication system. A telephone or other two-way communications system connected to an *approved constantly attended station* shall be provided at not less than every fifth floor in each *stairway.* ((~~where the doors to the *stairway* are locked.~~))

403.5.4 ((~~Smokeproof enclosures~~)) Smoke control in exit stairways. Every required *interior exit stairway* serving floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall ((~~be a *smokeproof enclosure* in accordance~~)) comply with Sections 909.20 and 1023.11.

Exception: Unless required by other sections of this code, portions of such stairways which serve floors below the level of exit discharge are not required to comply with Sections 909.20 and 1023.11 if the portion of the stairway below the level of exit discharge is separated from the pressurized stairway with not less than 1 hour fire barriers or horizontal assemblies or both.

403.5.5 Luminous egress path markings. Luminous egress path markings shall be provided in accordance with Section 1025.

403.5.6 Emergency escape and rescue. Emergency escape and rescue openings specified in Section 1030 are not required.

403.5.7 Access to roofs. Access to all roof levels with a slope less than 4:12 shall be provided by stairways.

Exception: Access to unoccupied roofs is permitted to be provided by ship's ladders or alternating tread devices.

403.5.8 Termination of required stairways. All required interior exit stairways shall terminate at the roof level with an exterior door complying with Sections 1010.1.1 and 1010.1.2.

[S] 403.6 Elevators. Elevator installation and operation in *high-rise buildings* shall comply with Chapter 30 and ((~~Sections 403.6.1 and 403.6.2~~)) this section.

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, every floor of the building shall be served by not fewer than two fire service access elevators ((~~, or all elevators, whichever is less, shall be provided~~)) in accordance with ((~~Section 3007~~)) this section. Each fire service access elevator shall have a capacity of not less than 3,500 pounds (1588 kg) and shall comply with Section ((~~3002.4~~)) 3016.12.

Exceptions:

1. Buildings with one elevator shall be provided with one fire service access elevator.
2. Floors below the lowest street-level building entrance are not required to be served by fire service access elevators.
3. Elevators serving only floors less than 75 feet above the lowest street-level building entrance are not required to be fire service access elevators.

403.6.1.1 Machine rooms. Each fire service access elevator shall be served by a different machine or control room.

403.6.1.2 Water protection. An *approved* method to prevent water from infiltrating into the hoistway enclosure from the operation of the *automatic sprinkler system* outside the fire service access elevator lobby shall be provided.

403.6.1.3 Hoistway enclosures. The fire service access elevator hoistway shall be located in a shaft enclosure complying with Section 713.

403.6.1.4 Hoistway lighting. When fire-fighters' emergency operation is active, the entire height of the hoistway shall be illuminated at not less than 1 footcandle (11 lux) as measured from the top of the car of each fire service access elevator.

403.6.1.5 Fire service access elevator lobby. The fire service access elevator shall open into a fire service access elevator lobby in accordance with Sections 403.6.1.5 through 403.6.1.5.5. Egress is permitted through the elevator lobby in accordance with Item 1 of Section 1016.2.

Exception: Where a fire service access elevator has two entrances onto a floor, the second entrance shall be permitted to open into an elevator lobby in accordance with Section 713.14.1.

403.6.1.5.1 Access to interior exit stairway or ramp. The fire service access elevator lobby shall have *direct access* from the enclosed elevator lobby to an enclosure for an interior exit stairway or ramp.

Exception: Access to an *interior exit stairway* or *ramp* shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance with Section 716.2.2.1.

403.6.1.5.2 Lobby enclosure. The fire service access elevator lobby shall be enclosed with a smoke barrier having a fire-resistance rating of not less than 1 hour, except that lobby doorways shall comply with Section 716.2.2.1.

Exceptions:

1. Enclosed fire service access elevator lobbies are not required at the *levels of exit discharge*.
2. Enclosed fire service access elevator lobbies are not required for elevators with pressurized hoistways.

403.6.1.5.3 Lobby doorways. Other than doors to the hoistway or elevator control room, each doorway to a fire service access elevator lobby shall be provided with a 3/4-hour *fire door assembly* complying with Section 716.2. The *fire door assembly* shall also comply with the smoke and draft control door assembly requirements of Section 716.2.2.1.1 with the UL 1784 test conducted without the artificial bottom seal.

403.6.1.5.4 Lobby size. Regardless of the number of fire service access elevators served by the same elevator lobby, the enclosed fire service access elevator lobby shall be not less than 150 square feet (14 m^2) in area with a minimum dimension of 8 feet (2440 mm).

403.6.1.5.5 Fire service access elevator symbol. A pictorial symbol of a standardized design designating which elevators are fire service access elevators shall be installed on each side of the hoistway door frame on the portion of the frame at right angles to the fire service access elevator lobby. The fire service access elevator symbol shall be designed as shown in Figure 403.6.1.5.5 and shall comply with the following:

1. The fire service access elevator symbol shall be not less than 3 inches (76 mm) in height.
2. The helmet shall contrast with the background, with either a light helmet on a dark background or a dark helmet on a light background.
3. The vertical center line of the fire service access elevator symbol shall be centered on the hoistway door frame. Each symbol shall be not less than 78 inches (1981 mm), and not more than 84 (2134 mm) inches above the finished floor at the threshold.

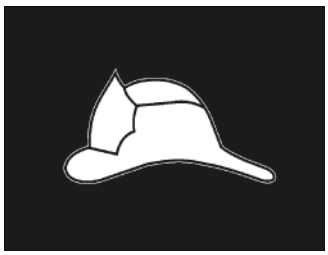

FIGURE 403.6.1.5.5
FIRE SERVICE ACCESS ELEVATOR SYMBOL

403.6.1.6 Elevator system monitoring. The fire service access elevator shall be continuously monitored at the fire command center by a standard emergency service interface system meeting the requirements of NFPA 72.

403.6.1.7 Protection of wiring or cables. Wires or cables that are located outside of the elevator hoistway and machine room and that provide normal or emergency power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to fire service access elevators shall be protected by construction having a *fire-resistance rating* of not less than 2 hours, shall be a circuit integrity cable having a *fire-resistance rating* of not less than 2 hours or shall be protected by a listed electrical protective system having a *fire-resistance rating* of not less than 2 hours.

Exception: Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operations.

403.6.1.8 Standpipe hose connection. A Class I standpipe hose connection in accordance with Section 905 shall be provided in the interior exit stairway and ramp having direct access from the fire service access elevator lobby.

