

CHAPTER 30

ELEVATORS AND CONVEYING SYSTEMS

Note: Chapter 30 is entirely Seattle amendments to the *International Building Code* and is not underlined.

SECTION 3001 PURPOSE

3001.1 Purpose. The purpose of this chapter is to protect persons, buildings and the contents thereof from hazards arising from the use of elevators, dumbwaiters, material lifts, escalators and moving walks by establishing minimum requirements regulating the design, construction, alteration, operation and maintenance of elevators, dumbwaiters, material lifts, escalators and moving walks, and by establishing procedures by which these requirements may be enforced.

SECTION 3002 SCOPE

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

3002.2 Application to existing conveyances.

3002.2.1 Minimum standard for existing conveyances. All existing conveyances shall comply with *Washington Administrative Code* (WAC) Chapter 296-96 Part D and Section 3011 as a minimum standard.

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

3002.2.3 Repairs and replacements. Repairs to existing conveyances and replacements of devices and components shall be made with parts of at least equivalent material, strength and design. They shall comply with WAC 296-96 Part D and ASME A17.1 Section 8.6.

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

Unless otherwise approved by the building official, alterations, repairs, replacements and maintenance of conveyances shall comply with the requirements of ASME A17.1

Section 8.7. Where Section 8.7 refers to a requirement that has been amended by this chapter, the requirements of this chapter take precedence. Where Section 8.7 refers to ASME A17.3, the requirements of WAC 296-96 Part D apply. Alterations to existing material lifts shall conform with the requirements of WAC Chapter 296-96 Part C1, Material Lifts.

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

3002.2.6 Change of use. When the use of an existing freight elevator is changed to conveyance of passengers, the elevator must comply with the retroactive requirements of this code, ASME A17.1, 2.16.4 and WAC 296-96 Part D for passenger elevators.

3002.2.7 Historic buildings and structures. See Section 3403.9 for regulations regarding historic buildings or structures.

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

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

SECTION 3003 CODES

3003.1 *Seattle Elevator Code*. The following are adopted as part of the *Seattle Building Code*; they also constitute the *Elevator Code* of the City of Seattle.

1. ASME Codes:

1.1. *Safety Code for Elevators and Escalators*, ASME A17.1-2004, A17.1a-2005, as amended in this ordinance and Appendices A through D, F through I, K through M and P.

Exception: ASME A17.1 Section 5.10, Elevators Used for Construction, is not adopted.

1.2. *Safety Standard For Platform Lifts and Stairway Chairlifts*, ASME A18.1-2005.

2. The building official is authorized to adopt by administrative rule, in accordance with Section 104.17, addenda to ASME A17.1-2004, that further the intent and purpose of this code, that encourage the use of state-of-the-art technology, materials or methods of construction, and which provide standards that are equal or better than those contained in this code.

3. Safety regulations for all elevators, dumbwaiters, escalators and other conveyances, *Washington Administrative Code* Chapter 296-96.

Exception: The following sections of WAC Chapter 296-96 are not part of the Elevator Code of the City of Seattle:

1. Part B, Licenses and Fees for all Elevators, Dumbwaiters, Escalators, and Other Devices, WAC 296-96-00900 through -01075.
2. Part B-1, Regulations and Fees for All Elevators, Dumbwaiters, Escalators and Other Conveyances
3. Part C3, Construction, Operation, Maintenance and Inspection of Private Residence Conveyances for Transporting Property for Residential Use, WAC 296-96-08010 through -08250.
4. Part C4, Temporary Hoists, WAC 296-96-09001 through -10002.
5. Part C5, Additional Types of Conveyances, WAC 296-96-11001 through -20005.

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

SECTION 3004 DEFINITIONS

3004.1 Definitions. The following definitions are in addition to ASME A17.1 Section 1.3, RCW 70.87, *Laws Governing Elevators and Other Lifting Devices*, and Chapter 2 of this code.

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

ASME CODE. Those portions of the *American National Standard Safety Code for Elevators and Escalators* adopted by reference in Section 3003.

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

AUTOMOBILE PARKING ELEVATOR. An elevator located in either a stationary or horizontally moving hoistway and used exclusively for parking automobiles where, during the parking process, each automobile is moved under its own power onto and off the elevator directly into parking spaces or cubicles in line with the elevator and where no persons are normally stationed on any level except the receiving level.

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

CONTROL SPACE, ELEVATOR, DUMBWAITER, MATERIAL LIFT. A space inside or outside the hoistway, intended to be accessed with or without full bodily entry, that

contains the motor controller. This space could also contain electrical and/or mechanical equipment used directly in connection with the elevator, dumbwaiter or material lift but not the electric driving machine or the hydraulic machine.

CONVEYANCE. An elevator, accessibility lift, escalator, dumbwaiter, material lift, automobile parking elevator or moving walk.

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

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

ENFORCING AUTHORITY. As used in the ASME Code means the building official.

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

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

MACHINE ROOM AND CONTROL ROOM, REMOTE, ELEVATOR, DUMBWAITER, MATERIAL LIFT. A machine room or control room that is not attached to the outside perimeter or surface of the walls, ceiling or floor of the hoistway.

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

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

MACHINERY SPACE AND CONTROL SPACE, REMOTE, ELEVATOR, DUMBWAITER, MATERIAL LIFT. A machinery space or control space that is not within the hoistway, machine room or control room, and that is not attached to the outside perimeter or surface of the walls, ceiling or floor of the hoistway.

MATERIAL LIFT. A fixed, stationary conveyance that:

1. Has a car or platform that moves in guides;
2. Serves two or more floors or landings of a building or structure;
3. Has a vertical rise of at least 30 inches (762 mm) and no more than 60 feet (18 288 mm);
4. Has a maximum speed of 50 feet (15 240 mm) per minute;

5. Is an isolated, self-contained lift and is not a part of a conveying system;
6. Travels in an inclined or vertical, but not horizontal, direction;
7. Is operated only by, or under the direct supervision of, an individual designated by the employer; and
8. Is installed in a commercial or industrial area, and not in an area that is open to access by the general public.

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

3005.1 Disconnection of utilities. In addition to the provisions for Emergency Orders provided in Section 102.2, the building official is authorized to disconnect or order discontinuance of any utility service or energy supply to equipment regulated by this code in cases of emergency or where necessary for safety to life and property. Such utility service shall be discontinued until the equipment, appliances, devices or wiring found to be defective or defectively installed are replaced, repaired or restored to a safe condition. Proper posting and seals shall be affixed to the equipment to prevent inadvertent use.

3005.2 Conveyances out of service. A conveyance shall be taken out of service temporarily after the building official has inspected the unit for proper parking of the car, securing the hoistway openings and disconnection of power. A seal and tag shall be placed on the equipment to insure against unauthorized use. A conveyance is permitted to remain in a temporarily out-of-service status for a period not to exceed 2 years, after which time it shall be placed in a permanently out-of-service status.

