Package #1
Draft for Public Review

May 2024

A17.1-20XX/B44-XX, Safety Code for Elevators and Escalators
(Proposed Revisions of ASME A17.1-2022/CSA B44:22)

TENTATIVE
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8.6.4.19.XX Testing of Flood Detection Means. Where provided, Flood Detection Means shall be tested to determine conformance with the applicable requirements. (See 2.2.9 and 2.27.12)

8.6.5.14.XX Testing of Flood Detection Means. Where provided, Flood Detection Means shall be tested to determine conformance with the applicable requirements. See 2.2.9 and 3.27.5)

8.10.2.2.5(s) Flood Detection Means. Verify location and operation of Flood Detection Means when provided (2.2.9 and 2.27.12).

8.10.3.2.5(w) Flood Detection Means. Verify location and operation of Flood Detection Means when provided (2.2.9 and 3.27.5).

8.11.2.1.5(q) Flood Detection Means. (2.2.9 and 2.27.12).

8.11.3.1.5(s) Flood Detection Means. (2.2.9 and 3.27.5).

Rationale: To provide inspection and testing requirements where flood detection operation is provided in accordance with approved proposal Record 13-1893.
3.24.3 Atmosphere Atmospheric Storage and Discharge Tanks

3.24.3.1 Covers and Venting.

3.24.3.1(a) Covers and tank(s)
Tanks shall be covered and suitably vented to the means shall be provided to maintain atmospheric pressure in the tank atmosphere. Where tanks are located in the hoistway, they shall be vented to prevent accumulation of fumes in the hoistway and their covers shall be of sufficient strength to resist falling objects.

Rationale:
Clarify that the tank is not a pressure vessel as noted in the both the current and slightly revised title of this requirement and that atmospheric pressure is to be maintained.

3.24.3.1(b) Venting
Where a tank(s) is located in the hoistway, the tank(s) a means shall be provided with a means to prevent the accumulation of vapors or fumes in the hoistway or the hoistway shall be provided with a means to prevent accumulation of vapors or fumes.

Rationale:
To clarify that a means to prevent the accumulation of fumes in the hoistway shall be provided.
2.18.7.2 Where jawless governors are used and where the force imparted to the governor rope (see 2.18.6.1) is necessary to activate the safety, including tripping the releasing carrier, if used, and is dependent on the tension in the governor rope, a switch or switches shall be provided that are mechanically opened by the governor tension sheave before the sheave reaches its upper or lower limit of travel. This switch(es) shall be the manually reset type and shall conform to 2.26.4.3. Subsequent to the first stop of the car following the opening of the switch, the car shall remain inoperative until the switch is manually reset.

2.18.7.2 Jawless Governor Requirements

2.18.7.2.1 If the retarding force to activate a safety or trip a releasing carrier (See 2.18.6.1) by a jawless governor is dependent on tension in the governor rope prior to actuation, a means shall be provided and shall function as follows:

   (a) The means shall actuate before the tension in the rope is less than that required to activate the safety or releasing carrier.

   (b) The means shall be of the manually reset type accessible only to elevator personnel and shall conform to 2.26.4.3.

   (c) When actuated while the elevator is running, the means shall automatically function to stop the car at the next available landing and prevent restarting except on hoistway access, or inspection operation (see 2.26.1.4) or until the means is manually reset.

   (d) When actuated while the elevator is not running, the means shall prevent restarting except on hoistway access, or inspection operation (see 2.26.1.4) or until the means is manually reset.

**Rationale:** As a result of Inquiry 16-2986, to address the stopping language. Secondly, to address that the sensing means for the jawless governor rope tension can be either a switch meeting the requirements of 2.26.4.3.1 or a SIL rated device meeting the requirements of 2.26.4.3.2. To require that a car should only be stopped at a landing, thus avoiding an entrapment. To reword and restructure the requirement for clarity

(Electrical)

<table>
<thead>
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**Rationale:** Add the SIL level for the jawless governor rope tension sensing means to SIL Table 2.26.4.3.2 where the SIL value is set at 2 based on the addition of this item to the hazard assessment used to derive the original SIL values for the table.
### 2.9.3.2 Beams or Foundations Supporting Machinery and Sheaves Not Located Directly Over the Hoistway

**2.9.3.2.1** Machines and sheaves located below or at one side of a hoistway shall be anchored fastened to beams, foundations, or floors with bolts, conforming to ASTM A307, of sufficient size and number to withstand the applicable load conditions specified in 2.9.2.2. Based on these initial loads, total tension tensile stress in anchor bolts shall not exceed 85 MPa (12,000 psi) of net section, and the total shear stress shall not exceed 60 MPa (9,000 psi) of actual area in the shear plane. (See also 2.9.3.5.) Requirement 2.9.3.5 shall also be applicable.

**2.9.3.5 Bolts Made of Steel.** Bolts made of steel shall conform to ASTM A307, used to comply with the requirements of 2.9.3.2.1, 2.9.3.3.3, and 2.9.3.4.2. However, bolts having a greater strength than that specified by ASTM A307 shall be permitted, provided that the maximum allowable stresses are increased proportionally based on the ratio of the ultimate strengths. Elongation shall conform to the requirements of the corresponding ASTM specification. Threaded fasteners complying with standards other than ASTM A307 shall adhere to the strength and elongation requirements of their respective standards.

**Rationale:** to imply other standards such as SAE, ISO etc. are acceptable.

### 2.15.6.2.2 Rivets, Bolts, and Rods.

Steel used for rivets, bolts, and rods shall conform to the following specifications:

(a) ASTM A502, Rivets
(b) ASTM A307, Bolts and Rods shall conform to 2.9.3.5.
(c) Rivets shall conform to ASTM A502.
(d) Maximum permissible stresses and deflections shall conform to 2.23.5.

### SECTION 2.23

**CAR AND COUNTERWEIGHT GUIDE RAILS, GUIDE-RAIL SUPPORTS, AND FASTENINGS**

**2.23.2.1 Requirements for Steel, Where Used**

(a) Rails, brackets, fishplates, and rail clips shall be made of open-hearth steel, or its equivalent, having an ultimate tensile strength of not less than 380 MPa (55,000 psi) and having an elongation of not less than 22% in a length of 50 mm (2 in.) when measured in accordance with ASTM E8.

(b) Bolts shall conform to ASTM A307 2.9.3.5.

(c) Rivets shall conform to ASTM A502.

(d) Maximum permissible stresses and deflections shall conform to 2.23.5.

**Rationale:** Remover open hearth reference for steel as it is no longer applicable.

**2.23.9.2 Bracket Fastenings**

2.23.9.2.1 Guide-rail brackets shall be secured to their supporting structure by one of the following means:

(a) by bolts or, rivets, lag bolts, or post-installed anchors used in masonry or concrete

(b) by using clip fastenings to mount brackets to the building structure, provided that
the friction force of such clips has a minimum factor of safety of 10

(2) an additional means, having a safety factor of not less than 5, of resisting horizontal shear
is incorporated
(c) by welding conforming to Section 8.8

2.23.9.2.2 Fastening bolts and bolt holes in brackets and their supporting beams shall conform to
2.23.10. All bolts and lag bolts used in brackets (e.g., multi-part brackets), and the attachment of brackets
to supporting structure shall be of sufficient size and quantity to withstand the applicable load conditions
specified in 2.23.5.2. Based on these loads, total tensile stress in bolts shall not exceed 85 MPa (12,000 psi)
of net section, and the total shear stress in bolts and rivets shall not exceed 60 MPa (9,000 psi) of actual
area in the shear plane. Requirement 2.9.3.5 shall also be applicable.

2.23.9.3 Slotted guide-rail brackets having single bolt fastenings shall be provided with an additional
means to prevent lateral movement of the rail bracket. Such means shall have a factor of safety of not less
than 5.

2.23.9.4 Post-installed wedge anchors used in masonry or concrete for securing brackets to supporting
structure shall be designed and applied per anchor manufacturer’s allowable working loads based on ICC-
ES-AC193 Acceptance Criteria for Post-Installed Mechanical Anchors as recognized in IBC.

2.23.10 Fastening of Guide Rails to Rail Brackets

2.23.10.1 Type of Fastenings. Guide rails shall be secured to their brackets by clips, welds, or bolts.
Bolts used for fastening shall be of such strength as to withstand the forces specified in 2.23.5.2 and
2.23.9.1.

Welding, where used, shall conform to Section 8.8.

2.23.10.2 Size of Bolts for Fastening. The size of bolts used for fastening the guide rails or rail clips to
the brackets shall be not less than specified in Table 2.23.10.2. Bolts used to secure rails to brackets shall
be of sufficient size and quantity to withstand the applicable load conditions specified in 2.23.5.2. Based
on these loads, total tensile stress in support bolts shall not exceed 85 MPa (12,000 psi) of net section, and
the total shear stress in bolts and rivets shall not exceed 60 MPa (9,000 psi) of actual area in the shear
plane. Requirement 2.9.3.5 shall also be applicable.

<table>
<thead>
<tr>
<th>Nominal Mass of Guide Rail, kg/m</th>
<th>SI Unites</th>
<th>Imperial Unites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Diameter of Rail Bolts, mm</td>
<td>M12</td>
<td>5/16</td>
</tr>
<tr>
<td>Nominal Weight of Guide Rail, lb/ft</td>
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### 2.23.10.3 Bolt Holes for Fastenings.

The diameter of holes or the width of slots for fastening bolts shall not exceed the diameter of the bolt by more than 2 mm (0.08 in.).

**Rationale:** The above changes to 2.9, 2.15 and 2.23 address the restrictive and outdated fastener requirements and provide equivalent language applicable in other sections of the code. Since bolts/threaded fasteners of greater strength than that of ASTM A307 are permitted, table 2.23.10.2 minimum size of rail fastening bolts is no longer valid. The tensile and shear stress applied to the bolt/threaded fastener is to be considered by the designer.

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<td>27.5</td>
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<td>5/8</td>
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<tr>
<td>33.5</td>
<td>M20</td>
<td>22 ½</td>
<td>¾</td>
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<tr>
<td>44.5</td>
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<td>30</td>
<td>¾</td>
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**General Rationale:** This proposal has been developed to codify design alternatives for elevator platform guards (aprons). Retractable platform guards are provided when pit depths do not allow a non-retractable platform guard to be installed with the required clearances. The proposal includes performance language to ensure safe design and operation of these devices. This language provides requirements for hardship installations where increasing pit depths is not possible. Additionally, to review and modify existing language with performance/safety related requirements (e.g., strength and deflection requirements).

2.4.1.5 When the car is resting on its fully compressed buffers or bumpers, no part of the car, or any equipment attached thereto or equipment traveling with the car, shall strike any part of the pit or any equipment mounted therein, except as permitted in 2.15.9.2(d) and (e).

**Rationale:** The exception has been added to permit the use of retractable platform guards that may require contact with pit mounted equipment for actuation.

2.15.9 Platform Guards (Aprons)

The entrance side of the platform of passenger and freight elevators shall be provided with smooth metal guard plates of not less than 1.5 mm (0.059 in.) thick steel, or material of equivalent strength and stiffness, adequately reinforced and braced to the car platform and conforming to 2.15.9.1 through 2.15.9.4. The platform guard is permitted to be non-retractable or retractable.

(a) Non-retractable platform guards, where provided, shall conform to 2.15.9.1.

(b) Retractable platform guards shall be permitted to be used where the rated speed is not in excess of 1 m/s (200 ft/min) and where provided, shall conform to 2.15.9.2.

**Note (2.15.9):** Retractable platform guards are provided when pit depths do not allow a non-retractable platform guard to be installed with the required clearances (see Section 2.4).

**Rationale:** The new requirements have been added to permit the use of retractable platform guards for rated speeds up to 1 m/s (200 ft/min). For speeds above 1 m/s (200 ft/min), the combination of height of the buffer and the buffer stroke require a pit depth that is adequate for a non-retractable platform apron.

2.15.9.1 Non-Retractable Platform Guard The guard plate shall extend not less than the full width of the widest hoistway door opening.

2.15.9.1.1 The width of the platform guard plate shall not be less than the full width of the widest hoistway door opening.