403.6.1.8.1 Access. The exit enclosure containing the standpipe shall have access to the floor without passing through the fire service access elevator lobby.

403.6.2 Occupant evacuation elevators. ((~~Where~~)) Elevators installed for compliance with Section 403.5.2, ((~~in accordance with Section 3008, passenger elevators for general public use~~)) shall ((~~be permitted to be used for occupant self-evacuation~~)) comply with Sections 403.6.2.1 through 403.6.2.10.1. Where other elevators are used for occupant self-evacuation, they shall also comply with these sections.

403.6.2.1 Number of occupant evacuation elevators. The number of elevators available for occupant evacuation shall be determined based on an egress analysis that addresses both of the following scenarios:

1. Full building evacuation where the analysis demonstrates that the number of elevators provided for evacuation results in an evacuation time less than one hour.
2. Evacuation of the 4 consecutive floors with the highest cumulative occupant load where the analysis demonstrates that the number of elevators provided for evacuation results in an evacuation time less than 15 minutes. Floors that are not atmospherically separated are considered one floor.

A minimum of one elevator in each elevator group shall be designated for occupant evacuation. Not less than two shall be provided in each occupant evacuation elevator lobby where more than one elevator opens into the lobby. Signage shall be provided to denote which elevators are available for occupant evacuation.

403.6.2.2 Fire safety and evacuation plan. The building shall have a fire safety and evacuation plan in accordance with the applicable requirements of Section 404 of the International Fire Code. The fire safety and evacuation plan shall incorporate specific procedures for the occupants using evacuation elevators.

403.6.2.3 Operation. The occupant evacuation elevators shall be used for occupant self-evacuation in accordance with the occupant evacuation operation requirements in ASME A17.1/CAS B44 and the building's fire safety and evacuation plan.

403.6.2.4 Water protection. An *approved* method to prevent water from infiltrating into the hoistway enclosure from the operation of the *automatic sprinkler system* outside the enclosed occupant evacuation elevator lobby shall be provided.

403.6.2.5 Hoistway enclosure protection. Occupant evacuation elevator hoistways shall be located in shaft enclosures complying with Section 713.

403.6.2.6 Occupant evacuation elevator lobby. The occupant evacuation elevators shall open into an elevator lobby in accordance with Sections 403.6.2.6 through 403.6.2.6.6. Egress is permitted through the elevator lobby in accordance with Item 1 of Section 1016.2.

403.6.2.6.1 Access to interior exit stairway or ramp. The occupant evacuation elevator lobby shall have *direct access* from the enclosed elevator lobby to an *interior exit stairway* or *ramp*.

Exceptions:

1. Access to an *interior exit stairway* or *ramp* shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance with Section 716.2.2.1.
2. Elevators that only service an open parking garage and the lobby of the building shall not be required to provide direct access in accordance with this section.

403.6.2.6.2 Lobby enclosure. The occupant evacuation elevator lobby shall be enclosed with a smoke barrier having a fire-resistance rating of not less than 1 hour, except that lobby doorways shall comply with Section 403.6.2.6.3.

Exception: Enclosed occupant evacuation elevator lobbies are not required at the levels of exit discharge.

403.6.2.6.3 Lobby doorways. Other than the doors to the hoistway, elevator machine rooms, machinery spaces and control rooms within the lobby enclosure smoke barrier, each doorway to an occupant evacuation elevator lobby shall be provided with a 3/4-hour *fire door assembly* complying with Section 716.2. The *fire door assembly* shall comply with the smoke and draft control assembly requirements of Section 716.2.2.1.1 with the UL 1784 test conducted without the artificial bottom seal.

403.6.2.6.3.1 Vision panel. A vision panel shall be installed in each *fire door assembly* protecting the lobby doorway. The vision panel shall consist of fire-protection-rated glazing and shall be located to furnish clear vision of the occupant evacuation elevator lobby.

403.6.2.6.3.2 Door closing. Each *fire door assembly* protecting the lobby doorway shall be automatic-closing upon receipt of any fire alarm signal from the *emergency voice/alarm communication system* serving the building.

403.6.2.6.4 Lobby size. Each occupant evacuation elevator lobby shall have minimum floor area as follows:

1. The occupant evacuation elevator lobby floor area shall accommodate, at 3 square feet (0.28 m^2) per person, not less than 25 percent of the occupant load of the floor area served by the lobby.
2. The occupant evacuation elevator lobby floor area also shall accommodate one wheelchair space of 30 inches by 48 inches (760 mm by 1220 mm) for each 50 persons, or portion thereof, of the occupant load of the floor area served by the lobby.

Exception: The size of lobbies serving multiple banks of elevators shall have the minimum floor area *approved* on an individual basis and shall be consistent with the building's fire safety and evacuation plan.

403.6.2.6.5 Signage. An *approved* sign indicating elevators are suitable for occupant self-evacuation shall be posted on all floors adjacent to each elevator call station serving occupant evacuation elevators.

403.6.2.6.6 Two-way communication system. A two-way communication system shall be provided in each occupant evacuation elevator lobby for the purpose of initiating communication with the fire command center or an alternate location *approved* by the fire department. The two-way communication system shall be designed and installed in accordance with Sections 1009.8.1 and 1009.8.2.

403.6.2.7 Elevator system monitoring. The occupant evacuation elevators shall be continuously monitored at the fire command center or a central control point *approved* by the fire department and arranged to display all of the following information:

1. Floor location of each elevator car.
2. Direction of travel of each elevator car.
3. Status of each elevator car with respect to whether it is occupied.
4. Status of normal power to the elevator equipment, elevator machinery and electrical apparatus cooling equipment where provided, elevator machine room and control room ventilation and cooling equipment.
5. Status of the *emergency power system* that provides backup power to the elevator equipment, elevator machinery and electrical cooling equipment where provided, elevator machine room and control room *ventilation* and cooling equipment.
6. Activation of any fire alarm initiating device in any elevator lobby, elevator machine room, machine space containing a motor controller or electric driving machine, control room or elevator hoistway.

403.6.2.8 Elevator recall. The fire command center or an alternate location *approved* by the fire department shall be provided with the means to manually initiate a Phase I Emergency Recall of the occupant evacuation elevators in accordance with ASME A17.1/CSA B44.