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

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

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

3005.3 Report and investigation of accidents. The owner or the owner's authorized agent shall promptly notify the building official of each accident involving a conveyance that requires the service of a physician or results in a disability exceeding one day, and shall afford the building official every facility for investigating and inspecting the accident. The building official shall without delay, after being notified, make an inspection and shall place on file a full and complete report of the accident. The report shall give in detail all material facts and information

available and the cause or causes, so far as they can be determined. The report shall be open to public inspection at all reasonable hours. If an accident involves the failure or destruction of any part of the construction or the operating mechanism of a conveyance, the use of the conveyance is forbidden until it has been made safe, it has been reinspected and any repairs, changes or alterations have been approved by the department and a permit has been issued by the building official. The removal of any part of the damaged construction or operating mechanism from the premises is forbidden until the building official grants permission to do so.

SECTION 3006 INSTALLATION AND ALTERATION PERMITS

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

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

Exceptions:

1. Permits for repairs required by inspection reports are permitted to be combined for a single building.
2. The building official is permitted to issue a single permit for minor alterations to more than one conveyance that do not require individual retesting of each conveyance.
3. No permit shall be required for ordinary repairs made with parts of the same materials, strength and design normally necessary for maintenance.
4. No permit shall be required for: modifications of cars that do not change the weight or materials (see ASME A17.1, 8.7.2.15.2 and 8.7.3.21); connection of alarm to stop switch; securing of car top exit cover; installation of door extension panels, cable guards, switch covers, access ladders or access modification; capacity posting; repairs of lighting fixtures, counterweight and pit guards; photoelectric eye devices and/or repairs to hoistway enclosures. All such installations and/or modifications shall be in conformance with the requirements of this code.

3006.3 Expiration and renewal of permits. Section 106.9 applies to permits required by this chapter.

SECTION 3007 PLANS AND SPECIFICATIONS

3007.1 Plans and specifications. Two sets of drawings shall be submitted with applications for installations of new elevators, escalators, dumbwaiters, automobile parking elevators, material lifts and moving walks.

In lieu of complete erection drawings and plans the building official is permitted to require details of any portion of an installation. If an installation requires material, fabrication or construction other than recognized standard types, has an offset car frame or is an observation-type elevator installed in other than a fully enclosed hoistway, drawings and details shall be submitted with the application for permit.

SECTION 3008 REQUIRED INSTALLATION INSPECTIONS

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

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

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

SECTION 3009 CERTIFICATES OF INSPECTION AND OPERATION

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

Exception: The building official is permitted to, after inspection of a conveyance under construction, authorize temporary use of the conveyance without issuing a certificate of inspection if the building official determines that temporary operation of the conveyance is reasonably safe. The building official is permitted to authorize temporary use for a period not to exceed 60 days to allow completion of the installation and passing of the final inspection.

If, at any time during the period of temporary use, the building official determines that the building owner is not making adequate progress toward obtaining a certificate of inspection, the building official is permitted to withdraw the temporary use approval on 7-days notice. The building official is authorized to forbid further use of the conveyance until a certificate of inspection is obtained.

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

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

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

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

SECTION 3010 REQUIREMENTS FOR OPERATION AND MAINTENANCE

3010.1 Requirements for operation and maintenance. The owner is responsible for the safe operation and maintenance of each device regulated by this chapter. The installation of pipes, ducts, conduits, wiring and the storage of materials not required for the operation of the elevator is prohibited in machine rooms and hoistways. See Section 3022. Sidewalk elevators in public places are also subject to the requirements of Title 15, *Seattle Municipal Code*, Street and Sidewalk Use, as amended. See Part 8 of ASME A17.1 for requirements for operation and maintenance.

SECTION 3011 RETROACTIVE REQUIREMENTS FOR EXISTING INSTALLATIONS

3011.1 General. Existing conveyances shall be made to comply with WAC 296-96 Part D, *Regulations for Existing Elevators, Dumbwaiters, and Escalators*, and the provisions of this section.

3011.2 Doors to elevator and dumbwaiter machine rooms. Doors to elevator and dumbwaiter machine rooms, control rooms, machinery spaces and control spaces shall be self-closing and self-locking. The lock shall be a spring-type lock arranged to permit the door to be opened from the inside without a key, incapable of being left in the unlocked position, and accessible only by a key from the outside.

3011.3 Key retainer box. A key retainer box locked and keyed to the standard City access key for elevator access and operation keys shall be provided. The key retainer box shall meet the following standards:

1. Dimensions - 8 inches (203 mm) high, 6 inches (152 mm) wide, 1 inch (25 mm) deep.

2. Material - 16 gauge steel welded.
3. Color - red (unless located in the main lobby above the hall call button, 6 feet (1829 mm) nominal above the floor).
4. Labeling - "FOR FIRE DEPARTMENT USE."
5. Lock - Ace 1-inch (25 mm) cylinder cam lock key #39504.

The key retainer box is to be installed at the designated recall floor above the Phase I recall switch or in the main lobby above the hall call button when no recall feature exists. The key retainer box is to be mounted 6 feet (1829 mm) nominal above the floor. The building official is permitted to approve other locations upon request.

Key retainer boxes are permitted to comply with Section 3016.9 as an alternative to complying with this section.

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

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

3011.5 Dumbwaiter machinery access. Access doors to dumbwaiter machinery space shall be provided with electric contacts and labeled on the exterior side "DANGER - DUMBWAITER MACHINE" in 1-inch letters.

3011.6 Machine space lighting and receptacles. Permanent electric lighting shall be provided in all machine rooms and machinery spaces. The illumination shall be not less than 10 foot-candles (108 lux) at the floor level. The lighting control switch shall be located within easy reach of the access to the room or space. Where practicable, the light control switch shall be located on the lock-jamb side of the access door. Where practical, elevator pits and machine rooms shall be provided with an electrical receptacle.

3011.7 Access to terminal landings. Mechanical access to terminal landings of elevator hoistways shall be provided in accordance with WAC 296-96-23162 (1).

3011.8 Wall covering material for passenger cars. All materials exposed to the car interior and the hoistway shall be metal or shall conform to the following:

1. Materials in their end use configuration, other than those covered by paragraph 2 below, shall conform to the fol-

lowing requirements, based on the tests conducted in accordance with the requirements of ASTM E84:

- a. flame spread rating of 0 to 75;
 - b. smoke development of 0 to 450.
2. Napped, tufted, wove, looped and similar materials in their end use configuration on car enclosure walls shall have a flame spread rating of 0-25.
 3. Padded protective linings, for temporary use in passenger cars during the handling of freight, shall be of materials conforming to either paragraph 1 or 2 above. The protective lining shall clear the floor by not less than 4 inches (102 mm).
 4. Floor covering, underlayment and its adhesive shall have a critical radiant flux of not less than 0.45 W/cm² as measured by ASTM E 648. Floor finish materials of a traditional type such as wood, vinyl, linoleum and terrazzo are permitted to be used.

Exception: Handrails, operating devices, ventilating devices, signal fixtures, audio and visual communication devices, and their housings are not required to comply with this Section 3011.8.

3011.9 Control and operating circuits and overcurrent protection. Overcurrent protection shall be maintained in accordance with 1984 *National Electrical Code* Section 620-61.

3011.9.1 Control and operating circuits.

3011.9.1.1 Electric elevators.

1. For electric elevators, the normal and final terminal stopping device shall not control the same controller switches unless two or more separate and independent switches are provided, two of which shall be closed to complete the driving-machine motor-and-brake circuit in either direction of travel. Where a two- or three-phase alternating current driving-machine motor is used, these switches shall be of the multipole type.

