

**OREGON ELEVATOR SPECIALTY
LIFTS CODE
PART I
VERTICAL RECIPROCATING LIFTS (VRL)**

Prepared by the Building Codes Division, Elevator
Safety Program effective April 1, 2005

ABBREVIATIONS USED IN THIS CODE

ft.	foot	ftc	foot-candle
in.	inch	lb.	pound (mass)
lbf	pound (force)	m	meter
lx	lux (candle power)		
mm	millimeter	N	Newton

**Standards for Vertical Reciprocating Lifts
(VRL).**

1. Scope and Application

- 1.1. The standards in this rule apply to the new installation and alteration of power-driven VRL's. A licensed structural engineer shall indicate conformance to these requirements, verifying a safety factor of 3 for all structural components.
- 1.2. VRL's installed prior to January 1, 1994 shall only be subject to these standards when obvious safety hazards exist. Obvious safety hazards shall include, but are not limited to the following: no hoistway enclosure or gates; no hoistway door locks; ability to operate the lift from the platform; no travel or final limits; violations of the electrical code in effect at time of installation.
 - 1.2.1. VRL wiring and electrical equipment shall be installed to the provisions of ANSI/NFPA 70.
 - 1.2.2. Riders shall not be permitted on vertical reciprocating lifts while the lift is in operation.
 - 1.2.3. All electrical equipment used for VRL's shall be certified as provided in ORS 479.760 to the industrial control standard UL508a.
 - 1.2.4. This standard does not apply to equipment covered by the following standards:
 - 1.2.4.1. ASME A17.1
 - 1.2.4.2. ASME A18.1
 - 1.2.4.3. ASME A90.1
 - 1.2.4.4. ASME B20.1 (if part of a mechanized conveyor system).

2. Definitions

The following definitions shall apply to the installation and maintenance of equipment under this code.

- 2.1. "**Controlled Access Facility**", is any facility where the use of facility and access thereto is restricted only to persons leasing or otherwise using space therein.
- 2.2. "**Doubled-ended platform**", refers to lifts that are capable of being loaded and unloaded from more than one side of the platform.
- 2.3. "**Electromechanical Interlock**", is a device that prevents the operation of the material lift unless all hoistway doors and car gates (when provided) are closed and locked when locking is possible when the lift is away from landing.

- 2.4. "**Final Limit**", is an electromechanical switch, device or system actuated by position of the car causing the main drive power to be disconnected from the driving machine when the lift reaches floor level or if the lift travels beyond the terminal landings.
- 2.5. "**General Public**", are persons other than employees or owner's agent of the facility where a VRL is installed and operated.
- 2.6. "**Vertical Reciprocating Lift**" is a power driven stationary conveyance permanently installed, and comprised of a car or platform that moves in guides, serves two or more floors or landings, and travels in a vertical or inclined direction. It is an isolated self-contained lift, and is not part of a mechanized conveyor system. VRL's are normally installed in a commercial or industrial area not accessible to the general public or intended to be operated by the general public.
- 2.7. "**Travel Limit**", is a device that mechanically limits the travel of the lift when the platform arrives or travels beyond the terminal landings. This device may be used in conjunction with a final limit device or system.

3. Hoistway Enclosure & Machine Rooms

3.1. **Hoistway Enclosures.** Hoistway enclosures shall comply with 3.1.1 to 3.1.3.

3.1.1. Constructed at each landing;

3.1.2. **Enclosure Height.** The height of the hoistway shall be not less than 2440-mm (96-in.) The top of the hoistway shall terminate as determined by the highest part of the lift, machinery or relating support structure; and

3.1.3. Constructed with material having the ability to withstand a 444.8-N (100-lb.) lateral force without deflection and reject a ball 50-mm (2-in) in diameter.

3.1.4. Where the lift is adjacent to a stairway, the enclosure shall of solid or perforated construction and shall not be less than 2440-mm (96-in.) above any step. Perforated construction shall reject a ball 25-mm (1-in.) in diameter.

3.2. **Backstops.** Where a double-ended platform is not accessible from both sides at a landing, the enclosure shall be provided with a backstop located on the hoistway enclosure opposite the landing opening. When car doors or gates are provided, backstops are not required.

3.2.1. The strength of the material used for the backstop shall be sufficient to withstand normal load impacts without significant deformation.

3.2.2. The backstop shall extend a minimum of 1100-mm (43-in.) high and not less than 50-mm (2-in.) below the platform or to floor level, as measured with the lift at floor level. The minimum width of the backstop shall be not less than the width of the clear platform opening.