403.6.2.9 Protection of wiring or cables. Wires or cables that are located outside of the elevator hoistway, and machine room and control room and that provide normal or emergency power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to occupant evacuation elevators shall be protected by construction having a *fire-resistance rating* of not less than 2 hours, shall be circuit integrity cable having a fire-resistance rating of not less than 2 hours or shall be protected by a listed electrical circuit protective system having a fire-resistance rating of not less than 2 hours.

Exception: Wiring and cables to control signals that do not serve Phase II emergency in-car operations are not required to be protected.

403.6.2.10 Emergency voice/alarm communication system. The building shall be provided with an emergency voice/alarm communication system. The emergency voice/alarm communication system shall be accessible to the fire department. The system shall be provided in accordance with Section 907.5.2.2.

403.6.2.10.1 Notification appliances. No fewer than one audible and one visible notification appliance shall be installed within each occupant evacuation elevator lobby.

[S] 403.7 Signs. Signs complying with Sections 403.7.1 through 403.7.4 shall be provided in *high-rise buildings*.

403.7.1 Elevator lobbies. A sign shall be posted in every elevator lobby above each hall call fixture noting that the elevators will be recalled to the building lobby on fire alarm.

Exception: If *approved* by the *building official*, signs need not be posted in lobbies at the main egress level if the means of egress are obviously identifiable.

403.7.2 Recall floor lobbies. A sign indicating the number of each elevator shall be posted and maintained in the elevator lobby at each designated recall floor and at alternate floors of recall, if provided.

403.7.3 Stair re-entry signs. A sign shall be posted on each floor landing within a stairway indicating where re-entry is provided into the building or indicating the location of telephones or other means of two-way communication.

403.7.4 Other signs. Other signs required by this code, including but not limited to stairway identification signs required by Section 1023.9 and exit signs required by Section 1013, shall be provided.

[S] 403.8 Emergency operational plan. Prior to the issuance of a Certificate of Occupancy, the owner-occupant of the building shall assign a responsible person as the building's Fire Safety Director to establish an operational plan for the building. The operational plan shall contain the guidelines and procedures to be followed and responsibilities of the building employees and tenants under emergency conditions, including special provisions for persons with disabilities. The plan shall also include procedures for operation, maintenance and testing of the life safety systems and the allowable use and occupancy of each portion of the building. One copy of the operational plan shall be stored in the fire command center prior to issuance of the Certificate of Occupancy.

The following excerpt is from the 2018 Seattle Building Code Chapter 7 FIRE AND SMOKE PROTECTION FEATURES

SECTION 712
VERTICAL OPENINGS

[S] 712.1 General. Each vertical opening shall comply in accordance with one of the protection methods in Sections 712.1.1 through ((~~712.1.16~~)) 712.1.17.

712.1.1 Shaft enclosures. Vertical openings contained entirely within a shaft enclosure complying with Section 713 shall be permitted. Elevator hoistways shall be protected in accordance with Section 713.14.2.

712.1.2 Individual dwelling unit. Unconcealed vertical openings totally within an individual residential dwelling unit and connecting four stories or less shall be permitted.

712.1.3 Escalator openings. Where a building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, vertical openings for escalators shall be permitted where protected in accordance with Section 712.1.3.1 or 712.1.3.2.

712.1.3.1 Opening size. Protection by a draft curtain and closely spaced sprinklers in accordance with NFPA 13 shall be permitted where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the escalator. In other than Groups B and M, this application is limited to openings that do not connect more than four stories.

Note: NFPA 13 requires draft curtains to be at least 18 inches (457 mm) deep, and to be of noncombustible or limited-combustible material.

712.1.3.2 Automatic shutters. Protection of the vertical opening by approved shutters at every penetrated floor shall be permitted in accordance with this section. The shutters shall be of noncombustible construction and have a *fire-resistance rating* of not less than 1.5 hours. The shutter shall be so constructed as to close immediately upon the actuation of a smoke detector installed in accordance with Section 907.3.1 and shall completely shut off the well opening. Escalators shall cease operation when the shutter begins to close. The shutter shall operate at a speed of not more than 30 feet per minute (152.4 mm/s) and shall be equipped with a sensitive leading edge to arrest its progress where in contact with any obstacle, and to continue its progress on release therefrom.

712.1.4 Penetrations. Penetrations, concealed and unconcealed, shall be permitted where protected in accordance with Section 714.

712.1.5 Joints. Joints shall be permitted where complying with Section 712.1.5.1 or 712.1.5.2, as applicable.

712.1.5.1 Joints in or between horizontal assemblies. Joints made in or between *horizontal assemblies* shall comply with Section 715. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be permitted where protected in accordance with Section 715.4.

712.1.5.2 Joints in or between nonfire-resistance-rated floor assemblies. Joints in or between floor assemblies without a required *fire-resistance rating* shall be permitted where they comply with one of the following:

1. The joint shall be concealed within the cavity of a wall.
2. The joint shall be located above a ceiling.
3. The joint shall be sealed, treated or covered with an *approved* material or system to resist the free passage of flame and the products of combustion.

Exception: Joints meeting one of the exceptions listed in Section 715.1.

712.1.6 Ducts and air transfer openings. Penetrations by ducts and air transfer openings shall be protected in accordance with Section 717. Grease ducts shall be protected in accordance with the *International Mechanical Code*.

712.1.7 Atriums. In other than Group H occupancies, atriums complying with Section 404 shall be permitted.

712.1.8 Masonry chimney. Approved vertical openings for masonry chimneys shall be permitted where the *annular space* is fireblocked at each floor level in accordance with Section 718.2.5.

712.1.9 Two-story openings. In other than Groups I-2 and I-3, a vertical opening that is not used as one of the applications listed in this section shall be permitted if the opening complies with all of the following items:

1. Does not connect more than two stories.
2. Does not penetrate a horizontal assembly that separates fire areas or *smoke barriers* that separate *smoke compartments*.
3. Is not concealed within the construction of a wall or a floor/ceiling assembly.
4. Is not open to a corridor in Group I and R occupancies.
5. Is not open to a corridor on nonsprinklered floors.
6. Is separated from floor openings and air transfer openings serving other floors by construction conforming to required shaft enclosures.

712.1.10 Parking garages. Vertical openings in parking garages for automobile ramps, elevators and duct systems shall comply with Section 712.1.10.1, 712.1.10.2 or 712.1.10.3, as applicable.

712.1.10.1 Automobile ramps. Vertical openings for automobile ramps in parking garages shall be permitted where constructed in accordance with Sections 406.5 and 406.6.