The control shall be so designed and installed that a single ground or short circuit may permit either, but not prevent both, the normal and final stopping device circuits from stopping the car.

2. In the design and installation of the control and operating circuits in electric elevators, the following requirements shall be met:
 - 2.1. If springs are used to actuate switches, contactors or relays to break the circuit to stop an elevator at the terminal landings, they shall be of the compression type.
 - 2.2. The completion or maintenance of an electric circuit shall not be used to interrupt the power to the elevator driving-machine motor or brake at the terminal landings, nor to stop the car when the emergency stop switch is opened or any of the electrical protective devices operate.

Exception: The requirements of this rule do not apply to dynamic braking, nor to speed control switches.

- 2.3. The failure of any single magnetically operated switch, contactor or relay to release in the intended manner, or the failure of any static control device to operate as intended, or the occurrence of a single accidental ground, shall not permit the car to start or run if any hoistway door interlock is unlocked or if any hoistway door or car door or gate electric contact is not in the closed position.
- 2.4. If generator-field control is used, means shall be provided to prevent the generator from building up and applying sufficient current to the elevator driving-machine motor to move the car if the elevator motor control switches are in the "OFF" position. The means used shall not interfere with maintenance of an effective dynamic-braking circuit during stopping and standstill conditions.
- 2.5. The control circuits shall be so designed and installed that the car speed in the down direction with rated load in the car, under normal operating conditions with the power supply on or off does not exceed governor tripping speed or 125 percent of rated speed, whichever is less.
3. Elevators with driving motors employing static control without motor generator sets shall conform to the following requirements:
 - 3.1. Two devices shall be provided to remove power independently from the driving-machine motor. At least one device shall be an electromechanical contactor.
 - 3.2. The contactor shall be arranged to open each time the car stops.
 - 3.3. The contactor shall open the driving-machine brake circuit.
 - 3.4. An additional contactor shall be provided to also open the driving-machine brake circuit. This contactor is not required to have contacts in the driving-machine motor circuit.
 - 3.5. The electrical protective devices required by Rule 210.2 of ASME A17.1d-1986 shall control the solid state device and both contactors.

Exception: Leveling can take place with power opening of doors and gates as restricted by the requirements of Rules 112.2a(1) and 112.2b(1) of ASME A17.1d-1986.

- 3.6. After each elevator stop, the car shall not respond to a signal to start unless both contactors are in the deenergized position.

Exception: Elevators employing alternating-current hoist motors driven from a direct-current source through a static inverter.

4. Elevators employing alternating-current driving motors driven from a direct-current power source through a static inverter shall conform to the following requirements:
 - 4.1. Two separate means shall be provided to independently inhibit the flow of alternating current through the solid state devices that connect the direct-current power source to the alternating-current driving motor. At least one of the means shall be an electromechanical relay.
 - 4.2. The relay shall be arranged to open each time the car stops.
 - 4.3. The relay shall cause the driving-machine brake circuit to open.
 - 4.4. An additional contactor shall be provided to also open the driving-machine brake circuit. This contactor is not required to have contacts in the driving-machine motor circuit.
 - 4.5. The electrical protective devices required by Rule 210.2 of ASME A17.1d-1986 shall control both the means that inhibit the flow of alternating current through the solid state devices and the contactors in the brake circuit.

Exception: Leveling can take place with power opening of the doors and gates as restricted by the requirements of Rules 112.2a(1) and 112.2b(1) of ASME A17.1d-1986.

- 4.6. After each elevator stop, the car shall not respond to a signal to start unless the relay that inhibits the flow of alternating current through the solid state devices, and the contactors in the brake circuit, are in the deenergized position.

3011.9.1.2 Hydraulic elevators. The design and installation of the control and operating circuits for hydraulic elevators shall conform to the following requirements:

1. Springs, where used to actuate switches, contactors or relays to stop an elevator at the terminals or to actuate electrically operated valves, shall be of the compression type.
2. The completion or maintenance of an electric circuit shall not be used to interrupt the power to control-valve-operating magnets nor to the pump driving motor of electrohydraulic elevators under the following conditions:
 - 2.1. To stop the car at the terminals.

- 2.2. To stop the car when the emergency-stop switch or any of the electrical protective devices operate.
3. The failure of any single magnetically operated switch, contactor or relay to release in the intended manner or the occurrence of a single accidental ground shall not permit the car to start or run if any hoistway door interlock is unlocked or if any hoistway-door or car-door or gate contact is not in the closed position.

3011.10 Roped hydraulic elevators. Roped horizontal hydraulic elevators are permitted to continue in service but once taken out of service shall not be reactivated.

3011.11 Pit Access and equipment. Access ladders shall be installed in elevator pits deeper than 3 feet (914 mm).

Pits shall be illuminated by a permanent luminaire that provides not less than 5 foot-candles (54 lux) of illumination at the pit floor. Light bulbs shall be externally guarded to prevent contact and accidental breakage.

Pit light control switches shall be located inside the hoistway of every elevator approximately 48 inches (1219 mm) above the threshold, and either within 18 inches (457 mm) of the access door or within reach from the access floor and adjacent to the pit ladder if provided.

Access shall be provided for safe maintenance and inspection of all equipment located in the pit.

3011.12 Floor numbers. Elevator hoistways shall have floor numbers not less than 2 inches (51 mm) in height, placed on the walls and/or doors of hoistways at intervals such that a person in a stalled elevator upon opening the car door could determine the floor position.

3011.13 Car top work light. A permanently wired work light and outlet shall be installed on top of freight and passenger elevators to provide adequate illumination for inspection and work in the hoistway. The light shall be provided with a non-keyed switch in or adjacent to the fixture. The fixture shall be protected from accidental breakage.

3011.14 Labeling. All equipment (disconnect switches, machines and controllers) operating on a voltage in excess of 250 volts shall be labeled for the voltage used in letters $\frac{3}{4}$ inch (19 mm) high.

3011.15 Interior alterations. Alterations or modifications of elevator car interiors shall comply with ASME A17.1, 8.7.2.15.2 (increase or decrease in deadweight of car), Building Code requirements concerning flame spread ratings for wall coverings (See Chapter 8), and lighting requirements of ASME A17.1.

3011.16 Illumination. Illumination in the elevator car shall be maintained unless it is turned off manually by the switch in the car. A readily-accessible and labeled toggle-type test switch shall be provided on the top of the car to cut lighting power manually and test the emergency lighting.

3011.17 Conveyance number designation. In any building with more than one elevator, escalator or other type of conveyance a designating number [not less than 2 inches (51 mm) in height] shall be located at the door of the main entrance lobby,

inside the car, on the machine, on the disconnect switch or stop switch and on escalator upper and lower front plates.