**Rationale:** Reworded to eliminate the word “extend” to avoid confusion when referring to retractable platform guards.

2.15.9.1.2 The platform guard plate shall have a straight vertical face, extending below the floor surface of the platform. A horizontal door guiding groove is permitted below the floor surface for door operating devices, door guiding devices, and door retaining devices in accordance with 2.15.9.1.5. The platform guard plate shall be the depth of the leveling zone or truck zone, where provided, plus 75 mm (3 in.), but shall not be less than 1,220 mm (48 in.) from the floor surface, conform to one of the following:

(a) where the elevator is required to conform to 2.19.2.2(b), the depth of the truck zone, where provided, plus 75 mm (3 in.), but in no case less than 1,220 mm (48 in.).

(b) where the elevator is not required to conform to 2.19.2.2(b) the depth of the leveling zone or truck zone, where provided, plus 75 mm (3 in.), but in no case less than 525 mm (21 in.) from the floor surface.

**Rationale:** Revised to address the potential fall hazard created when a car stops between floors and passengers try to self-evacuate or during assisted evacuation that can exist for both electric and hydraulic elevators.

2.15.9.1.3 The lower portion of the platform guard shall be bent back at an angle of not less than 60 deg nor more than 75 deg from the horizontal.

**Rationale:** Revised to address the potential fall hazard created when a car stops between floors and passengers try to self-evacuate or during assisted evacuation that can exist for both electric and hydraulic elevators.
Rationale: To define a bend back length range.

2.15.9.1.4 The platform guard plate shall be securely braced and fastened in place to withstand a constant horizontal force of not less than 650 N (145 lbf) applied at a right angle to and at any position over an area of approximately 100 mm x 100 mm (4 in. x 4 in.) on the face of the guard plate:
   (a) within the unlocking zone, without:
      (1) deflecting more than 6 mm (0.25 in.)
      (2) causing permanent deformation
   (b) outside the unlocking zone, without:
      (1) deflecting more than 30 mm (1.25 in.)
      (2) causing permanent deformation

Where the car entrance on the truck loading side is provided with a collapsible type gate and the height of the hoistway door opening is greater than the distance from the car floor to the car top, a head guard extending the full width of the door opening shall be provided on the car to close the space between the car top and the soffit of the hoistway-door opening when the car platform is level with the floor at the truck loading landing entrance.

Rationale: The 6 mm (0.25 in.) deflection is maintained in the unlocking zone to retain running clearance dimensions. When the car is outside the unlocking zone, the deflection requirement has been increased to 30 mm (1.25 in.), as the platform guard in this area is being used to mitigate falling hazard during evacuation. The force has been applied over an area to be consistent with other portions of the code regarding load deflection requirements. Relocated last paragraph to new 2.15.9.1.6.

2.15.9.1.5 A horizontal door guiding groove with a maximum width of 10 mm (0.375 in.) shall be permitted at the transition of the car sill guard and the car sill, in accordance with the following requirements:
   (a) door power pre-opening in accordance with 2.13.2.2.2 shall not be permitted
   (b) leveling/re-leveling shall be initiated before vertical exposure of the groove is revealed
   (c) where exposure to the gap is revealed the car shall not re-level with open doors
   (d) edges forming the gap shall be configured to prevent hazards free of burrs or sharp edges

Rationale: Renumbered and modified to specify the hazards to be addressed.

2.15.9.1.64 Where the car entrance on the truck loading side is provided with a collapsible-type gate and the height of the hoistway door opening is greater than the distance from the car floor to the car top, a head guard extending the full width of the door opening shall be provided on the car to close the space between the car top and the soffit of the hoistway-door opening when the car platform is level with the floor at the truck loading landing entrance.

Rationale: Relocated from 2.15.9.4 to new 2.15.9.1.6.

2.15.9.2 Retractable Platform Guard

2.15.9.2.1 The width of the retractable platform guard plate shall not be less than the full width of the widest hoistway door opening.

Rationale: Same as requirement 2.15.9.1.1. Requirement repeated and renumbered for user clarity between non retractable and retractable platform aprons.

2.15.9.2.2 A horizontal door guiding groove with a maximum width of 10 mm (0.375 in.) shall be permitted at the transition of the car sill guard and the car sill, in accordance with the following requirements:
   (a) door power pre-opening in accordance with 2.13.2.2.2 shall not be permitted
   (b) leveling/re-leveling shall be initiated before vertical exposure of the groove is revealed
   (c) where exposure to the gap is revealed the car shall not re-level with open doors
   (d) edges forming the gap shall be free of burrs or sharp edges
Rationale: Same as requirement 2.15.9.1.5. Requirement repeated and renumbered for user clarity between non retractable and retractable platform aprons.

2.15.9.2.3 The retractable platform guard shall:
(a) have a fixed straight vertical panel, extending below the floor surface of the platform, with a vertical height not less than the unlocking zone.
(b) have one or more retractable straight vertical panels
(c) be the depth of the leveling zone or truck zone, where provided, plus 75 mm (3 in.), but shall not be less than 1220 mm (48 in.) from the floor surface when fully extended.

Rationale: To provide requirements for the vertical length of retractable platform guards.

2.15.9.2.4 The lower portion of the lowest panel shall:
(a) be bent back at an angle between 60 deg and 75 deg from the horizontal with a bent leg length of not less than 20 mm (0.8 in.) and not greater than 32 mm (1.25 in.).
(b) not have a recess or projection greater than 6 mm (0.25 in.) with respect to the face of the fixed straight vertical guard.
(c) not enter the refuge space in the pit, when the car is resting on its fully compressed buffers or bumpers.
(d) be permitted to make contact with the pit or any equipment mounted therein used in conjunction with operation of the retractable platform guard. Contact shall not affect the normal deceleration of the car or cause damage to the guard. Contact with equipment not used in conjunction with the retractable platform guard shall be prohibited.
(e) be designed and installed in a manner that in the event of a failure to retract, the deceleration of the car shall not exceed 9.8 m/s² (32.2 ft/s²). Failure to retract shall not affect the performance of other equipment located in the pit.

Rationale: To define the design requirements including bend back, low-speed contact with pit or pit equipment for the lower portion of the guard.

2.15.9.2.5 The retractable platform guard plate(s) shall be securely braced and fastened in place to withstand a constant horizontal force of not less than 650 N (145 lbf) applied at a right angle at any position over an area of approximately 100 mm x 100 mm (4 in. x 4 in.) on the face of the:
(a) fixed portion of guard plate within the unlocking zone, without:
   (1) deflecting more than 6 mm (0.25 in.)
   (2) causing permanent deformation
(b) fully extended retractable guard plate(s), outside the unlocking zone, without:
   (1) deflecting more than 30 mm (1.25 in.)
   (2) causing permanent deformation.

Rationale: The 6 mm (0.25 in.) deflection is maintained in the unlocking zone to retain running clearance dimensions. When the car is outside the unlocking zone, the deflection requirement has been increased to 30 mm (1.25 in.), as the platform guard in this area is being used to mitigate falling hazard during evacuation. The force has been applied over an area to be consistent with other portions of the code regarding load deflection requirements. The maximum possible sill-to-sill gap with a 145 lb. load applied to bottom of platform guard could be a maximum of 2.5 inches which does not increase the risk of a fall hazard.

2.15.9.2.6 The retractable platform guard shall be provided with a means to prevent operation of the elevator unless the retractable panel(s) is in its fully extended position when the elevator is more than the extended length of the platform guard above the lowest landing. The means shall be a manual reset type.

2.15.9.2.6.1 When the means detects the retractable platform guard is not fully extended, the elevator controls shall automatically function to stop the car in a controlled manner at a landing. Upon arrival, automatic power-operated doors shall open, and then reclose within 15 s. The door open button shall remain operative. The
The elevator shall not be permitted to restart until the detection means is manually reset. The elevator shall not be permitted to restart except on hoistway access or inspection operation.

**NOTE [2.15.9.2.6.1]:** This does not require the means itself to remain actuated, only that the elevator shall not be permitted to restart except on hoistway access or inspection operation until a manual reset is performed by elevator personnel.

**2.15.9.2.7** The means to prevent operation shall be tested in accordance with the requirements in 8.10.2.2.2(uu) for electric elevators or 8.10.3.2.2(kk) for hydraulic elevators, and instructions for testing shall be included in the on-site documentation [see 8.6.1.2.2(b)(6)] with sufficient detail to ensure that testing can be accomplished by elevator personnel.

**Rationale:** New requirements have been added to permit the use of retractable platform guards including testing and maintenance. Changes address Acceptance Inspections and Tests requirements for both electric (8.10.2.2.2) and hydraulic (8.10.3.2.2) elevators.

**8.6.1.2.2 On-Site Documentation**

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

...  
(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:

...  
(6) Procedures for tests; maintenance; replacements; adjustments; and repairs for retractable platform guards and related circuits [See 8.6.4.19.21 and 8.10.2.2.2(uu) for electric elevators or 8.6.5.14.11 and 8.10.3.2.2(kk) for hydraulic elevators.]  
(c) Written checkout procedures

...  
(8) for retractable platform guards (2.15.9.2.6)

**8.6.4.19 Periodic Test Requirements — Category 1**

...  
**8.6.4.19.21 Retractable Platform Guard Detection Means.** Where provided, testing of the detection means shall comply with the following:

...  
(a) The detection means shall be tested in accordance with procedures provided for 8.10.2.2.2(uu).

**8.6.5.14 Periodic Test Requirements — Category 1**

...  
**8.6.5.14.11 Retractable Platform Guard Detection Means.** Where provided, testing of the detection means shall comply with the following:

...  
(a) The detection means shall be tested in accordance with procedures provided for 8.10.3.2.2(kk).

**Rationale:** Requirements to address the potential situation if the retractable platform guard does not return to its fully extended position above the lowest landing. Changes address Periodic Test Requirements - Category 1 for both electric (8.6.4.19) and hydraulic (8.6.5.14) elevators.

**8.10.2.2.2 Machine Room/Spaces, Control Room/Spaces**

...  
**(uu) Testing of Retractable Platform Guard Means to Prevent Operation**  
(1) The retractable platform guard detection means shall be tested by simulating a partially extended platform guard as appropriate (2.15.9.2.6).
8.10.3.2.2 Machine Rooms/Spaces, Control Rooms/Spaces

... Testing of Retractable Platform Guard Means to Prevent Operation

(1) The retractable platform guard detection means shall be tested by simulating a partially extended platform guard as appropriate (2.15.9.2.6).

(2) The written check-out procedure must be left on-site as part of the On-Site Documentation (see 8.6.1.2.2(c)(8)).

Rationale: Requirements to address the potential situation if the retractable platform guard does not return to its fully extended position above the lowest landing. Changes address Acceptance Inspections and Tests requirements for both electric (8.10.2.2.2) and hydraulic (8.10.3.2.2) elevators.

SECTION 5.2
LIMITED-USE/LIMITED-APPLICATION ELEVATORS

5.2.1.15.2 Platform Guards. Requirement 2.15.9.1.2 does not apply. The platform guard shall have a straight vertical face, extending below the floor surface of the platform of not less than the depth of the unlocking zone (see 2.12.1) plus 75 mm (3 in.) but in no case less than the maximum distance from the landing that it takes to stop and hold the car upon detection and actuation of the device as prescribed in 2.19.2.

Rationale: To update reference in LULA Section regarding new platform guard requirement designations.

5.3.1 Private Residence Electric Elevators

... Platforms

(b) Platform Guards (Aprons). Where the elevator is equipped with a two-way leveling device, the entrance side(s) of the platform shall be provided with a guard conforming to 2.15.9, except that 2.15.9.1.2 does not apply. The platform guard shall have a straight vertical face, extending below the floor surface of the platform not less than the depth of the zone where the hoistway door is unlocked above the landing sill plus 50 mm (2 in.). The platform guard shall not strike the pit floor or any obstruction when the elevator is at its lowest point of travel.

Rationale: To update reference in Private Residential Electric Elevator section regarding new platform guard requirement designations.