712.1.10.2 Elevators. ((~~Vertical~~)) Non-fire-resistance rated vertical openings for elevator hoistways in parking garages that serve only the parking garage, and complying with Sections 406.5 and 406.6 ((~~, respectively,~~)) shall be permitted.

Note: When Section 712.1.10.2 is applied, the hoistway will be required to be enclosed, but it is not required to be fire-resistance rated. See Section 3020.1.

712.1.10.3 Duct systems. Vertical openings for mechanical exhaust or supply duct systems in parking garages complying with Sections 406.5 and 406.6 ((~~, respectively,~~)) shall be permitted to be unenclosed where such duct system is contained within and serves only the parking garage.

712.1.11 Mezzanine. Vertical openings between a mezzanine complying with Section 505 and the floor below shall be permitted.

712.1.12 Exit access stairways and ramps. Vertical openings containing *exit access stairways* or *ramps* in accordance with Section 1019 shall be permitted.

712.1.13 Openings. Vertical openings for floor fire doors and access doors shall be permitted where protected by Section 712.1.13.1 or 712.1.13.2.

712.1.13.1 Horizontal fire door assemblies. Horizontal *fire door* assemblies used to protect openings in fire-resistance-rated *horizontal assemblies* shall be tested in accordance with NFPA 288, and shall achieve a *fire-resistance rating* not less than the assembly being penetrated. Horizontal *fire door* assemblies shall be labeled by an *approved agency*. The *label* shall be permanently affixed and shall specify the manufacturer, the test standard and the *fire-resistance rating*.

712.1.13.2 Access doors. Access doors shall be permitted in ceilings of fire-resistance-rated floor/ceiling and roof/ceiling assemblies, provided that such doors are tested in accordance with ASTM E119 or UL 263 as horizontal assemblies and labeled by an approved agency for such purpose.

712.1.14 Group I-3. In Group I-3 occupancies, vertical openings shall be permitted in accordance with Section 408.5.

712.1.15 Skylights. Skylights and other penetrations through a fire-resistance-rated roof deck or slab are permitted to be unprotected, provided that the structural integrity of the fire-resistance-rated roof assembly is maintained. Unprotected skylights shall not be permitted in roof assemblies required to be fire-resistance rated in accordance with Section 705.8.6. The supporting construction shall be protected to afford the required *fire-resistance rating* of the *horizontal assembly* supported.

712.1.16 Gas vents and piping. Vertical openings for penetrations of floors inside a wall cavity by gas vents and piping in buildings of Types III, IV, and V construction shall be permitted.

((~~712.1.16~~)) 712.1.17 Openings otherwise permitted. Vertical openings shall be permitted where allowed by other sections of this code.

SECTION 713
SHAFT ENCLOSURES

713.1 General. The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. *Interior exit stairways* and *ramps* shall be enclosed in accordance with Section 1023.

713.2 Construction. Shaft enclosures shall be constructed as *fire barriers* in accordance with Section 707 or horizontal assemblies in accordance with Section 711, or both.

713.3 Materials. The shaft enclosure shall be of materials permitted by the building type of construction.

[S] 713.4 Fire-resistance rating. Shaft enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting more than four *stories*, ((~~or more, and not less than 1 hour where connecting less than four *stories*.~~)) The number of *stories* connected by the shaft enclosure shall include any basements but not any *mezzanines*. Shaft enclosures shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours. Shaft enclosures shall meet the requirements of Section 703.2.1.

713.5 Continuity. Shaft enclosures shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, and shall have continuity in accordance with Section 707.5 for *fire barriers* or Section 711.2.2 for *horizontal assemblies,* as applicable.

713.6 Exterior walls. Where *exterior walls* serve as a part of a required shaft enclosure, such walls shall comply with the requirements of Section 705 for *exterior walls* and the fire-resistance-rated enclosure requirements shall not apply.

Exception: Exterior walls required to be fire-resistance rated in accordance with Section 1021.2 for exterior egress balconies, Section 1023.7 for interior *exit* stairways and ramps and Section 1027.6 for exterior *exit* stairways and ramps.

713.7 Openings. Openings in a shaft enclosure shall be protected in accordance with Section 716 as required for *fire barriers*. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 716.2.6.6.

713.7.1 Prohibited openings. Openings other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures.

713.8 Penetrations. Penetrations in a shaft enclosure shall be protected in accordance with Section 714 as required for *fire barriers*. Structural elements, such as beams or joists, where protected in accordance with Section 714 shall be permitted to penetrate a shaft enclosure. See Section 3022 for installation of pipes and ducts in elevator hoistways.

713.8.1 Prohibited penetrations. Penetrations other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures.

Exception: *Membrane penetrations* shall be permitted on the outside of shaft enclosures. Such penetrations shall be protected in accordance with Section 714.4.2.

713.9 Joints. Joints in a shaft enclosure shall comply with Section 715.

713.10 Duct and air transfer openings. Penetrations of a shaft enclosure by ducts and air transfer openings shall comply with Section 717.

713.11 Enclosure at the bottom. Shafts that do not extend to the bottom of the building or structure shall comply with one of the following:

1. They shall be enclosed at the lowest level with construction of the same *fire-resistance rating* as the lowest floor through which the shaft passes, but not less than the rating required for the shaft enclosure.
2. They shall terminate in a room having a use related to the purpose of the shaft. The room shall be separated from the remainder of the building by *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The *fire-resistance rating* and opening protectives shall be not less than the protection required for the shaft enclosure.
3. They shall be protected by *approved fire dampers* installed in accordance with their listing at the lowest floor level within the shaft enclosure.

The following excerpt is from the 2018 Seattle Building Code Chapter 8 INTERIOR FINISHES

CHAPTER 8

INTERIOR FINISHES

User notes:

About this chapter: *Chapter 8 contains the performance requirements for controlling fire growth and smoke propagation within buildings by restricting interior finish and decorative materials. The provisions of this chapter require materials used as interior finishes and decorations to meet certain flame spread index or flame propagation criteria and smoke development criteria based on the relative fire hazard associated with the occupancy. The performance of the material is evaluated based on test standards.*

SECTION 801
SCOPE

801.1 Scope. The provisions of this chapter shall govern the use of materials used as *interior finishes*, *trim* and *decorative materials.*

SECTION 802
GENERAL

802.1 Interior wall and ceiling finish. The provisions of Section 803 shall limit the allowable fire performance and smoke development of *interior wall and ceiling finish* materials based on occupancy classification.