3011.18 Escalator starting switches. “Up” and “Down” positions shall be clearly indicated on all starting switches.

3011.19 Anchorage for elevator equipment. All elevator equipment, hydraulic or cable type shall be anchored.

3011.20 Restricted opening of doors. All existing passenger elevators in Group R, Division 1 hotels and dormitory buildings shall comply with the following:

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

SECTION 3012 RETROACTIVE REQUIREMENTS FOR EXISTING MATERIAL LIFTS

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

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

1. A balanced-type, vertically sliding hoistway gate shall extend from not more than 2 inches (51 mm) from the landing threshold to not less than 66 inches (1676 mm) above the landing threshold.
2. A gate shall be solid or openwork of a design that will reject a ball 2 inches (51 mm) in diameter. A gate shall be located so that the distance from the hoistway face of the gate to the hoistway edge of the landing sill is not more than $2\frac{1}{2}$ inches (64 mm). A gate shall be designed and guided so that it will withstand a lateral pressure of 100 pounds (445 N) applied at approximately its center without breaking or being permanently deformed and without displacing the gate from its guides or tracks.
3. Hoistway gates or doors shall have a combination mechanical lock and electric contact, which shall prevent operation of the material lift by the normal operating devices unless the door or gate is closed.

3012.3 Controls.

1. The control station shall be remotely mounted so that it is inaccessible from the material lift car.

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

3012.4 Capacity posting and no-riders sign. Each material lift shall have a capacity sign permanently and securely fastened in place in the material lift car and on the landings. The sign shall indicate the rated load of the material lift in pounds. The sign shall be metal with black letters 2 inches (51 mm) high on yellow background.

A sign stating "NO PERSONS PERMITTED TO RIDE THIS DEVICE" shall be conspicuously and securely posted on the landing side of all hoistway gates and doors and in the enclosure of each material lift car. The sign shall be metal with black letters 2 inches (51 mm) high on red background.

SECTION 3013 REQUIREMENTS FOR NEW MATERIAL LIFTS

3013.1 Requirements for new material lifts. New material lifts shall comply with ASME A17.1, Sections 2.7, 2.8 and 3.7. The requirements of WAC 296-96 Part C1, *Minimum Standards for All Material Lifts*, apply to all material lifts as defined in Section 3004.

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

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

Exceptions:

1. Elevators that comply with the standards for new installations provided in Section 3018;
2. Elevators with less than 25 feet (7620 mm) of travel if the building official and the fire code official give written approval; and
3. Elevators that comply with ASME A17.1, Rule 211.3a 1984 edition or later and Sections 3014.10 and 3014.11.

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

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

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

3014.4 Key location.

1. A key box meeting the standards of Section 3011.3 shall be provided at the designated recall floor above the Phase I recall switch. The key box is to be mounted approximately 6 feet (1829 mm) above the floor. The building official is permitted to approve other locations upon request.
2. When a central control station is provided, an additional set of keys shall be provided and hung in the control station in a location designated by the fire chief. The keys shall be identified by a ring or paddle.

3014.5 Key switch functions.

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

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

1. All cars controlled by this switch that are on automatic service shall return nonstop to the designated level and power-operated doors shall open and remain open.
2. A car traveling away from the designated level shall reverse at or before the next available floor without opening its doors.
3. A car stopped at a landing shall have the in-car emergency stop switch or in-car stop switch rendered inoperative as soon as the doors are closed and the car starts toward the designated level. A moving car, traveling to or away from the designated level, shall have the in-car emergency stop or in-car stop switch rendered inoperative immediately.
4. A car standing at a floor other than the designated level, with doors open and in-car emergency stop switch or in-car stop switch in the run position, shall conform to the following:
 - 4.1. Elevators having automatic power-operated horizontally sliding doors shall close the doors without delay and proceed to the designated level;

- 4.2. Elevators having power-operated vertically sliding doors provided with automatic or momentary pressure closing operation in accordance with ASME A17.1 Rule 112.3d, 1984 or later edition shall have the closing sequence initiated without delay in accordance with ASME A17.1 Rule 112.3d (1), (2), (3), and (5), 1984 or later edition, and the car shall proceed to the designated level;
- 4.3. Elevators having power-operated doors provided with continuous-pressure closing operation per ASME A17.1 Rule 112.3b, 1984 or later edition or elevators having manual doors shall conform to the requirements of Section 3014.7. Sequence operation, if provided, shall remain effective.
5. Door reopening devices for power-operated doors that are sensitive to smoke or flame shall be rendered inoperative. Mechanically actuated door reopening devices not sensitive to smoke or flame shall remain operative. Car door open buttons shall remain operative. Door closing shall conform to the requirements of ASME A17.1 Rule 112.5, 1984 or later edition. Door hold-open switches shall be rendered inoperative.
6. All car and corridor call buttons and all corridor door opening and closing buttons shall be rendered inoperative. All call register lights and directional lanterns shall be extinguished and remain inoperative. Position indicators, if provided, shall remain in service. All prior registered calls shall be canceled.
7. The activation of a smoke detector installed in accordance with Article 193 of the *Seattle Fire Code* in any elevator lobby or associated elevator machine room, other than the designated level, shall cause all cars in all groups that serve that lobby to return nonstop to the designated level. The fire code official is permitted to approve the connection of other detection devices to activate recall. The operation shall conform to the requirements of Phase I emergency recall operation. Whenever new elevator controllers are installed, they shall meet all provisions of the then-current building and elevator codes. Newly-installed controllers shall have the capability of selecting alternate recall floors.

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

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

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

3014.10 Nurses' preemption. Nurses' preemption (hospital service) is permitted to commandeer up to one-half of the cars

in a particular bank of elevators. At least one-half of the cars shall respond to Phase I and all cars not preempted shall respond.

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

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

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

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

3015.1 General. Existing elevators in buildings having floors used for human occupancy located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or buildings having floors used for human occupancy 35 feet (10 668 mm) above grade, which lack fire department vehicle access to at least one side shall have Phase II in-car operation and shall comply with this section.

Exceptions:

1. Elevators that comply with the standards for new installations as provided in Section 3019;
2. Elevators with less than 25 feet (7620 mm) of travel when the building official and fire code official give written approval; and
3. Elevators that comply with ASME A17.1 Rule 211.3c, 1984 or later edition.

3015.2 Phase II in-car operation key switch.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SECTION 3016 NEW INSTALLATIONS – CONSTRUCTION STANDARDS

3016.1 General. All new elevators, escalators, moving walks and dumbwaiters and their installation shall conform to the requirements of ASME A17.1 as amended in this section and to the specific requirements of Sections 3017, 3018 and 3019. For elevator shaft requirements, see Section 707. Material lifts shall conform to WAC 296-96 Part C1, *Minimum Standards for All Material Lifts*, as amended by Section 3013.

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

1. ASME A17.1 Section 2.14.
2. *Seattle Building Code* requirements concerning flame spread ratings for wall coverings and use of plastics. (See Chapter 8.)
3. WAC 296-96-23216, except that interior finish materials need not be firmly bonded flat to the enclosure and are permitted to be padded.

3016.3 Seismic considerations. New installations shall comply with ASME A17.1 Section 8.4. The provisions for Seismic Zone 3 shall apply.

3016.4 Requirements to accommodate people with disabilities. All new elevators shall comply with Chapter 11. In addition, WAC 296-96-02300 through 02360 applies.

3016.5 Hoistway smoke control. The requirements of Section 3016.6 apply in addition to ASME A17.1, 2.1.4 and Section 707.14.