SECTION 7.5
ELECTRIC MATERIAL LIFTS WITHOUT AUTOMATIC TRANSFER DEVICES

7.5.2.4 Requirement 2.15.9.1.2 applies to Type A Material Lifts and Type B Material Lifts that operate in a leveling or truck zone in accordance to 7.5.12.2.5 only, except the minimum allowance of 1220 mm (48 in.) in 2.15.9.1.2(a) does not apply to Type A and Type B Material Lifts and the minimum allowance of 525 mm (21 in.) in 2.15.9.2(b) does not apply to Type B Material Lifts.

7.5.2.5 Requirement 2.15.9.1.3 does not apply.

7.5.12.2.5.2 The material lift leveling zone at any landing shall not extend more than 75 mm (3 in.) above and below any landing. Operation in the leveling zone above any landing shall only be permitted when a car apron conforming to 2.15.9 is provided, except the minimum allowances of 1 220 mm (48 in.) in 2.15.9.1.2(a) and 525 mm (21 in.) in 2.15.9.2(b) do not apply.
7.5.12.2.5.3 The material lift truck zone at any landing shall not extend more than 1 700 mm (67 in.) above the landing. Truck zones shall only be permitted when a car apron conforming to 2.15.9 is provided, except the minimum allowances of 1 220 mm (48 in.) in 2.15.9.1.2(a) and 525 mm (21 in.) in 2.15.9.2(b) does not apply.

*Rationale:* To update reference in the electric material lifts without automatic transfer devices section regarding new platform guard requirements and designations. The 525 mm (21 in.) no longer applies.

8.10.2.2.4 Outside Hoistway

(a) Car Platform Guard (Item 4.1)
   
   (1) apron (2.15.9)
   
   (2) car head guards (2.15.9.41.6)

*Rationale:* To update reference in the acceptance inspection and tests of electric elevators section regarding new platform guard requirement designations.
Record 18-2276

2.9.4 Allowable Stresses for Machinery and Sheave Beams or Floors, Their Supports, and Any Support Members That Transmit Load to the Guide Rails or Structural Walls

2.9.4.1 The unit stresses for all machinery and sheave beams and floors and their supports, based on the loads computed as specified in 2.9.2 or 2.9.6, whichever is greater, shall not exceed 80% of those permitted for static loads by the following standards:

(a) Structural Steel. ANSI/AISC Book No. S326 360 or CAN/CSA-S16.1, whichever is applicable (see Part 9).

(b) Reinforced Concrete. ANSI/ACI 318 or CAN3-A23.3, whichever is applicable (see Part 9).

Table 2.15.10.1 Maximum Allowable Stresses in Car Frame and Platform Members and Connections, for Steels Specified in 2.15.6.2.1 and 2.15.6.2.2

<table>
<thead>
<tr>
<th>Member Type</th>
<th>Stress Type</th>
<th>Maximum Stress, MPa (psi)</th>
<th>Area Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car crosshead</td>
<td>Bending</td>
<td>95 (14,000)</td>
<td>Gross section</td>
</tr>
<tr>
<td>Car frame plank (normal loading)</td>
<td>Bending</td>
<td>95 (14,000)</td>
<td>Gross section</td>
</tr>
<tr>
<td>Car frame plank (buffer reaction)</td>
<td>Bending plus tension</td>
<td>115 (17,000)</td>
<td>Gross section</td>
</tr>
<tr>
<td>Car frame uprights (tirles)</td>
<td></td>
<td>140 (20,000)</td>
<td>Net section</td>
</tr>
<tr>
<td>Holding rope hitch plate and shapes</td>
<td>Bending plus tension</td>
<td>75 (11,000)</td>
<td>Net section</td>
</tr>
<tr>
<td>Platform framing</td>
<td>Bending</td>
<td>95 (14,000)</td>
<td>Gross section</td>
</tr>
<tr>
<td>Platform stringers</td>
<td>Bending</td>
<td>115 (17,000)</td>
<td>Gross section</td>
</tr>
<tr>
<td>Threaded brace rods and other tension members except bolts</td>
<td>Tension</td>
<td>60 (9,000)</td>
<td>Net section</td>
</tr>
<tr>
<td>Bolts</td>
<td>Tension</td>
<td>55 (8,000)</td>
<td>Net section</td>
</tr>
<tr>
<td>Bolts in clearance holes</td>
<td>Shear</td>
<td>55 (8,000)</td>
<td>Actual area in shear plane</td>
</tr>
<tr>
<td>Bearing</td>
<td>Shear</td>
<td>120 (17,500)</td>
<td>Gross section</td>
</tr>
<tr>
<td>Rivets or tight body-fit bolts</td>
<td>Shear</td>
<td>75 (11,000)</td>
<td>Actual area in shear plane</td>
</tr>
<tr>
<td>Any framing member normal loading</td>
<td>Compression</td>
<td>Note (1)</td>
<td>Gross section</td>
</tr>
</tbody>
</table>

NOTE: (1) The maximum allowable compressive stress in any member at normal loading shall not exceed 80% of stress permitted for static loads by ANSI/AISC Book No. S326 360 or CAN/CSA-S16.1.

Part 9

Reference Codes, Standards, and Specifications

<table>
<thead>
<tr>
<th>Designator</th>
<th>Standard</th>
<th>Publisher</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI/ACI 318-08 (latest edition)</td>
<td>Building Code Requirements for Structural Concrete</td>
<td>ACI</td>
<td>US</td>
</tr>
<tr>
<td>CAN/CSA-S16.1-09 (latest edition)</td>
<td>Design of Steel Structures</td>
<td>CSA</td>
<td>Canada</td>
</tr>
</tbody>
</table>

Rationale: Update ACI and AISC standard to the latest version. CAN/CSA-S16.1 has been superseded by CAN/CSA-S16.
2.15.13 Suspension-Rope Member Hitch Plates or Shapes

Where cars are suspended by hoisting ropes suspension means attached to the car frame or to the overhead supporting beams by means of rope shackles fastenings, the shackles fastenings shall be attached to steel hitch plates or to structural or formed steel shapes.

2.15.13.1 Such Hitch plates, structural shapes or formed shapes shall be secured to the underside or to the webs of the car-frame member(s) with bolts, rivets, or welds so located that the tensions in the hoisting ropes suspension means will not develop direct tension in the bolts, or rivets or welds.

2.15.13.2 Where the fastenings are attached to a crosshead assembly consisting of two or more members, a means shall be provided to prevent the separation of the members if separation could render the attachment of the suspension members ineffective.

2.15.13.3 The stresses in the connections (bolts, rivets or welds) referred to in 2.15.13.1 shall not exceed those permitted by 2.9.3.34.2.

Rationale: Certain designs utilizing a 1:1 suspension means configuration have the hitch plate secured to the underside of a crosshead assembly with two or more members. If the crosshead assembly is damaged during service or has a load applied in a manner that would spread the two members, it might permit the hitch plate attachment to become ineffective. Requirement 2.9.3.4.2 is a more appropriate reference than 2.9.3.3 for hitchplate connections/attachment, especially for crosshead assemblies.
8.11.12 Examination After Safety Application. After any safety application on a traction elevator has occurred, whether due to testing or during normal service, the driving-machine sheave, all other sheaves, where furnished, and retainers and suspension members shall be examined throughout their complete length to ensure that all suspension members are properly seated in their respective sheaves and that no damage has occurred to sheaves, suspension members, or retainers. The elevator shall not be returned to service until this physical examination has been conducted and any repairs made, if necessary.

If any part of safety device is repaired, replaced, or adjusted such that can affect operation of the safety, then it shall be adjusted and tested by means that will verify its proper operation.

Rationale: Require the safety performance requirements have been verified after any repair, replacement, or adjustment to ensure that the safeties will be in a state that if needed will perform within the ASME A17.1/CSA B44 requirements. If repairs, replacements or adjustments are required after a test, it must be retested prior to placing the elevator back in service, refer to Interpretation 16-2239 (listed as Record 16-2239 on C&S Connect, but not in the approved Interpretations). Also, see Interpretation 97-53.
2.26.1.4.2 Top-of-Car Inspection Operation. Top of car inspection operation shall conform to 2.26.1.4.1 and the following:

(a) A stop switch(es) (see 2.26.2.8) shall be permanently located on the car top and readily accessible to a person, while standing at the any hoistway entrance normally that can be used for to access to the car top.

2.26.2.8 Stop Switch(es) on Top of Car. A stop switch(es) conforming to 2.26.2.5(a), (b), and (c) shall be provided on the top of every elevator car.

Rationale: To provide safe and convenient access to a car top stop switch on elevators with multiple entrances from any landing sill, which may require additional stop switches.
8.11.2.1.3 Top of Car

(rr) Hoistway Access Switches mounted on a sight guard (Item 4.5)

(1) examine flexible cords and flexible cables connected to devices and to fittings so that tension is not transmitted to joints or terminals (2.8.2.1)

(2) Check that flexible cords and flexible cables are protected by bushings or fittings where passing through holes in covers, outlet boxes, or similar enclosures (2.8.2.1)

(3) Verify standard markings indicate the flexible cords and flexible cables conform to the description in NFPA 70, Table 400.4 or CSA C22.1, Table 11 as applicable (2.8.2.1)

(4) Verify the hoistway access switch and hoistway door are grounded and bonded in accordance with NFPA 70, Article 250 or CSA C22.1, Section 10 as applicable (2.8.2.1)

8.11.3.1.3 Top of Car

(ii) Hoistway Access Switches mounted on a sight guard (Item 4.5)

(1) examine flexible cords and flexible cables connected to devices and to fittings so that tension is not transmitted to joints or terminals (2.8.2.1)

(2) Check that flexible cords and flexible cables are protected by bushings or fittings where passing through holes in covers, outlet boxes, or similar enclosures (2.8.2.1)

(3) Verify standard markings indicate the flexible cords and flexible cables conform to the description in NFPA 70, Table 400.4 or CSA C22.1, Table 11 as applicable (2.8.2.1)

(4) Verify the hoistway access switch and hoistway door are grounded and bonded in accordance with NFPA 70, Article 250 or CSA C22.1, Section 10 as applicable (2.8.2.1)

8.11.2.1.4 Outside the Hoistway

(b) Hoistway Doors (Item 4.2) Visually examine the hoistway access switch mounted on a sight guard, if installed. Check that the switch on the sight guard is securely fastened. [Item 4.2 & 4.5.1(b)]

8.11.3.1.4 Outside the Hoistway

(b) Hoistway Doors (Item 4.2) Visually examine the hoistway access switch mounted on a sight guard, if installed. Check that the switch on the sight guard is securely fastened. [Item 4.2 & 4.5.1(b)]

Rationale: To improve safety when hoistway access switches are installed on hoistway doors. To provide inspectors with inspection procedures.
### 8.6.5.14 Additional Tests

The following tests shall also be performed:

- **(a)** Normal Terminal Stopping Devices (8.6.4.19.5) (Item 3.5.2)
- **(b)** Governors (8.6.4.19.3) (Item 2.13.2.2)
- **(c)** Safeties (8.6.4.19.2) (Item 5.8.2)
- **(d)** Oil Buffers (8.6.4.19.1) (Item 5.12)
- **(e)** Firefighters’ Emergency Operation (8.6.4.19.6) (Items 6.1 through 6.5, as applicable)
- **(f)** Standby or Emergency Power Operation (8.6.4.19.7) (Item 1.17.2.2) Elevators equipped with standby or emergency power shall be tested to determine conformance with the applicable requirements. Absorption of regenerated power (2.26.10) does not apply to hydraulic elevators. Tests shall be performed with no load in the car.

**NOTE:** Absorption of regenerated power (2.26.10) does not apply to hydraulic elevators.

- **(g)** Power Operations of Door System (8.6.4.19.8) (Items 4.6 and 4.7)
- **(h)** Low Oil Protection Operation (3.26.9) (Item 2.39.2)
- **(i)** Auxiliary Power Lowering Device. The auxiliary power lowering device, where provided, shall be tested with no load in the car for conformance with applicable requirements (3.26.10) (Item 2.44).