802.2 Interior floor finish. The provisions of Section 804 shall limit the allowable fire performance of *interior floor finish* materials based on occupancy classification.

[F] 802.3 Decorative materials and trim. *Decorative materials* and *trim* shall be restricted by combustibility, fire performance or flame propagation performance criteria in accordance with Section 806.

802.4 Applicability. For buildings in flood hazard areas as established in Section 1612.3, *interior finishes*, *trim* and *decorative materials* below the elevation required by Section 1612 shall be flood-damage-resistant materials.

802.5 Application. Combustible materials shall be permitted to be used as finish for walls, ceilings, floors and other interior surfaces of buildings.

802.6 Windows. Show windows in the exterior walls of the first *story* above grade plane shall be permitted to be of wood or of unprotected metal framing.

802.7 Foam plastics. Foam plastics shall not be used as *interior finish* except as provided in Section 803.4. Foam plastics shall not be used as interior *trim* except as provided in Section 806.5 or 2604.2. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.

SECTION 803
WALL AND CEILING FINISHES

803.1 General. *Interior wall and ceiling finish* materials shall be classified for fire performance and smoke development in accordance with Section 803.1.1 or 803.1.2, except as shown in Sections 803.1.3 through 803.15. Materials tested in accordance with Section 803.1.1 shall not be required to be tested in accordance with Section 803.1.2.

803.1.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286. *Interior wall and ceiling finish* materials shall be classified in accordance with NFPA 286 and comply with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered to also comply with the requirements of Class A.

803.1.1.1 Acceptance criteria for NFPA 286. The *interior finish* shall comply with the following:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
5. The total smoke released throughout the test shall not exceed 1,000 m^2.

803.1.2 Interior wall and ceiling finish materials tested in accordance with ASTM E84 or UL 723. *Interior wall* and *ceiling finish* materials shall be classified in accordance with ASTM E84 or UL 723. Such *interior finish* materials shall be grouped in the following classes in accordance with their flame spread and *smoke-developed indices.*

Class A = *Flame spread index* 0–25; *smoke-developed index 0–450.*

Class B = *Flame spread index* 26–75; *smoke-developed index 0–450.*

Class C = *Flame spread index* 76–200; *smoke-developed index 0–450.*

Exception: Materials tested in accordance with Section 803.1.1 and as indicated in Sections 803.1.3 through 803.13.

803.1.3 Interior wall and ceiling finish materials with different requirements. The materials indicated in Sections 803.2 through 803.13 shall be tested as indicated in the corresponding sections.

803.2 Thickness exemption. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall not be required to be tested.

[W] 803.3 Heavy timber exemption. Exposed portions of building elements complying with the requirements for buildings of ((~~heavy timber~~)) Type IV construction in Section 602.4 ((~~or Section 2304.11~~)) shall not be subject to *interior finish* requirements except in interior exit stairways, interior exit ramps, and exit passageways.

803.4 Foam plastics. Foam plastics shall not be used as *interior finish* except as provided in Section 2603.9. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.

803.5 Textile wall coverings. Where used as interior wall finish materials, textile wall coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product-mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.1.1, 803.5.1 or 803.5.2.

803.5.1 Room corner test for textile wall coverings and expanded vinyl wall coverings. Textile wall coverings and *expanded vinyl wall coverings* shall meet the criteria of Section 803.5.1.1 when tested in the manner intended for use in accordance with the Method B protocol of NFPA 265 using the product-mounting system, including adhesive.

803.5.1.1 Acceptance criteria for NFPA 265. The *interior finish* shall comply with the following:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremities of the samples on the 8-foot by 12-foot (203 by 305 mm) walls.
3. Flashover, as defined in NFPA 265, shall not occur.
4. The total smoke release throughout the test shall not exceed 1,000 m^2.

803.5.2 Acceptance criteria for textile and expanded vinyl wall or ceiling coverings tested to ASTM E84 or UL 723. Textile wall and ceiling coverings and expanded vinyl wall and ceiling coverings shall have a Class A *flame spread index* in accordance with ASTM E84 or UL 723 and be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.6 Textile ceiling coverings. Where used as interior ceiling finish materials, textile ceiling coverings, including materials having woven or nonwoven, napped, tufted, looped or similar surface and carpet and similar textile materials, shall be tested in the manner intended for use, using the product-mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or 803.5.2.

803.7 Expanded vinyl wall coverings. Where used as interior wall finish materials, *expanded vinyl wall coverings* shall be tested in the manner intended for use, using the product-mounting system, including adhesive, and shall comply with the requirements of one of the following: Section 803.1.1, 803.5.1 or 803.5.2.

803.8 Expanded vinyl ceiling coverings. Where used as interior ceiling finish materials, expanded vinyl ceiling coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or 803.5.2.

803.9 High-density polyethylene (HDPE) and polypropylene (PP). Where high-density polyethylene or polypropylene is used as an *interior finish,* it shall comply with Section 803.1.1.

803.10 Site-fabricated stretch systems. Where used as interior wall or interior ceiling finish materials, *site-fabricated stretch systems* containing all three components described in the definition in Chapter 2 shall be tested in the manner intended for use, and shall comply with the requirements of Section 803.1.1 or 803.1.2. If the materials are tested in accordance with ASTM E84 or UL 723, specimen preparation and mounting shall be in accordance with ASTM E2573.

803.11 Laminated products factory produced with a wood substrate. Laminated products factory produced with a wood substrate shall comply with one of the following:

1. The laminated product shall meet the criteria of Section 803.1.1.1 when tested in accordance with NFPA 286 using the product-mounting system, including adhesive, as described in Section 5.8 of NFPA 286.

2. The laminated product shall have a Class A, B, or C *flame spread index* and *smoke-developed index*, based on the requirements of Table 803.13, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.