1. Hoistways of elevators shall be provided with means to prevent the accumulation of smoke and hot gases in case of fire.
2. When an elevator hoistway is pressurized and emergency or standby power is provided for the pressuriza-

tion equipment under the provisions of Section 707 or 909, hoistway venting will not be required.

3. Pressurization.

3.1. When pressurization is installed in elevator shafts, the pressurization of the shaft shall be measured with all elevator systems in recall mode, Phase I, and all cars at the designated recall level with the doors in the open position.

3.2. Activation of the fan serving the hoistway may be delayed by up to 30 seconds so that elevator recall can be initiated prior to pressurizing the hoistway.

4. Unless specifically installed to serve that space only, environmental air systems and pressurization systems shall not be located in hoistways, elevator mechanical rooms and elevator machinery spaces.

Exceptions:

1. Pressurization ducts serving a hoistway that are separated from the room or space by construction equal to the rated construction of the room or space and so located that all required clearances are maintained.
2. Pressurization duct openings, dampers and grilles are permitted to be located in hoistway shaft walls if the pressurization air does not impair the operation of the elevator.
5. Hoistways shall not be pressurized through pressurization of elevator machine rooms. The machine room floor between the hoistway and overhead machine room shall contain as few penetrations as possible. All penetrations for cable drops, etc., shall be held to a minimum size.
6. Elevator doors shall operate properly when hoistway pressurization is in effect.
7. Ventilation louver operating motors shall not infringe on any elevator machinery or controller working clearances.
8. Hoistways shall be vented in accordance with the following:
 - 8.1. Hoistways of elevators with more than 25 feet (7620 mm) of travel from lowest floor level to highest floor level shall be provided with means for venting smoke and hot gases to the outer air in case fire or smoke is detected in the building.

Exception: Pressurized hoistways are permitted to be unvented.

8.2. Vents, if used, shall be located in the side of the hoistway enclosure directly below the machinery room floor or ceiling at the top of the hoistway, and shall open directly to the outer air or through noncombustible ducts to the outer air. Ducts must have the same rating as is required for the hoistway they are venting.

8.3. The area of the vents shall not be less than $3\frac{1}{2}$ percent of the area of the hoistway nor less than 3 square feet (0.28 m²) for each elevator car,

whichever is greater. The required area of the vent is to be free area, unobstructed by louvers, etc.

8.4. When dampers are provided, they shall be of the normally-open type (open with power off). They shall be in the closed position unless power fails, or they are activated by fire alarm or approved smoke detection system.

3016.6 Elevator operation on emergency power. All elevators required to be supplied with emergency power shall comply with the following:

1. Each elevator shall be transferable to the emergency power supply system.
2. Emergency power supply systems capable of handling all elevators on the premises need no sequencing or switching other than the possibility of staggering the restarting of the generators.
3. Emergency power supply systems whose capacity can only handle one elevator of a duplex or one elevator in each group of elevators shall comply with the following. (For the purposes of this section, group is defined as all elevators serving the same portions of a building: high-rise, mid-rise, low-rise, etc.).
 - 3.1. All elevators on automatic operation shall be automatically assigned emergency power in sequence and returned to the Phase I recall or lobby floor, where they shall open their doors and then time out of service.
 - 3.2. The last car down will generally be the selected car of a duplex or a group to remain in service. The service shall continue to be automatic.
 - 3.3. The assignment of emergency power will skip or rotate past cars that are out of service (emergency stop switch pulled, malfunction, car top operation, etc.). If assignment is made to a manual or attendant-operated car and the car is unattended, the system shall rotate past the car as though it is out of service.
4. The car and elevator machine room lights shall be activated on the emergency system.
5. A manual emergency power assignment switch or switches shall be in an elevator status panel located in the fire department central control station. Each elevator shall be capable of being assigned emergency power from this location. The manual switching shall be effective at all times other than when the cars are automatically sequencing to the lobby or when the selected car is traveling. The switch shall not remove power in midflight or with doors closed.
6. Elevators on Phase II car operation shall remain in their respective locations upon loss of power. They shall remain in Phase II mode and shall not move unless the elevator is under the control of the operator and normal power has been restored or emergency power has been assigned to the car by either automatic or manual means.

7. Loss of power and initiation of emergency power immediately after Phase I recall operation has occurred shall not cause any cars to be stranded in the building. Upon the application of emergency power to the equipment, the cars shall follow the normal sequencing to the lobby, open their doors and time out of service. When all cars have been bypassed (out of service) or returned to the lobby, the assigned car shall then become available for firefighter's use on Phase II in-car operation.
8. Each elevator operating on emergency power shall be tested in accordance with applicable ASME A17.1a-2005, 2.16.8, 2.26.10 and 2.27.2, and ASME A17.2-2004, Part 6.
9. If the elevator cars are recalled to the alternate floor by Phase I recall and a loss of power occurs, the cars shall be sequenced to the alternate floor upon assignment of emergency power. The cars shall not go to the primary designated recall floor under these conditions. The alternate floor shall be provided with a means of identifying the elevator that is supplied with emergency power.
10. The elevator position indicator system, if provided, shall not become disoriented due to the loss of power or any other reason. However, upon the resumption of power, the car may move to reestablish absolute car position.
11. Communications to the car shall remain in service.

3016.7 Multiple hoistways. The number of elevators permissible in a hoistway is as follows: See ASME A17.1, 2.1.1.4.

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

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

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

3016.8 Additional doors. Doors other than the hoistway door and the elevator car door are prohibited at the point of access to an elevator car.

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

3016.9 Key retainer box. A key retainer box locked and keyed to the secure city access key for elevator access and operation keys shall be provided. The key retainer box shall meet the following standards:

1. Minimum dimensions – 6½ inches high, 6 inches wide, 2 inches deep (165 by 152 by 51 mm).
2. Material – at least 16 gauge steel welded
3. Color – red (unless located in the main lobby above the hall call button, 6 feet (1829 mm) above the floor).

4. Labeling – “For Emergency Use”

5. Lock – high security Medeco lock specified by the building official. Use of the key shall be restricted to fire, emergency response and elevator inspection personnel.

The key retainer box shall be flush or surface mounted, installed at the designated recall floor above the Phase I recall switch or in the main lobby above the hall call button if no recall feature exists. The key retainer box is to be mounted approximately 6 feet (1829 mm) above the floor. The key retainer box shall be attached to the building so as to be able to withstand a force of 300 pounds per square foot (14.4 kPa) applied horizontally at any point. In buildings with more than one elevator, the key retainer box shall be large enough to accommodate all required keys. The building official may approve other locations and custom box types upon request.

3016.10 Elevator access keys. Keys for access to and for the operation of elevator equipment shall be tagged and retained in the key retainer box. The key retainer box shall contain fire emergency service keys (Phase I and II, one key for each switch) and keys to all of the following that are in the building:

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

3016.11 Escalator conveyance number designation. In any building with more than one escalator, a designating number [not less than 2 inches (51 mm) in height] shall be located on the upper and lower front plates.