### 8.6.5.14.xx Terminal Speed Reducing/Limiting Devices

- **(a)** For elevators installed under ASME A17.1-2000 and later editions, test Terminal Speed-Reducing Device for compliance with requirement 3.25.2. (Item 3.6.2.2).
- **(b)** For elevators installed under ASME A17.1d-2000 and earlier editions, test Emergency Terminal Speed Limiting Device for compliance with Rule 305.2 (Item 3.6.2.2).

**Rationale:**

1. To revise 8.6.5.14 Category 1 Hydraulic Test requirements so as to correct the name of the device referred to in the code for the Category 1 periodic test relating to terminal speed-liming devices for hydraulic elevators.

2. Removing the language from 8.6.5.14.3(g) and relocating this requirement.

3. This will address multiple editions wherein it was referred to under different titles. The original phrase “Emergency Terminal Speed-Limiting Device” is from A17.1d-2000 and earlier editions language that addressed the same area.

4. Codify the note into 8.6.5.14.3(f) and add requirement to the list stating that “Requirement 2.26.10 does not apply” to be consistent with other sections that have the same exclusion, e.g., Section 3.26 [see 3.26.1(h)] and Section 7.6 [see 7.6.8.1(e)].

5. The language in 8.6.5.14.3(g), sequence operation of power door systems was removed based on approved TN 19-1339.
8.7.2.19 Speed Governors and Governor Ropes.

8.7.2.19.1 Where any alteration is made to a speed governor, or where a new governor is installed, it shall conform to 2.18. Where it is located inside the hoistway, it shall also conform to 2.7.6.3.4. Where there is a releasing carrier, it shall also conform to 2.17.14(d) and 2.17.15.

Governor ropes of a different material, or construction than originally specified by the governor manufacturer shall be permitted, provided that

(a) there is conformance with 2.18.5 through 2.18.7, and 2.18.9 except that the pitch diameters of existing governor sheaves and tension sheaves are not required to conform to 2.18.7.

(b) a test is made of the car or counterweight safety and speed governor with the new rope to demonstrate that the safety will function as required by 2.17.3.

Drum-operated safeties that require continuous tension in the governor rope to achieve full safety application shall be checked as specified in 8.6.4.20.1.

For inspection and test requirements, see 8.10.3.2(f).

Rationale: - To add the requirements of 2.7.6.3.4 if the governor is located inside the hoistway.

- Clarify the language for the releasing carrier to conform with the rest of 2.18 and also 2.17.14(d)
- Add requirements of the governor rope meeting 2.18.5 and 2.18.9

8.7.3.16 Governors and Governor Ropes. Where alterations are made to governors or where they are added, they shall conform to 8.7.2.19.

8.7.3.16.1 Where any alteration is made to a speed governor, or where a new governor is installed, it shall conform to 3.17.4. Where there is a releasing carrier, it shall also conform to 2.17.14(d) and 2.17.15.

Governor ropes of a different material, or construction than originally specified by the governor manufacturer shall be permitted, provided that

(a) there is conformance with 2.18.5 through 2.18.7, and 2.18.9 except that the pitch diameters of existing governor sheaves and tension sheaves are not required to conform to 2.18.7.

(b) a test is made of the car or counterweight safety and speed governor with the new rope to demonstrate that the safety will function as required by 2.17.3

Drum-operated safeties that require continuous tension in the governor rope to achieve full safety application shall be checked as specified in 8.6.4.20.1.

For inspection and test requirements, see 8.10.3.3.2(f).

Rationale: - To reference the requirement for a Governor and Ropes as defined by the Hydraulic Section of the Code. The reference to governors located in the hoistway is referenced through 3.17.4.

- Clarify the language for the releasing carrier to conform with the rest of 2.18 and also 2.17.14(d)
- Add requirements of the governor rope meeting 2.18.5 and 2.18.9
2.20.9.7 Method of Securing Wire Ropes in Tapered Sockets. Where the tapered type of socket is used, the method and procedure to be followed in making up the fastening shall conform to 2.20.9.7.1 through 2.20.9.7.10, as applicable.

2.20.9.7.1 Handling. The rope to be socketed shall be carefully handled to prevent twisting, untwisting, or kinking.

2.20.9.7.2 Seizing of Rope Ends. The rope ends to be socketed shall be seized before cutting, with seizing in accordance with the following:

(a) The seizing shall be done with annealed iron wire, provided that other methods of seizing that give the same protection from loss of rope lay are permitted. Where iron wire is used for seizing, the length of each seizing shall be not less than the diameter of the rope.

(b) For non-preformed rope, three seizings shall be made at each side of the cut in the rope. The first seizing shall be close to the cut end of the rope, and the second seizing shall be spaced back from the first the length of the end of the rope to be turned in. The third seizing shall be at a distance from the second equal to the length of the tapered portion of the socket.

(c) For preformed rope, one seizing shall be made at each side of the cut in the rope. The seizing shall be at a distance from the end of the rope equal to the length of the tapered portion of the socket plus the length of the portion of the rope to be turned in.

2.20.9.7.3 Spreading of Rope Strands. After the rope has been seized, it shall be inserted into the socket through the hole in the small end, a sufficient distance for manipulation, and where non-preformed rope is used, the first two seizings shall be removed. The rope strands shall then be spread apart, and where rope with fiber core is used, the fiber core shall be cut away as close as possible to the remaining seizing.

2.20.9.7.4 Removal of Grease or Oil. Thorough cleaning of the outer wires of the strand surface and the inside of the rope socket is required for good adhesion. Brush or dip in clean solvents is recommended.

2.20.9.7.5 Preparation of Rope Strands

(a) Turning in of Rope Strands for Babbitt Metal. The exposed rope strands shall then be bent, turned in, and bunched closely together, each strand being turned back the same distance. The portion turned in (rope rosette) shall have a length not less than 2.5 times the diameter of the rope and such that, when the rope is pulled as far as possible into the socket, the bend of the turned-in strands shall be slightly over-flush with the mouth of the tapered socket (large end) and will be visible when the socket has been completed (see 2.20.9.7.9). Where rope with steel core is used, the steel core shall be cut off even with tops of the looped strands

(b) Brooming of Rope Strands for Thermosetting Resin Composition. Where brooming is required per manufacturer’s instruction, the rope (including any steel core where appropriate) shall be unlaid into its constituent wires to form a broom. The opening angle of the broom shall not exceed 45° from the center axis of the rope as shown in Figure 1.
(1) The socket shall be drawn over the broom until the root of the broom protrudes into the tapered portion at the small end by no more than 0.5d (d: the diameter of the rope).

(2) The wires shall be evenly distributed within the socket basket.

(3) The distance between the end of the broom and the large end of the socket basket shall be not greater than 5% of the length of the socket basket.

(4) Follow the manufacturer’s recommendations for inserting the broom into the socket and see 2.20.9.7.8 for preparation of the embedment medium and recommended acceptance criteria.

2.20.9.7.6 Insertion of Bent-in Rope Strands in Socket. The rope end shall be pulled as far as possible into the socket, so that the remaining seizing projects outside the hole at the small end of the socket.

2.20.9.7.7 Position of Socket Preparatory to Pouring Embedment Medium. The socket shall be held in a vertical position with the large end up, and the rope held in a position truly axial with the socket. Tape or waste shall be permitted to be wound around the rope at the small end of the socket to prevent the embedment medium from seeping through but shall be removed after completion of the socket.

2.20.9.7.8 Preparation of Embedment Medium

(a) Babbitt Metal

(1) Heating of Babbit. The babbitt shall be heated to a fluidity just sufficient to char a piece of soft wood such as white pine without igniting it. Care shall be taken not to overheat the babbitt sufficiently to damage the rope.

(2) Heating of Socket Basket and Pouring of Babbit. The rope socket basket shall be heated by a blowtorch flame sufficiently to prevent chilling of the babbitt and to ensure that the babbitt, when poured, will completely fill the basket, including all the spaces between the rope strands. Following this, the molten babbitt shall be poured slowly and evenly into the basket until it is filled to a point level with the top of the opening in the large end.

(b) Thermosetting Resin Composition

(1) The manufacturer’s directions shall be strictly followed in handling, mixing, pouring, and curing the resin material.

(2) New containers of resin and catalyst shall be used for each set of rope sockets. The entire quantity of resin and catalyst shall be mixed when the containers are opened.

(3) Follow the manufacturer’s directions for resin socket temperatures during application and curing. Resin sockets shall not be poured at a temperature below 16°C (60°F) without first warming the socket and the resin composition to 21°C to 32°C (70°F to 90°F). The socket shall be permitted to be warmed using the electrical resistance heating devices intended for curing resin sockets.
Follow the manufacturer’s directions for curing times and verification methods. Curing of resin sockets shall be accomplished by heating at elevated temperature following the manufacturer’s suggested schedule and directions. Cure time shall not exceed 30 min. Electrical resistance heating devices designed to fit around the sockets, or other means of providing controlled, evenly distributed heat, shall be used to provide the elevated temperature for curing. Open flames or exposed electrical resistance heating elements shall not be used.

Upon completion of the socketing, the label from the container of resin shall be attached to one of the rope sockets for inspection purposes and shall be suitably protected.

2.20.9.7.9 Inspection of Sockets After Completion. A visual inspection of the completed sockets shall be made after they have cooled and the tape or waste has been removed from the small end of the sockets. The visual inspection shall verify that

(a) the embedment medium is visible at the small end of the socket
(b) the bends of all the individual rope strands (see 2.20.9.7.5) are approximately the same height above the embedment medium and are visible within the range of not less than one-half the diameter of the rope strand above the embedment medium and that there is not more than 1.5 mm (0.06 in.) clearance between the embedment medium and the underside of the bend in the rope strand
(c) no loss of rope lay has occurred where the wire rope enters the socket

2.20.9.7.10 Lubrication of Wire Rope After Socket Attachment. After the resin has cured, the wire ropes shall be lubricated at the base of the socket (small end) to replace the lubricant that was removed during the cleaning operation required under 2.20.9.7.4.

Rationale: This revision was developed in response to Inquiry 20-2065. Thermosetting resin compositions intended for elevator wire rope socketing are allowed to be used to secure ropes in tapered sockets under 2.20.9.6. Brooming of Rope Strands, which is applicable and recommended by manufacturers for Thermosetting Resin Compositions, is proposed to be added to the code.
8.6.4.20.10 Braking System, Traction, and Traction Limits. Traction and traction limits on traction elevators shall be verified for compliance with 2.24.2.3 in accordance with (a) or, subject to approval by the authority having jurisdiction, with (b).

(a) Dynamic Stopping Test. Traction elevators shall be tested to ensure that

(4) during an emergency stop initiated by any of the electrical protective device(s) listed in 2.26.2 (except 2.26.2.13) (except buffer switches for oil buffers used with Type C car safeties) at the rated speed in the down direction, with passenger elevators and freight elevators permitted to carry passengers carrying 125% of their rated load, or with freight elevators carrying their rated load, cars shall safely stop and hold the load (see 2.24.2.3.1 through 2.24.2.3.3)

(5) if either the car or the counterweight bottoms on its buffers or becomes otherwise immovable, one of the following shall occur (see 2.24.2.3.4) [Item 2.18.2]:

(-a) the suspension means shall lose traction with respect to the drive sheave and not allow the car or counterweight to be raised

(-b) the driving system shall stall and not allow the car or counterweight to be raised

(6) With a load in the car in accordance with Table 8.6.4.20.4, the braking system and traction relation shall be tested to show that the system can safely stop and hold the car and, where required by 2.16.2.2.4(c), shall releve the car.

(b) Alternative Test Method for Braking System, Traction, and Traction Limits. Alternative test methods shall comply with 8.6.11.10 and the following:

(3) Other methods for verifying traction for compliance with 2.24.2.3, and traction limits in compliance with 2.24.2.3.4, shall be permitted, provided the test method complies with the following:

(-a) When applied, the method shall verify that the elevator traction system performs, or is capable of performing, in compliance with the performance requirements of (a).

(-b) The braking system and traction relation shall be tested to show the system can safely stop and hold the car and, where required by 2.16.2.2.4(c), shall releve the car without a load in the car.

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

Rationale: Added reference to Item 2.18.2.