803.12 Facings or wood veneers intended to be applied on site over a wood substrate. Facings or veneers intended to be applied on site over a wood substrate shall comply with one of the following:

1. The facing or veneer shall meet the criteria of Section 803.1.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, as described in Section 5.9 of NFPA 286.
2. The facing or veneer shall have a Class A, B or C *flame spread index* and *smoke-developed index*, based on the requirements of Table 803.13, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.13 Interior finish requirements based on occupancy. *Interior wall and ceiling finish* shall have a *flame spread index* not greater than that specified in Table 803.13 for the group and location designated. *Interior wall and ceiling finish* materials tested in accordance with NFPA 286 and meeting the acceptance criteria of Section 803.1.1.1, shall be permitted to be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

TABLE 803.13
INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

GROUP	SPRINKLERED[l]			NONSPRINKLERED		
	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]
A-1 & A-2	B	B	C	A	A[d]	B[e]
A-3[f], A-4, A-5	B	B	C	A	A[d]	C
B, E, M, R-1	B	C[m]	C	A	B	C
R-4	B	C	C	A	B	B
F	C	C	C	B	C	C
H	B	B	C[g]	A	A	B
I-1	B	C	C	A	B	B
I-2	B	B	B[h, i]	A	A	B
I-3	A	A[j]	C	A	A	B
I-4	B	B	B[h, i]	A	A	B
R-2	C	C	C	B	B	C
R-3	C	C	C	C	C	C
S	C	C	C	B	B	C
U	No restrictions			No restrictions		

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2.

a. Class C interior finish materials shall be permitted for wainscotting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.15.1.

b. In other than Group I-3 occupancies in buildings less than three stories above grade plane, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.

c. Requirements for rooms and enclosed spaces shall be based on spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered to be enclosing spaces and the rooms or spaces on both sides shall be considered to be one room or space. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor regardless of the group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall be not less than Class B materials.

e. Class C interior finish materials shall be permitted in places of assembly with an occupant load of 300 persons or less.

f. For places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be permitted.

g. Class B material is required where the building exceeds two stories.

h. Class C interior finish materials shall be permitted in administrative spaces.

i. Class C interior finish materials shall be permitted in rooms with a capacity of four persons or less.

j. Class B materials shall be permitted as wainscotting extending not more than 48 inches above the finished floor in corridors and exit access stairways and ramps.

k. Finish materials as provided for in other sections of this code.

l. Applies when protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

m. Corridors in ambulatory care facilities shall be provided with Class A or B materials.

803.14 Stability. *Interior finish* materials regulated by this chapter shall be applied or otherwise fastened in such a manner that such materials will not readily become detached where subjected to room temperatures of 200°F (93°C) for not less than 30 minutes.

803.15 Application of interior finish materials to fire-resistance-rated or noncombustible building elements. Where *interior finish* materials are applied on walls, ceilings or structural elements required to have a *fire-resistance rating* or to be of noncombustible construction, these finish materials shall comply with the provisions of this section.

803.15.1 Direct attachment and furred construction. Where walls, ceilings or structural elements are required by any provision in this code to be of fire-resistance-rated or noncombustible construction, the *interior finish* material shall be applied directly against such construction or to furring strips not exceeding 1-3/4 inches (44 mm), applied directly against such surfaces.

803.15.1.1 Furred construction. If the *interior finish* material is applied to furring strips, the intervening spaces between such furring strips shall comply with one of the following:

1. Be filled with material that is inorganic or noncombustible.
2. Be filled with material that meets the requirements of a Class A material in accordance with Section 803.1.1 or 803.1.2.
3. Be fireblocked at not greater than 8 feet (2438 mm) in every direction in accordance with Section 718.

Exception: Compliance with Item 1, 2 or 3 is not required where the materials used to create the concealed space are noncombustible.

803.15.2 Set-out construction. Where walls and ceilings are required to be of fire-resistance-rated or noncombustible construction and walls are set out or ceilings are dropped distances greater than specified in Section 803.15.1, Class A finish materials, in accordance with Section 803.1.1 or 803.1.2, shall be used.

Exceptions:

1. Where *interior finish* materials are protected on both sides by an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Where *interior finish* materials are attached to noncombustible backing or furring strips installed as specified in Section 803.15.1.1.
3. Where the combustible void is filled with a noncombustible material.

803.15.2.1 Hangers and assembly members. The hangers and assembly members of such dropped ceilings that are below the horizontal fire-resistance-rated floor or roof assemblies shall be of noncombustible materials. The construction of each set-out wall and horizontal fire-resistance-rated floor or roof assembly shall be of fire-resistance-rated construction as required elsewhere in this code.

Exception: In Type III and V construction, *fire-retardant-treated wood* shall be permitted for use as hangers and assembly members of dropped ceilings.

803.15.3 Heavy timber construction. Wall and ceiling finishes of all classes as permitted in this chapter that are installed directly against the wood decking or planking of heavy timber construction in Section 602.4.2 or 2304.11 or to wood furring strips applied directly to the wood decking or planking shall be fireblocked as specified in Section 803.15.1.1.

803.15.4 Materials. An interior wall or ceiling finish material that is not more than 1/4 inch (6.4 mm) thick shall be applied directly onto the wall, ceiling or structural element without the use of furring strips and shall not be suspended away from the building element to which that finish material it is applied.

Exceptions:

1. Noncombustible *interior finish* materials.
2. Materials that meet the requirements of Class A materials in accordance with Section 803.1.1 or 803.1.2 where the qualifying tests were made with the material furred out from the noncombustible backing shall be permitted to be used with furring strips.
3. Materials that meet the requirements of Class A materials in accordance with Section 803.1.1 or 803.1.2 where the qualifying tests were made with the material suspended away from the noncombustible backing shall be permitted to be used suspended away from the building element.

SECTION 804
INTERIOR FLOOR FINISH

804.1 General. *Interior floor finish* and floor covering materials shall comply with Sections 804.2 through 804.4.2.

Exception: Floor finishes and coverings of a traditional type, such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not comprised of fibers.

804.2 Classification. *Interior floor finish* and floor covering materials required by Section 804.4.2 to be of Class I or II materials shall be classified in accordance with ASTM E648 or NFPA 253. The classification referred to herein corresponds to the classifications determined by ASTM E648 or NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

804.3 Testing and identification. *Interior floor finish* and floor covering materials shall be tested by an agency in accordance with ASTM E648 or NFPA 253 and identified by a hang tag or other suitable method so as to identify the manufacturer or supplier and style, and shall indicate the *interior floor finish* or floor covering classification in accordance with Section 804.2. Carpet-type floor coverings shall be tested as proposed for use, including underlayment. Test reports confirming the information provided in the manufacturer's product identification shall be furnished to the building official upon request.

804.4 Interior floor finish requirements. Interior floor covering materials shall comply with Sections 804.4.1 and 804.4.2 and *interior floor finish* materials shall comply with Section 804.4.2.