3016.12 Elevator car to accommodate ambulance stretcher. In buildings four stories or more above grade plane or four or more stories below grade plane, at least one elevator shall be provided for fire department emergency access to all floors. The elevator car shall be of such a size and arrangement to accommodate a 24-inch by 84-inch (610 mm by 2134 mm) ambulance stretcher in the horizontal, open position and shall be identified by the international symbol for emergency medical services (star of life). The symbol shall not be less than 3 inches (76 mm) high and shall be placed inside on both sides of the hoistway door frame.

**SECTION 3017
NEW INSTALLATIONS – GENERAL
EMERGENCY OPERATION REQUIREMENTS**

3017.1 General. All elevators shall conform to the requirements of this section and the specific requirements of Sections 3018 and 3019.

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

1. An additional two-position (“off” and “on”) Phase I recall switch for each elevator or group as defined by Section 3018 shall be installed when the control station is not within easy line of sight of the lobby Phase I recall switches; the switch(es) shall be rotated clockwise to go from “off” to “on” position;
2. A car position indicator shall be permanently installed, which shall be of a positive type that will not lose the car position nor need resetting on loss of power. Reading of the indicator shall not require special knowledge.
3. Firefighter’s phone jacks shall be provided that allow each elevator car to be connected to the fire control center;

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

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

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

**SECTION 3018
NEW INSTALLATIONS – PHASE I
RECALL REQUIREMENTS**

3018.1 ASME A17.1, 2.27.3 General. ASME A17.1, 2.27.3, Firefighters’ Emergency Operations Service–Automatic Elevators, is superseded by the following.

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

3018.2 ASME A17.1, 2.27.3.1 Phase I emergency recall operation. Elevators requiring Phase I recall emergency operation shall comply with ASME A17.1, 2.27.3.1, Phase I Emergency Recall Operation, and the following:

Groups of elevators containing four or more cars shall be provided with two 3-position key switches per group. A group is defined for the purpose of this section as all elevators serving the same portion of a building. Two-position (“off” and “on”) switches shall be provided in the fire control center if this code requires such a center. The switch(es) shall be rotated clockwise to go from “off” to “on” position. Hall call buttons common to a group shall remain in service unless both Phase I recall switches of a four-car or larger group are placed in the recall mode, or a fire alarm recall signal is initiated.

**SECTION 3019
NEW INSTALLATIONS – PHASE II IN-CAR
OPERATION REQUIREMENTS (ASME A17.1, 2.27.8)**

3019.1 New installations – Phase II in-car operation requirements. Elevators requiring Phase II in-car operation shall comply with ASME A17.1, 2.27.8, Switch Keys, as amended below.

ASME 2.27.8 Switch Keys. The key switches required by 2.27.2 through 2.27.5 for all elevators in a building shall be operable by the same key. The keys shall be Group 3 Security (see 8.1). There shall be a key for each switch provided.

These keys shall be kept ~~((on the premises in a location readily accessible to firefighters and emergency personnel, but not where they are available to the public. Where provided, a lock box, including its lock and other components, shall conform to the requirement of UL 1037 (see Part 9)))~~ in the key retainer box required by Section 3016.9.

**SECTION 3020
NEW INSTALLATIONS - CONSTRUCTION OF
HOISTWAYS AND MACHINE ROOMS**

3020.1 Construction of hoistways. All new elevator hoistways shall be of fire-resistance-rated construction if required by Section 707. ASME A17.1, 2.1.1.1, 2.1.1.2, 2.7.1.1, and 2.7.1.2 are superseded by this section.

Hoistways not required to be of fire-resistance-rated construction shall comply with ASME A17.1, 2.1.1.2 as amended below.

ASME 2.1.1.2 Non-Fire-Resistive Construction.

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

ASME 2.1.1.2.2 The hoistway shall be fully enclosed ~~((conforming to 2.1.1.2.2(a), (b), and (c), or 2.1.1.2.2(a) and (d)).~~

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

- (b.) ~~Openwork enclosures, where used above the 2000 mm (79 in.) level, shall reject a ball 25 mm (1 in.) in diameter.~~
- (c.) ~~Openwork enclosures shall be:~~
 - (1) ~~at least 2.2 mm (0.087 in.) thick wire, if of steel wire grille;~~
 - (2) ~~at least 2.2 mm (0.087 in.) thick, if of expanded metal; and~~
 - (3) ~~so supported and braced as to deflect not over 15 mm (0.6 in.) when subjected to a force of 450 N (100 lbf) applied horizontally at any point.~~
- (d.)) Enclosures shall be permitted to be glass, provided it is laminated glass conforming to ANSI Z97.1, 16 CFR Part 1201, or CAN/CGSB-12.1, whichever is applicable (see Part 9). Markings as specified in the applicable standard shall be on each separate piece of glass and shall remain visible after installation.

ASME 2.1.1.2.3 Entrances shall be in conformance with 2.11, except 2.11.14, 2.11.15, 2.11.16, and 2.11.18.

3020.2 Elevator equipment and machine rooms. Elevator controls and machinery other than driving machines and governors shall be located in a room dedicated exclusively to elevator equipment. Listed electrical equipment that serves the machine room is permitted to be installed in machine rooms. Air conditioning equipment is permitted to be installed in machine rooms in accordance with ASME A17.1, 2.8.4.

Elevator equipment and machine rooms shall be enclosed by fire barriers with at least a 1-hour fire-resistance rating. Machine rooms in high-rise buildings shall have a fire-resistance rating at least equal to that required for the hoistway.

3020.3 Machine room construction.

3020.3.1 Machine rooms for electric elevators. All machine rooms and machinery spaces for electric elevators shall have fire-resistive construction as required by Section 508 and shall comply with ASME A17.1 Section 2.7, Enclosure of Machine Rooms and Machinery Spaces.

3020.3.2 Machine rooms for hydraulic elevators. All machine rooms and machinery spaces for hydraulic elevators shall have fire-resistive construction as required by Section 508 and shall comply with ASME A17.1 Section 3.7, Machine Rooms and Machinery Spaces, as amended below:

ASME 3.7 Machine Rooms and Machinery Spaces. Machine rooms and machinery spaces for hydraulic elevators shall conform to 2.7.1 through 2.7.5 and 2.7.7 as amended by this code. Machine rooms for hydraulic elevators shall comply with Section 3020.2.

ASME 3.7.1 Location of Machine Rooms. Hydraulic elevator machine and control rooms ~~((shaft))~~ may be located overhead, adjacent to, underneath the

hoistway, or at a remote location. They shall not be located in the hoistway.

Where hydraulic machines and electrical control equipment are located in spaces separated from the hoistway enclosure (see 2.1.1 and 3020.1), such spaces shall be separated from other parts of the building by enclosures conforming to 2.7.1.2 ~~((and having an access door conforming to 2.7.3.4))~~ as amended by this code.

3020.4 Working clearances. The following working clearances shall be provided inside the equipment or machinery room for all elevators.

1. The width of working space in front of controllers shall be the width of the controller or 30 inches (762 mm), whichever is greater. The depth of the working space in the direction of access shall be not less than 48 inches (1219 mm).
2. The minimum clear space working clearances for free-standing equipment shall be 18 inches (457 mm) on two sides and between units of controllers, selectors and/or walls or other building obstructions. The 18-inch (457 mm) side clearance is permitted to be combined to permit 36 inches (914 mm) clear on one side only.
3. The minimum space at the rear of controllers with back-wiring, terminals or other elements requiring access shall be 36 inches (914 mm).
4. The working space shall be free of pipes, vents, storage, ducts or any other obstruction.