3.2.3. The horizontal clearance from the backstop to the edge of the platform shall not exceed 38-mm (1-1/2-in).

3.3. **Comparison to Dumbwaiters.** Where the cross-sectional area of the hoistway is 0.84-m² (9-ft.²) or less and the hoistway is required to be fire rated by the Oregon Structural Specialty Code, the installation shall be required to comply with ASME A17.1a 2002, Sections 7.1, 7.2 and 7.3 as applicable.

3.4. **Comparison to Material Lifts.** Where the size of the lift is 1220-mm (48-in.) or less in width and is 2285-mm (90-in.) or less in height and required to be installed in a fire rated hoistway, the device shall comply with ASME A17.1a 2002, Part 7, Sections 7.4, 7.5 and 7.6 as applicable.

3.5. **Machine Rooms.** Machine rooms or suitable enclosures around machinery and control equipment shall be required in facilities accessible by the general public or where the material lift equipment is readily accessible to tenants in controlled access facilities.

3.5.1. Enclosures shall be a minimum of 2000-mm (79-in.) in height with a door capable of being locked.

3.5.2. Illumination levels within the enclosure shall not be less than 100-lux (10-ftc) as measured at floor level.

3.6. **Pipes, Ducts and Wireways.** Only pipes, ducts and wiring directly related to the operation of the VRL shall be allowed in hoistways and machine rooms.

4. Hoistway Doors and Gates

4.1. **Protection of Hoistway Landing Openings.** The openings at each landing shall be provided with gates or doors that guard the full width of the opening and prevent entry to any hoistway area during material lift operation. Hoistway gates or doors shall extend vertically not more than 50-mm (2-in.) from the landing threshold and to a minimum height of 1830-mm (72-in) above the landing threshold.

4.2. **Running Clearances.** The horizontal clearance between the platform and landing threshold shall not be less than 13 mm (1/2-in.) nor greater than 40-mm (1-1/2 in.).

4.3. **Horizontal Clearances.** The horizontal clearance between the platform edge and the inside surface of the hoistway door shall not exceed 130-mm (5-in.). This measurement shall be taken from the edge of the platform to the gate panel nearest the hoistway sill with the platform at floor level.

4.4. **Hoistway Door Interlocks.** Each hoistway gate or door shall have an electromechanical interlock or combination mechanical door lock and contact to prevent the door from opening while the material lift is in operation and to prevent the material lift from operating if a door or gate is open at any landing. The interlock shall be located so it is not accessible from the landing side when the hoistway doors are closed. Access to the interlock through use of special tool is permitted provided the interlock is located not more than 2130-mm (84-in.) from floor level.

4.5. **No Riders Sign.** There shall be a sign on each landing door or gate reading "NO RIDERS". Letters on the sign shall be a minimum of 50-mm (2-in.) high and be a contrasting color to the surrounding background.

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4.6. **Power Door Operation.** When power doors are provided they shall conform to the following:

- 4.6.1. The closing force shall not exceed 45-N (10-lbf.) for swing doors.
- 4.6.2. The closing force shall not exceed 133-N (30-lbf.) for horizontal sliding or vertical operating doors.
- 4.6.3. The maximum closing speed for doors shall not exceed 0.305-m/s (1-ft/sec.).
- 4.6.4. A means shall be provided to cause the door to stop and/or reopen if obstructed while closing.
- 4.6.5. The control device to open and close the door shall be within sight of the hoistway door it controls. Doors shall not be closed automatically by timing circuits or similar systems.

5. Car Enclosures.

- 5.1. **Capacity Sign.** Each lift shall be equipped with a sign clearly visible on the car showing the maximum rated capacity.
- 5.2. **Car Enclosure Openings.** Openings in the car enclosure shall be constructed to reject a 50-mm (2-in.) ball. The enclosure walls on all sides not used for loading and unloading shall be constructed to prevent material from falling into or against the hoistway enclosure during operation and shall be a minimum of 1100-mm (43-in.) high.
- 5.3. **Snap Chains.** A snap chain, drop bar or similar device may be installed across all loading sides of the lift platform.
- 5.4. **Car gates.** Car gates are not required. Where provided, car gates shall be a minimum of 1100-mm (43-in.) high and provided with a gate switch contact to prevent operation of the lift unless the car gate is in the closed position.