8.6.10.1.1 Periodic Test. Dumbwaiters shall be subject to the applicable periodic tests specified in 8.6.4.19, 8.6.4.20, and 8.6.5.14 through 8.6.5.16. The test requirements shall apply to the corresponding requirements in Part 7. Any additional requirements for this equipment shall also be checked during these tests.

On winding-drum machines, the slack rope devices required by 2.26.2.1 shall be permitted to be tested as specified in Item 2.18. The driving-machine brake shall be tested to determine conformance with 7.2.10 [Item 2.18].

Drive machine brake

(-d) On winding drum machines, slack rope devices required by 2.26.2.1 shall be permitted to be tested as specified in Item 2.20.2.1(b)

(-e) On traction machines, if either the car or counterweight bottoms on its buffers or otherwise becomes immovable, the car or counterweight shall not be allowed to raise (see 2.24.2.3.4) [Item 2.18.2]

(-f) The driving-machine shall be tested to determine conformance with 7.2.10 (Item 2.18)

Rationale:

• Differentiated traction from winding drum dumbwaiter
• Changed reference to refer to slack-rope device for winding drum machines
**Background:** 8.10.2.2.2(cc)(3)(b) require the same test as in [Item 2.18.2]. However the acceptance test in 2.18.3 is currently empty.

**8.10.2.2.2(cc)(3)**

(-b) Traction shall slip, or the driving machine shall stall, if either the car or the counterweight bottoms on its buffer [Item 2.18.3]

**Rationale:** Added reference to Item 2.18.3.
2.26.4.3.1 The devices covered by 2.26.2 shall have contacts that are positively opened mechanically; their opening shall not be solely dependent on springs. Such devices, except those listed/certified according to 2.12.4, shall be marked with the direct opening action symbol or have technical documentation that demonstrates compliance (see 8.6.1.2.2(a)), have accompanying product documentation demonstrating compliance.

Exceptions are devices described by 2.26.2.4, 2.26.2.19, 2.26.2.29, and 2.26.2.30; and 2.26.2.12 and 2.26.2.16 where magnetically operated, optical, or solid-state devices are used.

NOTE (2.26.4.3.1): Positive opening is achieved when all the contact breaking elements are brought to their open position and when, for a significant part of the travel, there are no resilient members (e.g., springs) between the moving contacts and the part of the actuator to which the actuating force is applied.

An example of this is a contact complying with the requirements of IEC 60947-5-1:2004, Annex K.

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 in 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) and, where applicable, technical documentation demonstrating compliance with 2.26.4.3.1.

Rationale: Requirements are added to identify contacts that are positively opened, which will assist authorities having jurisdiction in determining compliance with the A17.1/B44 requirement 2.26.4.3.1.

Requirement of “contacts are positively opened mechanically” are the same for door interlocks (requirement 2.12.4) and EPDs (2.26.2); however, A17.1-2019/B44:19 already includes the requirements for interlocks.


2.25.2 Normal Terminal Stopping Devices

2.25.2.1 Where Required and Function. Normal terminal stopping devices shall conform to 2.25.2.1.1 through 2.25.2.1.3.

2.25.2.1.1 Normal terminal stopping devices shall be provided and arranged to detect the position of the car and cause the car to slow down and stop the car automatically, at or near within an inner landing zone extending not more than 75 mm (3 in.) above and 75 mm (3 in.) below the top and bottom terminal landings, with any load up to and including rated load in the car and from any speed attained in normal operation (see 2.16.8).—See 2.12.1 and Nonmandatory Appendix B for where the doors shall be openable.

Rationale: The proposed change is to specify what is meant by “at or near the top and bottom terminal landings” and to ensure that the normal terminal stopping device for electric elevators will stop the car within a specified distance from floor level to allow passengers to exit at the terminal landing.

2.25.2.1.2 The normal terminal stopping devices (i.e., those devices used for sensing relative changes in car position) shall function independently of the operation of the normal stopping means and of the final terminal stopping device, such that the failure of the normal stopping means and/or the failure of the final terminal stopping devices shall not prevent the normal terminal stopping device from functioning as specified in 2.25.2.1.1, except that

... (d) on elevators with a rated speed of 0.75 m/s (150 ft/min) or less, the normal terminal stopping device shall be permitted to be used as the normal stopping means provided that the normal terminal stopping device meets the requirements of 2.26.11.

Rationale: To ensure that the stopping and releveling accuracy as required in 2.26.11 is maintained when the normal terminal stopping device is used as the normal stopping means.

3.25.1 Normal Terminal Stopping Devices

3.25.1.1 Where Required and Function. Upper and lower normal terminal stopping devices shall be provided and arranged to detect the position of the car and cause the car to slow down and stop automatically, at or near within an inner landing zone extending not more than 75 mm (3 in.) above and 75 mm (3 in.) below the top and bottom terminal landings, with any load up to and including rated load in the car from any speed attained in normal operation. See 2.12.1 and Nonmandatory Appendix B for where the doors shall be openable.
**Rationale:** To specify what is meant by “at or near the top and bottom terminal landings” and to ensure that the normal terminal stopping device for hydraulic elevators will stop the car within a specified distance from floor level to prevent passenger entrapment at a terminal landing.
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 900mm (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. 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 and when provided the side rail handgrips, 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.

*Rationale: Clarification that other handgrips are permitted (see approved Record 18-858).*

2.2.4.2.2 The ladder rungs, cleats, or steps shall be a minimum of 400 mm (16 in.) wide.

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 the 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 115mm (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 adjacent to the side rails of not less than 115 mm (4.5 in.) from their centerline to the nearest permanent object. When obstructions are encountered, the clear distance adjacent to the side rails shall be permitted to be decreased to not less than 115 mm (4.5 in.). When the clear distance is decreased to less than 115 mm (4.5 in.), ladder rungs, cleats, or steps shall be provided above the height of the access door sill to the top of the ladder as handgrips, with the top handgrip located between 1200 mm and 1300 mm (48 in. and 51 in.) above the access door sill.

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

*Rationale: The rationale of approved Record 18-858 states that by providing rungs for the full length of the ladder a consistent hand grip is provided through the rungs while entering and exiting the elevator pit to prevent inadvertent loss of hand grip when changing from rungs to a side rail. This change removes the limitation when an obstruction is encountered and prescribes a required vertical range for the top hand grip when side rails are not provided.*
a rung to a side rail where the rungs are only provided to the height of the access door sill. By providing rungs for the full length of the ladder a consistent hand hold is provided through the rungs while entering and exiting the elevator pit. When exiting the elevator pit it is intuitive to use the ladder rungs to climb.
Record 21-2062

8.7.2.7.6 Lighting. No alteration shall be made that diminishes the lighting of a machine room or machinery space, machine room, control space, or a control room below that required by 2.7.9.1.

Rationale: The current requirement only addresses machine rooms and machinery spaces. Lighting requirements for control rooms and control spaces was added.
8.10.3.2.2 Machine Rooms, Machinery Spaces, and Control Rooms/Spaces

(y) Supply Lines and Shutoff Valves (Item 2.35). Data from the pipe, fitting, and valve manufacturers shall be provided to verify that the pressured rating of all components complies with pressure rating requirements (Item 2.18.3 3.19).

**Rationale:** Provide corrections to ensure A17.1, 8.10.3.2.2 is accurate.
Section 1.3
Definitions

elastomeric coated steel wire rope (hoisting and compensating): A circular suspension member constructed of an elastomeric coating over a steel wire rope used to raise and lower an elevator, dumbwaiter, or material lift car or its counterweight or both.

SECTION 2.20
SUSPENSION MEANS AND THEIR CONNECTIONS

2.20.1 Suspension Means
Elevator cars and counterweights shall be suspended by steel wire ropes, aramid fiber ropes, elastomeric coated steel wire ropes or non-circular elastomeric coated steel suspension members attached to the car frame or passing around sheaves attached to the car frame specified in 2.15.1. Suspension Means that have previously been installed and used on another installation shall not be reused. All suspension members in a set of suspension means shall be the same material, grade, construction, and dimensions. A suitable means shall be provided to protect the suspension means during the installation process.
Only the following shall be permitted:
(a) Steel wire ropes constructed in accordance with ASME A17.6, Part 1.
(b) Aramid fiber ropes constructed in accordance with ASME A17.6, Part 2.
(c) Non-circular elastomeric coated steel suspension members constructed in accordance with ASME A17.6, Part 3.
(d) Elastomeric coated steel wire ropes in accordance with ASME A17.6, Part 5.

Rationale: To recognize a new means of suspension to respective ASME standards.

2.20.2.2 Data Tag at Suspension Means Fastening
 ...
2.20.2.2.2 The following data on a data tag complying with 8.13.3 shall be provided:
(a) Type of Suspension (steel wire rope, aramid fiber rope, non-circular elastomeric-coated steel suspension member, or elastomeric coated steel wire rope.
...

Rationale: To permit elastomeric coated steel wire ropes in addition to aramid fiber ropes, non-circular elastomeric coated steel, and steel wire ropes.

2.20.3 Factor of Safety
Where suspension means are different from traditional un-coated steel wire ropes, technical criteria for essential safety requirements and parameters, such as minimum factor of safety, monitoring, residual strength, and replacement, shall be selected on the basis of sound engineering practice compatible with the product technology, including performance testing under elevator operating conditions for its range of application.

2.20.4 Minimum Number and Dimensions of Suspension Means

2.20.4.4 Elastomeric Coated Steel Wire Ropes. The minimum number of suspension members used shall be three. Elastomeric coated steel wire ropes shall not be used on drum machines.

Rationale: To accommodate elastomeric coated steel wire ropes. Outer wire diameter does not apply to elastomeric coated steel wire ropes as the rope is not exposed. No technical data has been provided to show that drum machine is a viable application, therefore it was not taken into consideration for this proposal.

2.20.8.2 Broken Suspension Member. All electric traction elevators, excluding those with un-coated steel wire ropes greater than or equal to 8 mm (0.315 in.), shall be provided with a broken-suspension-member detection means. The means shall...

2.20.8.3 Suspension Member Residual Strength. All electric traction elevators, excluding those with un-coated steel wire ropes, shall be provided with residual-strength detection means. The means shall...

2.20.9.4 Tapered Rope Sockets. The use of tapered rope sockets shall be permitted only for un-coated steel wire ropes 8 mm (5/16 in.) or greater. When used, the tapered rope sockets shall be of a design as shown in Figure 2.20.9.4

2.20.9.5 Wedge Rope Sockets. The use of wedge rope socket assemblies shall be permitted only for steel wire, aramid rope, and elastomeric coated steel wire ropes. When used, the wedge rope socket assemblies shall be of a design as shown in Figure 2.20.9.5 and shall conform to 2.20.9.2, 2.20.9.3, and 2.20.9.5.1 through 2.20.9.5.7. Socket and wedge surfaces that contact the rope shall be free of burrs or sharp edges that could damage the rope.

2.21.4 Compensation Means

Compensation means, such as compensating ropes or chains or other mechanical means and their attachments (except for safety hooks, where used) to tie the counterweight and car together, shall be capable of withstanding, with a factor of safety of 5, any forces to which the means is subjected with the elevator at rest.

The maximum suspended weight of the compensation means with the car or counterweight at the top of its travel and one-half of the total weight of the tension sheave assembly, where used, shall be included.

The factor of safety for compensation means shall be based on the minimum, breaking load, or breaking force as appropriate to the tensile testing method.

Steel wire ropes used for compensation shall comply with A17.6, Part 1. Elastomeric coated steel wire ropes used for compensation shall comply with A17.6, Part 5.

Rationale: To limit steel wire rope compensation to only those manufactured according to A17.6.
2.24.2.2 Minimum Pitch Diameter. Sheaves and drums used with suspension and compensating means (see 2.20.1) shall have a pitch diameter of not less than

(a) 40 times the diameter of steel wire rope where used for suspension ropes;
(b) 40 times the cord diameter (see ASME A17.6, 3.3.3.1.1) of non-circular elastomeric coated steel suspension members where used for suspension;
(c) 16 times the functional diameter (see ASME A17.6 2.3.3.1.2) of the load carrying fibers of aramid ropes where used for suspension or compensation; and
(d) 32 times the diameter of steel wire ropes and cord diameter of non-circular elastomeric coated steel suspension members where used for compensation.