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

5. The working clearance shall be located in conditioned space.

3020.5 Machinery rooms for private residence elevators. Machinery rooms for private residence elevators shall comply with ASME A17.1 Sections 2.7, 2.8 and 3.7.

3020.6 Labeling. Elevator machine and control rooms shall be identified by a permanent label on the door of the room. In buildings with more than one machine room, the label shall identify which cars are served by the equipment in the room.

**SECTION 3021
NEW INSTALLATIONS – CONSTRUCTION OF
FLOORS (ASME A17.1, 2.1.3.3)**

3021.1 New installations – Construction of floors. All new elevator hoistways and machine rooms shall comply with ASME A17.1, 2.1.3.4, Construction of Floors, as amended below.

ASME 2.1.3.4 Construction of Floors. Floors shall be ~~((of concrete or metal construction with or))~~ without perforations. ~~((Metal floors shall conform to the following:))~~

- ~~(a) If of bar-type grating, the openings between bars shall reject a ball 20 mm (0.8 in.) in diameter.~~
- ~~(b) If of perforated sheet metal or of fabricated openwork construction, the openings shall reject a ball 25 mm (1 in.) in diameter.~~

SECTION 3022

INSTALLATION OF PIPES OR DUCTS CONVEYING GASES, VAPORS OR LIQUIDS OR ELECTRICAL WIRING IN HOISTWAYS, MACHINE ROOMS OR MACHINERY SPACES (ASME A17.1 SECTION 2.8)

3022.1 Prohibited wiring, pipes and ducts. In accordance with ASME A17.1 Section 2.8.1 and 2.8.2, nonelevator electric wiring, pipes and ducts are prohibited in elevator machine rooms and hoistways except as otherwise provided in this section. The use of false ceilings and furring does not remove such items from the elevator spaces and shall not be acceptable except as allowed by ASME A17.1, 2.8.2 as amended below.

3022.2 Amendment to ASME A17.1 2.8.2. All elevator hoistways and machine rooms shall comply with ASME A17.1, 2.8.2, Pipes, Ducts, Tanks, and Sprinklers, as amended below:

ASME 2.8.2 Pipes, Ducts, Tanks, and Sprinklers.

~~2.8.2.1 ((Steam and hot water pipes)) Pipes conveying gases, vapors or liquids ((shall be)) are not permitted to be installed in hoistways, machine rooms, and machinery spaces unless necessary for operation or maintenance of the elevator and not used for any other purpose. ((for the purpose of heating these areas only, subject to the requirements of 2.8.2.1.1 through 2.8.2.1.3.))~~

Exception: Subject to the approval of the building official, pipes protected with double containment and pipes with threaded or welded joints may be permitted. Pipes shall not be located less than 7 feet (2134 mm) above the floor in machine rooms.

~~((2.8.2.1.1 Heating pipes shall convey only low pressure steam [100kPa (15 psi) or less] or hot water [100°C (212°F) or less].~~

~~2.8.2.1.2 All risers and return pipes shall be located outside the hoistway. When the machine room is located above the roof of the building, heating pipes for the machine room shall be permitted to be located in the hoistway between the top floor and the machine room.~~

~~2.8.2.1.3 Traps and shutoff valves shall be provided in accessible locations outside the hoistway.))~~

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

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

2.8.2.3 Sprinkler systems conforming to NFPA 13 ~~((or the NBCC, whichever is applicable (see Part 9)))~~ shall be permitted to be installed in the hoistway, machine room, and machinery spaces, subject to ~~((the requirements of 2.8.2.3.1 through 2.8.2.3.4))~~ rules promulgated by the building official.

~~((2.8.2.3.1 All risers and returns shall be located outside these spaces. Branch lines in the hoistway shall supply sprinklers at not more than one floor level. When the machine room is located above the roof of the building, risers, return pipes, and branch lines for the machine room sprinkler(s) shall be permitted to be located in the hoistway between the top floor and the machine room.~~

~~2.8.2.3.2 In jurisdictions not enforcing the NBCC, means shall be provided to automatically disconnect the main line power supply to the affected elevator upon or prior to the application of water from sprinklers located in the machine room or in the hoistway more than 600 mm (24 in.) above the pit floor.~~

- ~~(a.) This means shall be independent of the elevator control and shall not be self-resetting.~~
- ~~(b.) Heat detectors and sprinkler flow switches used to initiate main line elevator power shut-down shall comply with the requirements of NFPA 72.~~
- ~~(c.) The activation of sprinklers outside of the hoistway or machine room shall not disconnect the main line power supply.~~

~~2.8.2.3.3 Smoke detectors shall not be used to activate sprinklers in these spaces or to disconnect the main line power supply.~~

~~2.8.2.3.4 In jurisdictions not enforcing the NBCC, when sprinklers are installed in the hoistway, all electrical equipment, except earthquake protective devices conforming to 8.4.10.1.2(d), located less than 1 225 mm (48 in.) above the pit floor, shall be:~~

- ~~(a.) weatherproof (NEMA4)~~
- ~~(b.) wiring shall be identified for use in wet locations in accordance with the requirements in NFPA 70.))~~

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

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

**SECTION 3023
ACCESS TO PITS (ASME A17.1, 2.2.4)**

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

ASME 2.2.4 Access to Pits. Safe and convenient access shall be provided to all pits, and shall conform to 2.2.4.1 through 2.2.4.4.

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

2.2.4.2 There shall be installed in the pit of each elevator, where the pit extends more than 900 mm (35 in.) below the sill of the pit access door, a fixed vertical ladder of noncombustible material, located within reach of the access door unlocking device. The ladder shall extend not less than 1 200 mm (48 in.) above the sill of the access door. The rungs, cleats, or steps shall be a minimum of 400 mm (16 in.) wide. When unavoidable obstructions are encountered, the width shall be permitted to be decreased to less than 400 mm (16 in.). The reduced width shall be as wide as the available space permits, but not less than 225 mm (9 in.). The rungs, cleats, or steps shall be spaced 300 mm (12 in.) on center. A clear distance of not less than 180 mm (7 in.) from the centerline of the rungs, cleats, or steps to the nearest permanent object in back of the ladder shall be provided. When unavoidable obstructions are encountered, the distance shall be permitted to be reduced to 115 mm (4.5 in.). Siderails, if provided, shall have a clear distance of not less than 115 mm (4.5 in.) from their centerline to the nearest permanent object. The nearest point of the ladder shall be within 1 000 mm (39 in.), measured horizontally from the means to unlock the egress door from the pit.