804.4.1 Test requirement. In all occupancies, interior floor covering materials shall comply with the requirements of the DOC FF-1 "pill test" (CPSC 16 CFR Part 1630) or with ASTM D2859.

804.4.2 Minimum critical radiant flux. In all occupancies, *interior floor finish* and floor covering materials in enclosures for stairways and ramps, exit passageways, corridors and rooms or spaces not separated from corridors by partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux. The minimum critical radiant flux shall be not less than Class I in Groups I-1, I-2 and I-3 and not less than Class II in Groups A, B, E, H, I-4, M, R-1, R-2 and S.

Exception: Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials are permitted in any area where Class I materials are required, and materials complying with DOC FF-1 "pill test" (CPSC 16 CFR Part 1630) or with ASTM D2859 are permitted in any area where Class II materials are required.

SECTION 805
COMBUSTIBLE MATERIALS IN TYPES I AND II CONSTRUCTION

805.1 Application. Combustible materials installed on or embedded in floors of buildings of Type I or II construction shall comply with Sections 805.1.1 through 805.1.3.

Exception: Stages and platforms constructed in accordance with Sections 410.2 and 410.3, respectively.

805.1.1 Subfloor construction. Floor sleepers, bucks and nailing blocks shall not be constructed of combustible materials, unless the space between the fire-resistance-rated floor assembly and the flooring is either solidly filled with noncombustible materials or fireblocked in accordance with Section 718, and provided that such open spaces shall not extend under or through permanent partitions or walls.

[S] 805.1.2 Wood finish flooring. Wood finish flooring or wood sheathing used as flooring is permitted to be attached directly to the embedded or fireblocked wood sleepers and shall be permitted where cemented directly to the top surface of fire-resistance-rated floor assemblies or directly to a wood subfloor attached to sleepers as provided for in Section 805.1.1.

805.1.3 Insulating boards. Combustible insulating boards not more than 1/2 inch (12.7 mm) thick and covered with finish flooring are permitted where attached directly to a noncombustible floor assembly or to wood subflooring attached to sleepers as provided for in Section 805.1.1.

SECTION 806
DECORATIVE MATERIALS AND TRIM

[F] 806.1 General. The following requirements shall apply to all occupancies:

1. Furnishings or decorative materials of an explosive or highly flammable character shall not be used.
2. Fire-retardant coatings in existing buildings shall be maintained so as to retain the effectiveness of the treatment under service conditions encountered in actual use.
3. Furnishings or other objects shall not be placed to obstruct exits, access thereto, egress therefrom or visibility thereof.
4. The permissible amount of decorative vegetation and noncombustible decorative materials shall not be limited.

[F] 806.2 Combustible decorative materials. In Groups A, B, E, I, M and R-1 and in dormitories in Group R-2, curtains, draperies, fabric hangings and similar combustible decorative materials suspended from walls or ceilings shall comply with Section 806.4 and shall not exceed 10 percent of the specific wall or ceiling area to which such materials are attached.

Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered to be *interior finish,* shall comply with Section 803 and shall not be considered to be *decorative materials* or furnishings.

Exceptions:

1. In auditoriums in Group A, the permissible amount of curtains, draperies, fabric hangings and similar combustible decorative materials suspended from walls or ceilings shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an *approved automatic sprinkler system* in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 803.15 of this code.
2. In Group R-2 dormitories, within sleeping units and dwelling units, the permissible amount of curtains, draperies, fabric hangings and similar decorative materials suspended from walls or ceiling shall not exceed 50 percent of the aggregate wall areas where the building is equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.
3. In Group B and M occupancies, the amount of combustible fabric partitions suspended from the ceiling and not supported by the floor shall comply with Section 806.4 and shall not be limited.
4. The 10-percent limit shall not apply to curtains, draperies, fabric hangings and similar combustible decorative materials used as window coverings.

806.3 Occupancy-based requirements. Occupancy-based requirements for combustible decorative materials, other than decorative vegetation, not complying with Section 806.4 shall comply with Sections 807.5.1 through 807.5.6 of the *International Fire Code*.

[F] 806.4 Acceptance criteria and reports. Where required to exhibit improved fire performance, curtains, draperies, fabric hangings and similar combustible decorative materials suspended from walls or ceilings shall be tested by an *approved agency* and meet the flame propagation performance criteria of Test 1 or 2, as appropriate, of NFPA 701, or exhibit a maximum heat release rate of 100 kW when tested in accordance with NFPA 289, using the 20 kW ignition source. Reports of test results shall be prepared in accordance with the test method used and furnished to the *building official* upon request.

[F] 806.5 Foam plastic. Foam plastic used as *trim* in any occupancy shall comply with Section 2604.2.

[F] 806.6 Pyroxylin plastic. Imitation leather or other material consisting of or coated with a pyroxylin or similarly hazardous base shall not be used in Group A occupancies.

[F] 806.7 Interior trim. Material, other than foam plastic used as interior *trim*, shall have a minimum Class C flame spread and *smoke-developed index* when tested in accordance with ASTM E84 or UL 723, as described in Section 803.1.2. Combustible *trim*, excluding handrails and guardrails, shall not exceed 10 percent of the specific wall or ceiling area to which it is attached.

[F] 806.8 Interior floor-wall base. *Interior floor-wall base* that is 6 inches (152 mm) or less in height shall be tested in accordance with Section 804.2 and shall be not less than Class II. Where a Class I floor finish is required, the floor-wall base shall be Class I.

Exception: Interior *trim* materials that comply with Section 806.7.

SECTION 807
INSULATION

807.1 Insulation. Thermal and acoustical insulation shall comply with Section 720.

SECTION 808
ACOUSTICAL CEILING SYSTEMS

808.1 Acoustical ceiling systems. The quality, design, fabrication and erection of metal suspension systems for acoustical tile and lay-in panel ceilings in buildings or structures shall conform to generally accepted engineering practice, the provisions of this chapter and other applicable requirements of this code.

808.1.1 Materials and installation. Acoustical materials complying with the *interior finish* requirements of Section 803 shall be installed in accordance with the manufacturer's recommendations and applicable provisions for applying *interior finish*.

808.1.1.1 Suspended acoustical ceilings. Suspended acoustical ceiling systems shall be installed in accordance with the provisions of ASTM C635 and ASTM C636.