(e) 25 times the diameter of the steel wire rope inside the elastomeric coating, not the diameter of the elastomeric coating for elastomeric coated steel wire rope where used for suspension and compensation.

Rationale: To allow for the use of elastomeric coated steel wire ropes. The diameter of the steel wire rope within the elastomeric coating is the diameter used when calculating minimum pitch diameter.

2.24.2.3 Percent Counterweight Overbalance Data Plate. The designed maximum and minimum percent counterweight overbalance range that is required to meet the traction requirements of 2.24.2.3.1, 2.24.2.3.2, or 2.24.2.3.3, or 2.24.2.3.6 shall be provided on a data plate. This data plate shall be integral with or adjacent to the data plate required in 2.16.3. Where this data plate is adjacent to the data plate required by 2.16.3, the material and markings shall conform to 2.16.3.3.

2.24.2.3.6 Elastomeric Coated Steel Wire Ropes. Where surfaces are used to provide traction, sufficient traction shall be provided between the elastomeric coated steel wire rope and the surface and in the event of failure of the elastomeric coating around the load-carrying ropes and the sheave contact surface, to safely stop and hold the car with rated load [see 2.16.8(c)] from rated speed in the down direction. Sheaves with undercut U-grooves, V-grooves, or reverse bends shall not be permitted with elastomeric coated steel wire rope.

Rationale: To ensure that sufficient traction is available if the elastomeric coating of the elastomeric coated steel wire rope is damaged. To prohibit use of coated steel wire rope with sheaves having undercut U-grooves, V-grooves, or reverse bends. ISO 8100-2:2019(E) 5.12.2.3 A bend is only considered to be a reverse bend if the distance from the rope contacts two consecutive pulleys, which have a fixed distance between their axles, is less than 200 times the rope diameter and the bending planes are rotated through more than 120 degrees.

8.6.3.2 Replacement Suspension Means.

... 8.6.3.2.4 For Elastomeric Coated Steel Wire Ropes, A17.6 Section 5.7 shall apply.

Rationale: To provide requirements for replacement criteria of elastomeric coated steel wire ropes.
1.1.3 Application of Parts

This Code applies to new installations only, except Part 1 and Sections 5.10, 8.1, and 8.6 through 8.1213, which apply to both new and existing installations.

Rationale: 8.13 was always intended to be applicable to new and existing equipment. This proposal corrects 1.1.3.
Proposed editorial revisions to A17.1/B44:

INDEX:
...
Flexible hose and fittings, hydraulic elevator, 3.19.2.3
   annual inspection of, 8.6.5.14.4
Flood elevation (see Flood detection)
   definition of, Section 1.3
Flood detection
   electric elevators, 2.2.9
   hydraulic elevators, 3.27.5
   operation, 2.27.12
Floor, car (see Car platform)
...

Rationale: Updating the index to incorporate new flood detection requirements approved via Record 13-1893
8.7.2.29 Emergency Responder Radio Coverage (ERRC) Equipment Inside Hoistways and Cars
(a) The alteration or addition of Emergency Responder Radio Coverage (ERRC) equipment inside the hoistway shall meet the requirements of 2.8.7.
(b) The alteration or addition of Emergency Responder Radio Coverage (ERRC) equipment inside the car shall meet the requirements of 2.27.12.

8.7.3.31.14 Emergency Responder Radio Coverage (ERRC) Equipment Inside Hoistways and Cars
(a) The alteration or addition of Emergency Responder Radio Coverage (ERRC) equipment inside the hoistway shall meet the requirements of 2.8.7.
(b) The alteration or addition of Emergency Responder Radio Coverage (ERRC) equipment inside the car shall meet the requirements of 2.27.12.

Rationale: To include Alteration requirements for Emergency Responder Radio Coverage Equipment that were added to the to be published ASME A17.1-2022/CSA-B44:22 by Record 19-1766; for Electric and Hydraulic elevators.
8.6.4.13 Door Systems

8.6.4.13.1 General. All landing and car door or gate mechanical and electrical components shall be maintained to ensure safe and proper operation, including but not limited to, the following:

(a) hoistway door interlocks or mechanical locks and electric contacts
(b) car door electric contacts or car door interlocks, where required
(c) door reopening devices
(d) vision panels and grilles, where required
(e) hoistway door unlocking devices and escutcheons
(f) hangers, tracks, door rollers, up-thrusts, and door safety retainers, where required
(g) astragals and resilient members, door space guards, and sight guards, where required
(h) sills and bottom guides, fastenings, condition, and engagement
(i) clutches, engaging vanes, retiring cams, and engaging rollers
(j) interconnecting means
(k) door closers, where required
(l) means to restrict hoistway or car door opening

(m) and expiration date for the alternate power source **for a power operated door restrictor**, where required, to ensure that its expiration date has not elapsed (see 2.14.5.7.4(b)(2)(-b))

**Rationale:** Clarification
**Record 22-1054**

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**Background:**

*sound engineering practice*: the use of engineering or technical methods to design or evaluate a device or system by taking into account relevant factors that may influence its efficacy and operation. This practice also involves the use of applicable standards, specifications, codes, and regulatory and industry guidelines, as well as accepted engineering and design methods and installation and maintenance practices.

**Proposal:**

2.22.4.6 Means for Determining Oil Level. Oil buffers shall be provided with means for determining that the oil level is within the maximum and minimum allowable limits. Transparent sight gauges shall be permitted to be used, provided they meet the requirements for the purpose in accordance with *good-sound* engineering practice. They shall resist shock loading on the buffer or pressure rise as a result of impact, and shall not be stained by the presence of buffer oil, or a means shall be provided to ensure that any staining does not affect the reading of the oil level.

2.24.4 Fasteners and Connections Transmitting Load

2.24.4.1 Fasteners and Rigid Connections. Fasteners and rigid connections shall comply with 2.24.4.1.1 through 2.24.4.1.4 in accordance with *good-sound* engineering practice.

**Rationale:** To use the defined term “sound engineering practice” instead of “good engineering practice” to be consistent with the use of the term throughout the code.
2.18.4.2 Setting of Car Speed Governor Overspeed Switches and Speed-Sensing Means. The setting of the car speed governor overspeed switch and the speed-reducing means shall conform to 2.18.4.2.1 through 2.18.4.2.5.

2.18.4.2.1 For rated speeds more than 0.75 m/s (150 ft/min), up to and including 2.5 m/s (500 ft/min), the car speed governor overspeed switch shall open in the down direction of the elevator at not more than 90% of the speed at which the governor is set to trip in the down direction.

2.18.4.2.2 For rated speeds more than 2.5 m/s (500 ft/min), the car speed governor overspeed switch shall open in the down direction of the elevator at not more than 95% of the speed at which the governor is set to trip in the down direction.

2.18.4.2.3 For rated speeds less than or equal to 0.75 m/s (150 ft/min) elevators with static control, the car speed governor overspeed switch shall open in the down direction of the elevator at not more than 90% of the speed at which the governor is set to trip in the down direction.

Rationale: The current requirements were developed in 1975 when mechanical selectors were state-of-the-art technology and prone to being out of synchronization with the physical car position. Removal of 2.18.4.2.3 the static control provision based on solid state devices, the 90% requirement was based on the lack of history and industry experience with solid state devices. The technology for solid state speed control and position systems has passed the test of time to be reliable. Elimination of this requirement will provide a reduction of OS false tripping entrapments for governors used in typical traction elevator applications of 150fpm and less while still protecting overspeed conditions as described. Revised requirement to reflect remove of the static control % reduction and aligned with Table 2.18.2.1 for the over speed switch setting requirements.

2.18.4.2.4 The speed governor overspeed switch, when set as specified in 2.18.4.2.1, 2.18.4.2.2, or 2.18.4.2.3, shall open in the up direction at not more than 100% of the speed at which the governor is set to trip in the down direction.

2.18.4.2.5 The speed governor overspeed switch shall be permitted to open in the down direction of the elevator at not more than 100% of the speed at which the governor is set to trip in the down direction, subject to the following requirements:

(a) A governor speed-reducing switch conforming to 2.18.4.1.3 is provided on the governor to reduce the speed of the elevator in case of overspeed. The switch shall be set to open as specified in 2.18.4.2.1 or 2.18.4.2.2, or 2.18.4.2.3.

(b) Subsequent to the first stop of the car following the opening of the speed-reducing switch, the car shall remain inoperative until the switch is manually reset.

2.18.4.2.6 The speed-sensing means that is part of the normal speed control system shall be permitted as an alternative to the governor speed-reducing switch [see 2.18.4.2.5(a)]. The means shall monitor the speed of the elevator in all modes of operation, shall reduce the speed of the elevator in case of overspeed, and shall be actuated at the speeds specified in 2.18.4.2.1 or 2.18.4.2.2. Upon actuation and subsequent to the first stop of the car following the detection of an overspeed condition, the car shall remain inoperative. Means shall be required to manually reset before returning the car to
service. For elevators with power-operated doors, the in-car door open button(s) shall remain operative, but the doors shall not be able to be power-opened from the landing.

**Rationale:** Renumbered and editorial change to 2.18.4.2.4 & 2.18.4.2.5 to use the same term speed governor overspeed switch. Provide requirements that will reduce false tripping entrapments for governors while still protecting overspeed conditions. Added requirement 2.18.4.2.6 as an alternative method for speed sensing means to be within the controller for the governor speed-reducing switch.

Table 2.18.2.1 Maximum Car Speeds at Which Speed Governor Trips and Governor Overspeed Switch Operates

NOTE: (1) See 2.18.4.2.5 and 2.18.4.2.6.

**Rationale:** To correct reference note (1) in Table 2.18.2.1.
2.27.3.3.1 When the “FIRE OPERATION” switch is in the “ON” position, the elevator shall be on Phase II Emergency In-Car Operation, for use by emergency personnel only, and the elevator shall operate as follows:

... 

(m) Every car shall be provided with a switch, conforming to the requirements of 2.26.2.33 and located as required in 2.27.3.3.7. When the switch is in the “STOP” position, all registered calls shall be canceled and power shall be removed from the elevator driving-machine motor and brake. The door open and door close buttons shall function in conformance with the applicable requirements of 2.27.3.3.1, regardless of the position of this switch. When the switch is moved to the “RUN” position from the “STOP” position, the car shall not move, except for leveling, until a call is entered. If the type of switch used is a button, it shall be a minimum 19 mm (0.75 in.) in the smallest dimension.

NOTE [2.27.3.3.1(m)]: This requirement does not limit the firefighters’ stop switch to a specific style of switch. Toggle switches and push/pull buttons are two possible styles. A switch, if provided, should be operable to the “STOP” position by a firefighter wearing protective gloves (see NFPA 1971).

Rationale: To codify that the firefighters’ stop switch should not affect the constant pressure requirements of the door open and close buttons during Fire Phase II operation.
Record 22-1085

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Rationale: To update the index to reflect new code language added via Record 21-810.
2.14.7.1.2 The minimum illumination at the car threshold for freight and passenger elevators, with the
door closed, shall be not less than 50 lx (5 fc)

(a) 50 lx (5 fc) for passenger elevators
(b) 25 lx (2.5 fc) for freight elevators

Rationale: To provide an equivalent level of safety for freight operators and persons necessary
for loading and unloading freight as for passenger elevator users.
2.13.2.1 Power Opening of Car Doors or Gates. Power opening of a car door or gate shall be subject to the requirement of 2.13.2.1.1 and through 2.13.2.1.2.

2.13.2.1.3 Power opening shall be permitted to be initiated automatically through control circuits, provided the car is being automatically stopped or leveled and, when stopping under normal operating conditions, the car shall be at rest or level with the landing before the car door is fully opened, except that on freight elevators with vertically sliding car doors or gates, automatic initiation shall not occur unless the car is within 75mm (3 in.) of the landing.