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

2.2.4.3 Pits shall be accessible only to elevator personnel.

2.2.4.4 Separate pit door, when provided, shall be subject to the following requirements:

- (a.) If the door swings into the pit, it shall be located so that it does not interfere with moving equipment.
- (b.) If the door swings out, and the lowest structural or mechanical part, equipment, or device installed beneath the car platform, except guide shoes or rollers or safety jaw assemblies, projects below the top of the separate pit access door

opening when the car is level with the bottom terminal landing

- (1.) an electric contact conforming to 2.26.2.26 shall be provided to prevent operation of the elevator when the door is open
- (2.) the door shall be provided with a vision panel(s) that is glazed with clear wired glass not less than 6 mm (0.25 in.) thick, will reject a ball 150 mm (6 in.) in diameter, and have an area of not more than 0.03 m² (47 in.²).
- (c.) The door shall provide a minimum opening of 750 mm (29.5 in.) in width and ~~((+825))~~ 2 032 mm ~~((72))~~ 80 in.) in height.
- (d.) The door shall be equipped with a barrier conforming to 2.11.1.2(i), where the door sill is located more than 300 mm (12 in.) above the pit floor.
- (e.) The door shall be self-closing and provided with a spring-type lock arranged to permit the door to be opened from inside of the pit without a key. Such doors shall be kept closed and locked. The key shall be of Group 1 Security (see 8.1).
- (f.) Separate pit access doors shall not be located where a person, upon entering the pit, can be struck by any part of the car or counterweight when either is on its fully compressed buffer.
- (g.) Permanent noncombustible platforms for safe access and maintenance to the underside of elevator cars shall be provided where pit depths exceed 2438 mm (8 ft) as approved by the building official.

**SECTION 3024
SUPPLY LINE SHUTOFF VALVE
(ASME A17.1, 3.19.4.1)**

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

ASME 3.19.4.1 Shutoff Valve. A manually operated shutoff valve shall be provided between the hydraulic machines and the hydraulic jack and shall be located outside the hoistway and adjacent to the hydraulic machine on all hydraulic elevators. An additional shutoff valve may be provided in the pit.

**SECTION 3025
GUARDS AT CEILING INTERSECTION
(ASME A17.1, 6.1.3.3.11)**

3025.1 Guards at ceiling intersection. All escalators shall comply with ASME A17.1, 6.1.3.3.11, Guard at Ceiling Intersection, WAC 296-96-23410, and the following:

Guards shall be provided at any pinching, snagging or wedging points between the handrail, balustrade and adjacent build-

ing components or equipment if such points are within the clearances delineated in 6.1.3.3.11.

**SECTION 3026
TEST REPORTS**

3026.1 Test reports. If tests are required by ASME A17.1, Part 8, as amended in this code, immediately after tests are completed all test results shall be submitted to the building official for approval on forms furnished by the building official. The submitted results shall be completed and signed by the person performing the tests and shall identify the testing firm. Copies of the completed forms shall be provided to the owner or to the owner’s duly-authorized agent.

**SECTION 3027
ACCEPTANCE INSPECTIONS AND TESTS**

3027.1 Acceptance inspections and tests. Inspections and tests shall comply with ASME A17.1, 8.10.1, Acceptance Inspection and Tests, as amended below.

ASME 8.10.1 General Requirements for Acceptance Inspections and Tests.

8.10.1.1 Persons Authorized to Make Acceptance Inspections and Tests.

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

8.10.1.1.2 The person installing or altering the equipment shall perform all of the tests required by ASME A17.1, 8.10.2 through 8.10.5 in the presence of the inspector specified in 8.10.1.1.1.

((8.10.1.1.3 The inspector shall meet the qualification requirements of the ASME QEI-1. Inspectors and inspection supervisors shall be certified by an organization accredited by ASME in accordance with the requirements of ASME QEI-1. Requirement 8.10.1.1.3 does not apply in Canadian jurisdictions.))

**SECTION 3028
PERIODIC INSPECTIONS AND TESTS**

3028.1 Persons authorized to make periodic inspections and tests. Periodic inspection and tests shall comply with ASME A17.1, 8.11.1 except that 8.11.1.1 does not apply.

3028.2 Intervals for periodic inspections and tests. ASME A17.1, 8.11.2 (electric elevators), 8.11.3 (hydraulic elevators), 8.11.4 (escalators and moving walks) and 8.11.5 (other equipment) shall be performed at intervals specified in Table 3029.

**TABLE 3029
INSPECTION AND TEST INTERVALS
Note: Intervals are specified in months**

SECTION	EQUIPMENT TYPE	PERIODIC TESTS							
		PERIODIC INSPECTIONS		CATEGORY ONE		CATEGORY THREE		CATEGORY FIVE	
		Requirement	Interval	Requirement	Interval	Requirement	Interval	Requirement	Interval
8.11.2	Electric elevators	8.11.2.1	12	8.11.2.2	12	N/A	N/A	8.11.2.3	60
8.11.3	Hydraulic elevators	8.11.3.1	12	8.11.3.2	12	8.11.3.3	36	8.11.3.4	60
8.11.4	Escalators and moving walks	8.11.4.1	12	8.11.4.2	24	N/A	N/A	N/A	N/A
8.11.5.3	Hand elevators	8.11.2.1	12	8.11.2.2	12	N/A	N/A	8.11.2.3 8.11.3.4	60
8.11.5.4 8.11.5.5	Dumbwaiters	8.11.2.1 8.11.3.1	12	8.11.2.2 8.11.3.2	12	8.11.3.3	36	8.11.2.3 8.11.3.4	60
8.11.5.5	Material lifts and dumbwaiters with automatic transfer devices	8.11.2.1 8.11.3.1	12	8.11.2.2 8.11.3.2	12	8.11.3.3	—	8.11.2.3 8.11.3.4	60
8.11.5.6	Special purpose personnel elevators	8.11.2.1 8.11.3.1	12	8.11.2.2 8.11.3.2	—	8.11.3.3	—	8.11.2.3 8.11.3.4	60
8.11.5.7	Inclined elevators	8.11.2.1 8.11.3.1	12	8.11.2.2 8.11.3.2	—	8.11.3.3	—	8.11.2.3 8.11.3.4	60
8.11.5.9	Screw-column elevators	8.11.2.1 8.11.3.1	12	8.11.2.2 8.11.3.2	—	8.11.3.3	—	8.11.2.3 8.11.3.4	60
8.11.5.10	Rooftop elevators	8.11.2.1 8.11.3.1	12	8.11.2.2 8.11.3.2	—	8.11.3.3	—	8.11.2.3 8.11.3.4	60
8.11.5.12	Limited use/limited application elevators	8.11.2.1 8.11.3.1	12	8.11.2.2 8.11.3.2	—	8.11.3.3	—	8.11.2.3 8.11.3.4	60

3028.3 Category One tests. The tests required by ASME A17.1, 8.11.2.2.1 through 8.11.2.2.4 shall be performed with rated load in the car.

3028.4 Category Five tests. Elevators shall be subject to five-year inspection test requirements in accordance with ASME A17.1, 8.11.2.3, Periodic Test Requirements – Category Five, except that safety and governor systems of cars operating on wood guide rails shall be tested by tripping the governor by hand with rated load in the car, and the car at rest.

**SECTION 3029
PERIODIC INSPECTION AND TESTS OF
ESCALATORS AND MOVING WALKS
(ASME A17.1, 8.11.4)**

3029.1 Periodic inspection and tests of escalators and moving walks. In addition to the routine inspection and tests required by ASME A17.1, 8.11.4, a certificate of cleaning the escalator trusses and pan shall be performed.

The step/skirt performance index test specified in 8.11.4.2.19 is required for all periodic escalator and moving walk tests.