808.1.1.2 Fire-resistance-rated construction. Acoustical ceiling systems that are part of fire-resistance-rated construction shall be installed in the same manner used in the assembly tested and shall comply with the provisions of Chapter 7.

The following excerpt is from the 2018 Seattle Building Code Chapter 9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

[S] 909.21 Elevator hoistway pressurization alternative. Where elevator hoistway pressurization is provided in lieu of required enclosed elevator lobbies, the pressurization system shall comply with Sections 909.21.1 through ((~~909.21.11~~)) 909.21.7.

909.21.1 Pressurization requirements. Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The pressure differentials shall be measured between the hoistway and the adjacent elevator landing. The opening and closing of hoistway doors at each level must be demonstrated during this test. ((~~The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.~~))

Exceptions:

1. On floors containing only Group R occupancies, the pressure differential is permitted to be measured between the hoistway and a *dwelling unit* or *sleeping unit.*
2. Where an elevator opens into a lobby enclosed in accordance with Section ((~~3007.6 or 3008.6~~)) 403.6.1.5 or 403.6.2.6, the pressure differential is permitted to be measured between the hoistway and the space immediately outside the door(s) from the floor to the enclosed lobby.
3. The pressure differential is permitted to be measured relative to the outdoor atmosphere on floors other than the following:
   3.1. The fire floor.
   3.2. The two floors immediately below the fire floor.
   3.3. The floor immediately above the fire floor.
4. The minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to occupied floors are not required at the floor of recall with the doors open.
5. Subject to the approval of the *building official*, pressurization is not required for elevators in high-rise buildings with less than 75 feet (22 860 mm) from the lowest floor to the highest ceiling of the *stories* served by the elevator.
6. Maximum and minimum pressures are permitted to comply with rules promulgated by the *building official.*

Interpretation I909.21: For the purposes of measuring pressure differentials, smoke zones consisting of floors interconnected by unenclosed vertical openings shall constitute a single floor.

909.21.1.1 Supply air. The supply air shall be taken from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any mechanical exhaust outlet and dampered relief openings required by Section 909.20.5.3. The supply air intake may be located within the building provided it is located no more than 20 feet (6096 mm) from major openings in the building exterior such as loading docks and vehicular entrances. There shall be no obstruction to the flow of air to the intake.

Dampers other than motorized dampers required by the *International Energy Conservation Code* are not permitted in the elevator hoistway pressurization system air supply unless *approved* by the *building official.*

((~~909.21.1.1~~)) 909.21.1.2 Use of ventilation systems. Ventilation systems, other than hoistway supply air systems, are permitted to be used to exhaust air from adjacent spaces ((~~on the fire floor, two floors immediately below and one floor immediately above the fire floor~~)) to the building's exterior where necessary to maintain positive pressure relationships as required in Section 909.21.1 during operation of the elevator shaft pressurization system. Ventilation systems used to achieve elevator hoistway pressurization are not required to comply with Section 909.21.4.

909.21.2 Rational analysis. A rational analysis complying with Section 909.4 shall be submitted with the *construction documents.*

Exception: A rational analysis is not required for elevator hoistway pressurization in low-rise buildings.

909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same *fire-resistance rating* as required for the elevator shaft enclosure.

909.21.4 Fan system. The fan system provided for the pressurization system shall be as required by Sections 909.21.4.1 through 909.21.4.4.

909.21.4.1 Fire resistance. Where located within the building, the fan system that provides the pressurization shall be protected with the same *fire-resistance rating* required for the elevator ((~~shaft~~)) hoistway enclosure.

909.21.4.2 Smoke detection. The fan system shall be equipped with ((~~a~~)) two smoke detectors ((~~that will~~)) located in accordance with NFPA 72 arranged to automatically shut down the fan system only when both smoke detectors activate. ((~~is detected within the system.~~)) The detectors shall be located downstream of the fan and shall be connected to the fire alarm as a supervisory signal.

909.21.4.3 Separate systems. A separate fan system shall be used for each elevator hoistway.

909.21.4.4 Fan capacity. The ((~~supply~~)) fan system shall be ((~~either adjustable with a capacity of not less than 1,000 cfm (0.4719 m^3/s) per door, or that specified by a *registered design professional* to meet the requirements of a designed pressurization system~~)) provided with the capacity to pressurize the elevator hoistway as determined by a registered design professional. The fan system shall be provided with a means to balance or modulate the airflow to the elevator hoistway to meet the differential pressure requirements on all floors for each condition identified by the rational analysis.

909.21.5 ((~~Standby~~)) Legally required standby and emergency power. Pressurization systems shall be powered by an *approved* emergency or *legally required standby power system*. ((~~The~~)) An *emergency power system* conforming to Section 909.11 shall be provided for pressurization systems in high-rise and underground buildings. Legally required standby power shall be provided ((~~with~~)) for the pressurization system in all other buildings. The emergency and legally required standby power shall be in accordance with Section 2702. For other than high-rise or underground buildings, connection ahead of the service disconnecting means in accordance with Seattle Electrical Code Section 701.12(E) is permitted as a source of legally required standby power.

909.21.6 Activation of pressurization system. The elevator pressurization system shall be activated upon activation of either the building fire alarm system or the elevator lobby smoke detectors. Where both a building fire alarm system and elevator lobby smoke detectors are present, each shall be independently capable of activating the pressurization system. Activation of the fan serving the hoistway is permitted to be delayed by up to 30 seconds so that elevator recall can be initiated prior to pressurizing the hoistway. Activation of the pressurization equipment shall be independent of the position of any dampers in the elevator hoistway air supply system.

Note: Activation of fans serving occupant evacuation elevators is allowed to be delayed, but the elevators must begin occupant evacuation activities and may not be immediately recalled.

((~~**909.21.7 Testing.** Testing for performance shall be required in accordance with Section 909.18.8. System acceptance shall be in accordance with Section 909.19.~~))

909.21.7 Machine and control rooms. Elevator machine and control rooms shall be pressurized in accordance with this section unless separated from the elevator hoistway by construction in accordance with Section 713.

((~~**909.21.8 Marking and identification.** Detection and control systems shall be marked in accordance with Section 909.14.~~

~~**909.21.9 Control diagrams.** Control diagrams shall be provided in accordance with Section 909.15.~~

~~**909.21.10 Control panel.** A control panel complying with Section 909.16 shall be provided.~~

~~**909.21.11 System response time.** Hoistway pressurization systems shall comply with the requirements for smoke control system response time in Section 909.17.~~))