2.13.2.2 Power opening shall be permitted to be initiated automatically through control circuits, provided the car is being automatically stopped or leveled and, when stopping under normal operating conditions, the car shall be at rest or substantially level with the landing before the hoistway door is fully opened, except that on freight elevators with vertically sliding doors, automatic initiation shall not occur unless the car is within 75mm (3 in.) of the landing.

Rationale: To limit automatic power opening of vertically sliding doors and gates to the landing zone to reduce the probability that someone will trip when the elevator arrives at the landing and the doors open. Door opening via door open push buttons, release of the door closing button or initiation of an object detection device is permitted outside this zone to provide users with a means to initiate re-opening in the event of an obstruction present in the opening during door closing and self-evacuation if the elevator is fails to relevel perfectly.
8.7.2.27.4 Controllers

(a) Where a motion controller is installed, without any change in the type of motion control, and without replacing the existing operation control, the installation shall conform to the following:

... 

(6) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.2.27.10.

For inspection and test requirements, see 8.10.2.3.2(s) and 8.10.2.3.2(ss).

(b) Where an operation controller is installed, and the type of operation control, if automatic remains automatic, or, if nonautomatic remains continuous pressure, car switch, or other type of operation where the movement or stopping of the car is under the manual control of the operator (nonautomatic), and the existing motion control equipment is retained, the installation shall conform to the following:

... 

(5) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.2.27.10.

For inspection and test requirements, see 8.10.2.3.2(s) and 8.10.2.3.2(ss).

(c) Where both a motion controller and an operation controller are installed without any change in the type of motion control as described in (a) and without any change in the type of operation control as described in (b), the installation shall conform to the following:

... 

(10) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.2.27.10.

For inspection and test requirements, see 8.10.2.3.2(s) and 8.10.2.3.2(ss).

8.7.2.27.5 Change in Type of Motion Control. Where there is a change in the type of motion control (the method of controlling acceleration, speed, retardation, and stopping), the installation shall conform to the following:

... 

(o) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.2.27.10.

For inspection and test requirements, see 8.10.2.3.2(t) and 8.10.2.3.2(ss).

8.7.2.27.6 Change in Type of Operation Control. Where there is a change in the type of operation control, from continuous pressure, car switch, or other type of operation where the movement or stopping of the car is under the manual control of the operator, to any form of automatic operation, or vice versa, the installation shall conform to the following:

... 

(q) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.2.27.10.

For inspection and test requirements, see 8.10.2.3.2(t) and 8.10.2.3.2(ss).
Rationale: To provide requirements in the controller alteration section to require flood detection means where required by 2.2.9.

8.7.2.27.10 Flood Detection Operation. Where an alteration consists of the addition or alteration to Flood Detection Operation the installation shall conform to 2.2.9, 2.27.3, 2.27.12, 2.28 and 8.12.1. The permitted location of equipment used directly in connection with the elevator may also be affected. See 1.2.2.1 and 8.12.1. 

For inspection and test requirements, see 8.10.2.3.2(ss).

8.7.3.31.5 Controllers

(a) Where a motion controller is installed, without any change in the type of motion control, and without replacing the existing operation control, the installation shall conform to the following:

... 

(6) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.3.31.X.

For inspection and test requirements, see 8.10.3.3.2(s) and 8.10.3.3.2(qq).

(b) Where an operation controller is installed, and the type of operation control, if automatic remains automatic, or if nonautomatic remains continuous pressure, car switch, or other type of operation where the movement or stopping of the car is under the control of the operator (nonautomatic), and the existing motion control equipment is retained, the installation shall conform to the following:

... 

(5) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.3.31.X.

For inspection and test requirements, see 8.10.3.3.2(s) and 8.10.3.3.2(qq).

(c) Where both a motion controller and an operation controller are installed without any change in the type of motion control as described in (a) and without any change in the type of operation control as described in (b), the installation shall conform to the following:

... 

(10) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.3.31.X.

For inspection and test requirements, see 8.10.3.3.2(s) and 8.10.3.3.2(qq).

... 

(e) Where a controller for the elevator operation on emergency or standby power systems or Firefighters’ Emergency Operation is installed, see 8.7.3.31.8.

(6) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.3.31.X.

For inspection and test requirements, see 8.10.3.3.2(s) and 8.10.3.3.2(qq).

8.7.3.31.6 Change in Type of Motion Control. Where there is a change in the type of motion control (the method of controlling acceleration, speed, retardation, and stopping), the installation shall conform to the following:

... 

(n) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.3.31.X.

For inspection and test requirements, see 8.10.3.3.2(r) and 8.10.3.3.2(qq).

8.7.3.31.7 Change in Type of Operation Control. Where there is a change in the type of operation control, from continuous pressure, car switch, or other type of operation where the movement or stopping of the car is under the manual control of the operator, to any form of automatic operation, the installation shall conform to the following:

... 

(o) Where Flood Detection Means is required by 8.12.1, it shall conform to 8.7.3.31.X.

For inspection and test requirements, see 8.10.3.3.2(p) and 8.10.3.3.2(qq).
Rationale: To provide requirements in the controller alteration section to require flood detection means where required by 2.2.9.

8.7.3.31.X Flood Detection Operation. Where an alteration consists of the addition or alteration to Flood Detection Operation the installation shall conform to 3.7.1, 3.27.5, 3.28 and 8.12.1. The permitted location of equipment used directly in connection with the elevator may also be affected. See 1.2.2.1 and 8.12.1.

For inspection and test requirements, see 8.10.3.3.2(qq).

Rationale: To provide alteration requirements for a Flood Detection Means and Flood Detection Operation to meet the requirements of ASCE/SEI 24, to prevent the elevator cab from descending into floodwaters; also, to prevent any other elevator equipment from descending into floodwaters.

8.10.2.3.2 Tests shall be performed when the following alterations are made:

(ss) Where an alteration consists of a change to or addition of Flood Detection Operation (8.7.2.27.10), the affected components and operation shall be tested as specified in 8.10.2.2.5(s).

8.10.3.3.2 Tests shall be performed when the following alterations are made:

(qq) Where an alteration consists of a change to or addition of Flood Detection Operation (8.7.3.31.X), the affected components and operation shall be tested as specified in 8.10.3.2.5(w).

Rationale: To provide acceptance testing requirements for Flood Detection alterations.
Note: This proposal references requirements from approved Record 13-915 and Record 13-1893.
8.6.8.15.18 Comb-Step or Comb-Pallet Impact Device. For escalators or moving walks required to comply with Rules 805.1u, 805.3n, 905.1r, and/or 905.3k in ASME A17.1d-2000 or earlier editions, or requirements 6.1.6.3.13 or 6.2.6.3.11, the comb-step/comb-pallet impact devices shall be tested in both the vertical and horizontal directions by placing a vertical and horizontal force on the combplate to cause operation of the device. The vertical and horizontal tests shall be independent of each other. The horizontal forces shall be applied independently of each other at the front edge center and both sides; the forces shall be applied in the direction of travel into the combplate. The vertical force shall be applied at the front edge center. Both the vertical and horizontal forces required to operate the device shall be recorded (6.1.6.3.13 and 6.2.6.3.11) (Items 7.7.2 and 9.7.2). See 8.6.9.2.3 for horizontal forces required.

Rationale: Clarification that the horizontal forces are tested independently.
2.24.2.4 Minimum Sheave and Drum Diameter. Drive sheaves and drums shall be permanently and legibly marked to state the minimum sheave or drum diameter, measured at the bottom of the groove, that is required to maintain structural integrity (see 2.24.3), except those sheaves not permitted to be re-grooved stating “Regrooving of sheaves is not permitted” (see 2.24.2.1.1).

2.24.2.1.1 Sheaves. Driving-machine sheaves shall be integral with or directly attached to driving machine shafts. Sheaves shall be provided with steel shafts and metal bearings. Sheaves constructed of plastic, fiber-reinforced plastic, or combinations thereof or sheaves not permitted to be regrooved by the manufacturer shall be non-regroovable. Permanent and legible marking shall be provided on or adjacent to the nonmetallic sheaves stating, “Regrooving of sheave is not permitted.”

Rationale: Requirement 2.24.2.4 was added prior to sheaves for elastomeric-coated suspension members and inadvertently required these to have sheave markings, which are not appropriate. This revision corrects this oversight.
8.6.10.1.1 Periodic Test. Material lifts and dumbwaiters without automatic transfer devices shall be subject to the applicable periodic tests specified in 8.6.4.19 and 8.6.5.14. The test requirements shall apply to the corresponding requirements in Part 7. Any additional requirements for this equipment shall also be checked during these tests. On winding-drum machines, the slack-rope devices required by 2.26.2.1 shall be permitted to be tested as specified in Item 2.18. The driving-machine brake shall be tested to determine conformance with 7.2.10 (Item 2.18)…

Rationale: add language that has been omitted from 8.6.10.1.1 to include periodic test for material lifts. Section 8.10 addresses both material lifts and dumbwaiters which are equipped with or without automatic transfer devices. In section 8.6.10.1, material lifts and dumbwaiters without automatic transfer devices, provides requirements for maintenance, however section 8.6.10.1.1 only specifies requirements for periodic tests for dumbwaiters. In contrast, section 8.6.10.2, material lifts and dumbwaiters with automatic transfer devices, provides maintenance requirements for both material lifts and dumbwaiters and section 8.6.10.2.1 specifies periodic tests for both material lifts and dumbwaiters. Note: Record number 19-2325 includes periodic tests for material lifts which align with the requirements noted in 8.6.10.1.1.
NONMANDATORY APPENDIX D
RATED LOAD AND CAPACITY PLATES FOR PASSENGER ELEVATORS

Requirement 2.16.1 specifies the minimum rated load for passenger elevators in terms of kilograms (pounds). Requirement 2.16.3.2.1 requires that a capacity plate indicating the rated load in kilograms (pounds) be located inside the car.

When local ordinances require the elevator capacity to be also indicated in terms of persons, the number of persons should be calculated by dividing the rated load, if expressed in kilograms, by 72.575 or, if expressed in pounds, by 160. The result (quotient) should be reduced to the next lowest whole number. As an example, if the result is 14.97, the capacity in terms of persons should be 14.

**Rationale:** Update average weight of a human to align with the global norms and standards (ref ISO 8100-1, clause 0.3.6). This change provides consistency between both standards when determining permitted number of passengers within the elevator cab when required to be posted.
SECTION 2.20
SUSPENSION MEANS AND THEIR CONNECTIONS

2.20.1 Suspension Means
Elevator cars and counterweights shall be suspended by steel wire ropes, aramid fiber ropes, or noncircular elastomeric-coated steel suspension members attached to the car frame or passing around sheaves attached to the car frame specified in 2.15.1. Suspension means that have previously been installed and used on another installation shall not be reused. All suspension members in a set of suspension means shall be the same material, grade, construction, and dimensions. A suitable means shall be provided to protect the suspension means during the installation process.

Only the following shall be permitted:
(a) steel wire ropes constructed in accordance with ASME A17.6, Part 1
(b) aramid fiber ropes constructed in accordance with ASME A17.6, Part 2
(c) noncircular elastomeric-coated steel suspension members constructed in accordance with ASME A17.6, Part 3
(d) wind turbine tower elevators and suspension and governor ropes constructed in accordance with ASME A17.6, Part 4

2.20.2.2 The following data on a data tag complying with 8.13.3 shall be provided:
(a) type of suspension (steel wire rope, aramid fiber rope, or noncircular elastomeric-coated steel suspension member)
...

2.20.4.2 Reserved for Future Use, Aramid Fiber Ropes. The minimum number of suspension members used shall be three. The term “diameter,” where used in reference to ropes, shall refer to the nominal diameter as given by the rope manufacturer. Aramid fiber ropes shall not be used on drum machines.

2.20.9.5 Wedge Rope Sockets. The use of wedge rope socket assemblies shall be permitted only for steel wire and aramid ropes. When used, the wedge rope socket assemblies shall be of a design as shown in Figure 2.20.9.5 and shall conform to 2.20.9.2, 2.20.9.3, and 2.20.9.5.1 through 2.20.9.5.7. Socket and wedge surfaces that contact the rope shall be free of burrs or sharp edges that could damage the rope.

2.20.9.5.5 Means shall be provided to prevent the aramid fiber rope from slipping in the socket should the load on the rope be removed for any reason.

2.24.2.2 Minimum Pitch Diameter. Sheaves and drums used with suspension and compensating means (see 2.20.1) shall have a pitch diameter of not less than
(a) 40 times the diameter of steel wire rope where used for suspension ropes
(b) 40 times the cord diameter (see ASME A17.6, 3.3.3.1.1) of noncircular elastomeric-coated steel suspension members where used for suspension
(c) 16 times the functional diameter (see ASME A17.6, 2.3.3.1.2) of the load-carrying fibers of aramid ropes where used for suspension or compensation
(d) 32 times the diameter of steel wire ropes and the cord diameter of noncircular elastomeric-coated steel suspension members where used for compensation

2.24.2.3.2 **Reserved for Future Use. For Aramid Fiber Ropes.** Where grooves are used to provide traction, sufficient traction shall be provided between the rope cover and the groove, and in the event of failure of the cover, between the load carrying portion of the rope and the sheave groove, to safely stop and hold the car with rated load [see 2.16.8(c)] from rated speed in the down direction. Undercut grooves shall not be permitted with aramid fiber rope.

**8.6.3.2.2** For aramid fiber ropes, ASME A17.6, Section 2.9 shall apply.

**8.6.3.2.32** For noncircular elastomeric-coated steel suspension members, ASME A17.6, Section 3.7 shall apply.

### NONMANDATORY APPENDIX U
DESIGN REQUIREMENTS — TRACTION ELEVATOR SUSPENSION SYSTEM

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**GENERAL NOTES:**
(a) AFR = aramid fiber ropes
(ba) CSM = noncircular elastomeric-coated steel suspension members
(c) SEP = sound engineering practice
(d) SWR = steel wire ropes

**Rationale:** Revise requirements within ASME A17.1 to align with approved revisions that will be included in the 2022 edition of ASME A17.6 that deleted part 2 from the standard (approved in Record 21-1284).
SECTION 2.1
CONSTRUCTION OF HOISTWAYS AND HOISTWAY ENCLOSURES
2.1.3 Floor Over Hoistways
2.1.3.1 General Requirements
...
2.1.3.4 Area to Be Covered by Floor

Rationale: Editorial correction adding two missing spaces.
...

2.1.3.5 Floor Openings. Openings in the floor shall be provided with a means to guard the opening with a minimum height of 100 mm (4 in.) above the floor. The means shall be securely fastened and capable of withstanding 225 N (50 lbf) applied in a lateral direction to the means.

Rationale: Current code fails to protect against objects that could fall through openings in the floor that could strike elevator personnel working on the car top. The proposal protects against objects that could slide or roll across the floor into the opening. The openings can be protected by equipment, guard, and/or a combination of the equipment and a separate guard.
2.7.5.2 Working Areas in the Pit. The requirements of 2.7.5.2.1 through 2.7.5.2.4 shall be complied with if maintenance or inspections of the elevator driving-machine brake or an emergency brake or of elevator motion controllers or motor controllers are to be carried out from the pit. 2.7.5.2.1 One of the following shall be provided:

(a) a means in compliance with 2.7.5.1.1, 2.7.5.1.2, and 2.7.4.5
(b) a mechanical device to stop vertical car movement to create a vertical clearance as required by 2.7.4.5 between the floor of the working area and the lowest part of the car, and between the floor of the working area and the counterweight where a counterweight guard in conformance with 2.3.2 is not provided ...

(3) When the mechanical device is in the active position, it shall operate an electrical contact that, when in the open position, shall permit the car to move only on inspection operation or hoistway access [see 2.12.7.3, 2.26.1.4.1 and 2.26.9.3.1(d)]. The electrical contact shall be positively opened mechanically, and its opening shall not depend solely on springs.

(4) A sign in conformance with the requirements ...

**Rationale:** To allow the car to be moved down on to the mechanical device from outside the hoistway at the bottom floor using hoistway access.
2.7.5.4 Working Platforms in the Line of Movement of the Car or Counterweight.

Working platforms in the line of movement of the car or counterweight shall be permitted in conformance with either (a) or (b)

(a) where retractable stops are provided and the car is
   (1) below the platform, the travel of the elevator shall be limited by a retractable stop(s) in such a manner that the car shall be stopped below the platform at least the distance required for top-of-car clearance (see 2.4.7)
   (2) above the platform, the travel of the elevator shall be limited by a retractable stop(s) in such a manner that the car shall be stopped above the platform at least the distance required in 2.7.4.5

(b) where the elevator is provided with a device conforming to 2.7.5.1.1 and 2.7.5.1.2

Rationale: Editorial clarification that working platforms can comply with either 2.7.5.4(a) or 2.7.5.4(b).
8.7.6.1.8 Combplates. Any alteration of the combplates shall require conformance with 6.1.6.3.13. For inspection and test requirements, see 8.10.4.2.2(k).

8.7.6.2.8 Combplates. An alteration of the combplates shall require conformance with 6.2.3.8 and 6.2.6.3.11. For inspection and test requirements, see 8.10.4.2.2(k).

**Rationale:** The listed test should point to (l), which states: 8.10.4.2.2 (l) Where alterations involve the combplate, it shall be inspected and tested for conformance with 8.7.6.1.8 for escalators and 8.7.6.2.8 for moving walks...

8.7.6.1.14 Lighting, Access, and Electrical Work. An alteration to or addition of lighting, access, or electrical work shall conform to the specific requirements within 6.1.7 for that change. For inspection and test requirements, see 8.10.4.2.2(lm).

8.7.6.2.14 Lighting, Access, and Electrical Work. An alteration to or addition of lighting, access, or electrical work shall conform to the specific requirements within 6.2.7 for that change. For inspection and test requirements, see 8.10.4.2.2(lm).

**Rationale:** The listed test should point to (m), which states: 8.10.4.2.2 (m) Where alterations involve the lighting, access, and electrical work, it shall be inspected and tested for conformance with 8.7.6.1.14 for escalators and 8.7.6.2.14 for moving walks...

8.7.6.1.15 Entrance and Egress. Any alteration to the entrance or egress end shall comply with 6.1.3.6.1 through 6.1.3.6.4. For inspection and test requirements, see 8.10.4.2.2(mn).

8.7.6.2.18 Entrance and Egress. Any alteration to the entrance or egress end shall comply with 6.2.3.8.1 through 6.2.3.8.4. For inspection and test requirements, see 8.10.4.2.2(n).

**Rationale:** The listed test should point to (n), which states: 8.10.4.2.2 (n) Where alterations involve the entrance and egress, they shall be inspected and tested for conformance with 8.7.6.1.15 for escalators and 8.7.6.2.18 for moving walks and tested as specified in 8.10.4.1.1(d) and 8.10.4.1.1(l).

8.7.6.1.17 Variable-Frequency Drive Motor Control. Where the alteration consists of the addition of, or alteration to, a variable-frequency drive motor control, the installation shall conform to 6.1.6.3.2, 6.1.6.10.3, and 6.1.6.10.4. For inspection and test requirements, see 8.10.4.2.2(no).
8.7.6.2.16 Variable-Frequency Drive Motor Control. Where the alteration consists of the addition of, or alteration to, a variable-frequency drive motor control, the installation shall conform to 6.2.6.3.2, 6.2.6.10.3, and 6.2.6.10.4.

For inspection and test requirements, see 8.10.4.2.2(o).

**Rationale:** The listed test should point to (o), which states: **8.10.4.2.2 (o)** Where alterations involve the variable-frequency drive motor control, it shall be inspected and tested for conformance with 8.7.6.1.17 for escalators and 8.7.6.2.16 for moving walks...
2.13.5 Reopening Device(s) for Power-Operated Horizontally Sliding Doors and Gates

Reopening device(s) for power-operated horizontally sliding doors or gates shall conform to the requirements of 2.13.5.1 through 2.13.5.6. Where the term “door(s)” is used, the requirement shall apply to “gate(s)” as well.

2.13.5.6 Maintenance and On-Site Testing of Detection Means. The maintenance and method of on-site testing of the detection means shall be provided in the Maintenance Control Program on-site documentation (see 8.6.4.19.18).

Rationale: This requirement should not be in the design requirements of Section 2.13. Maintenance is addressed in A17.1, requirement 8.6.4.13.1, which requires the reopening device to be maintained through housekeeping, not needing on-site documentation. On-site testing is now included in A17.2-2020, Item 1.1.1. Any manufacturer specific or unique procedures are required by A17.1-2022/B44:22, requirement 8.6.1.2.2(c)(6) to be provided.
2.20.8.2 Broken Suspension Member. All electric traction elevators, excluding those with steel wire ropes greater than or equal to 8 mm (0.315 in.), shall be provided with a broken-suspension-member detection means. The means shall

(a) operate at or before the separation of a suspension member

(b) when actuated, automatically function to

(1) prevent the elevator from automatically starting if stopped at a landing.

(2) stop the elevator at the next available landing.

(3) when not on Firefighters’ Phase II In-Car Emergency Operation, cause automatic power-operated doors to open and then initiate reclosing within 15 s when stopped at a landing. The door open button(s) shall remain operative and when released, automatic closing shall be initiated within 15 s.

(4) when on Firefighters’ Phase II In-Car Emergency Operation, cause automatic power-operated doors to function in conformance with the applicable requirements of 2.27.3.3.

(4)/(5) prevent a stopped elevator from restarting except on hoistway access or inspection operation.

(c) be arranged to be tested in accordance with the requirements in 8.10.2.2(ss)(1), and instructions for testing shall be included in the on-site documentation [see 8.6.1.2.2(b)(5)] with sufficient detail to ensure that testing can be accomplished by elevator personnel

(d) remain actuated until it is manually reset

NOTE [2.20.8.2(d)]: This does not require the means itself to remain actuated, only that the elevator shall not be permitted to restart except on hoistway access or inspection operation until a manual reset is performed.

Rationale: To clarify that Broken Suspension Member detection means should not affect the door operation or constant pressure requirements of the door open and close buttons during Fire Phase II operation.
2.20.1 Suspension Means

Elevator cars and counterweights shall be suspended by a suspension means complying with ASME A17.6, steel wire ropes or noncircular elastomeric-coated steel suspension members attached to the car frame or passing around sheaves attached to the car frame specified in 2.15.1. Suspension means that have previously been installed and used on another installation shall not be reused. All suspension members in a set shall be new, from the same manufacturer, and of the same material, grade, construction, and dimensions. A suitable means shall be provided to protect the suspension means during the installation process. Only the following shall be permitted:

(a) steel wire ropes constructed in accordance with ASME A17.6, Part 1
(b) noncircular elastomeric coated steel suspension members constructed in accordance with ASME A17.6, Part 3
(c) wind turbine tower elevators and suspension and governor ropes constructed in accordance with ASME A17.6, Part 4

*Rationale:* To align with ASME A17.6.
2.11.3 Closing of Hoistway Doors

2.11.3.1 Horizontally sliding or single-section swinging 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.

2.11.3.2 On horizontally sliding center-opening doors, if both panels do not have hoistway door interlocks or closed detection means (see 2.26.2.14) there is an interlock on only one panel, the door closer required by 2.11.3.1 shall be provided on the leading panel that does not have a hoistway door interlock or closed detection means operates in the opposite direction (see 2.11.11.7).

Rationale:
The current requirement does not provide the door status of the non-driven panel; therefore, the closer has to be on the panel that operates in the opposite direction. In addition to clarifying the requirement, the proposed language is recognizing that if door position status of the non-driven panel is known the closure can be on the driven panel and it will prevent the car from leaving the landing if any panel fails to close. Therefore, when only one door closer is provided its location should be based on hoistway door closed detection means. Per 2.11.11.7.2 each driven door panel has an interlock and if the non-driven panel has a hoistway door close detection means, when there is a failure of the connection of door panels, the car is prevented from leaving the landing. Requirement 2.26.2.14 is relevant to this change because it addresses door interlocks and closed detection means. The “horizontally sliding” was editorially added based on the comments, as it is already implied by the reference to 2.11.3.1.