6. Driving Machines and Control Equipment.

- 6.1. **Equipment Prohibited.** Driving machines, pump units and other equipment shall be permanently secured in place and shall not be supported by hooks, cables, chains, similar devices or configurations. Chain hoists, rope falls or similar hoisting devices are prohibited from use as the main driving machine.
- 6.2. **Sheave Diameter.** The diameter of drive sheaves for traction machines and drums shall not be less than 30 times the diameter of the hoisting cables. The diameter of all other sheaves shall not be less than 21 times the diameter of the hoisting cables.
- 6.3. **Access to Equipment.** The controller, driving machine and other equipment requiring periodic

service and repair shall be readily accessible.. Where machines are located in the hoistway, a safe means of access shall be provided from outside the hoistway to facilitate maintenance and repairs. Where equipment access panels are located more than 1830 mm (72-in.) above floor level, stairs or fixed ladders shall be provided. Stairs shall comply with OR-OSHA and fixed ladders shall comply with ANSI A14.3.

6.4. **Illumination of Work Areas.** Areas containing machines and controls shall be provided with a minimum illumination of not less than 108-lux (10-ftc) as measured at a point in front of the equipment. An electrical outlet conforming to the Oregon Electrical Specialty Code Article 620-85 shall be provided within 2000-mm (79-in.) of the control equipment.

6.5. **Bypass Pressure Relief.** By-pass pressure on hydraulic units shall be set and sealed not to exceed manufacturer's specifications and shall be appropriately tagged.

6.6. **Controllers.** Controllers shall not be located in the hoistway. Location of panels shall be as required in NFPA 70.

7. Lift Operating Protective Devices.

7.1. **Suspension Means.** Each lift suspended by wire ropes, chains or similar means shall be equipped with car safeties. The car safety shall be capable of stopping the car and sustaining the car with 125 percent of its rated load. Upon activation of the car safeties, an electric safety switch shall be provided that will cause the power to be disconnected from the main driving means.

7.2. The suspension means shall be provided with a tag indicating the following:

- 7.2.1. Manufacturer's name
- 7.2.2. Breaking strength
- 7.2.3. Rope size or chain number
- 7.2.4. Rope or chain quantity
- 7.2.5. Date of installation

7.3. **Travel Limits and Limit Switches.** Each lift shall be provided with top and bottom travel limits, or final limit switches, or a combination of both. Where travel limits are not used or the lift is suspended by ropes, chains or similar means, the lift shall be provided with a final limit device or system.

7.4. **Control Stations.** Control stations shall be permanently installed on the outside of each landing. The control stations shall be in view of the hoistway and shall have an emergency mechanical set -reset type stop switch.

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7.4.1. The control stations shall be located at a point outside the hoistway so it is not possible for the same person to operate the control and ride the lift.

7.5. **Disconnecting Means.** A fused disconnect switch or circuit breaker shall be provided and conform to the Oregon Electrical Specialty Code Article 620-51. The disconnecting means shall be installed adjacent to the controller..

7.6. **Winding Drum Machines.** A lift with a winding drum machine shall be provided with a slack chain or cable device, that will cause the main power to be removed from the driving machine if the suspension means become slack. The device shall be of the manually reset type.

8. Installations in Sidewalk Applications

8.1. Where VRL's penetrate a sidewalk, the lift shall also comply with applicable requirements of ASME A17.1a 2002, Section 5.5 Power Sidewalk Elevators.

8.2. *Note: Where references are made to other sections of A17.1, the appropriate reference in this code shall be substituted. If there is no appropriate reference in this standard, the A17.1 reference shall apply.*

9. Operation, Maintenance and Testing

9.1. **Acceptance Testing.** At time of installation, testing shall be performed to verify rated lifting capacity and performance capability.

9.2. **Periodic Testing.** At least once every 60-months, the equipment shall be subjected to a full load test to determine equipment structural integrity and operational safety. A record of such tests and their findings shall be kept on site and be available for inspection. The type of tests shall be applicable to the type of equipment.

9.3. Reclassification of Freight or Passenger Elevators to VRL Classification

9.3.1. Freight and passenger elevators shall continue to be maintained and tested according to this section and the applicable testing requirements for such equipment in ASME A17.1, Section 8.11.

9.4. **Maintenance.** Equipment shall be kept clean and free from unrelated storage. Installation of unrelated equipment in the area of the material lift shall not impair the operation of the lift nor obstruct access to the equipment for maintenance and repairs.

9.4.1. The frequency of maintenance shall be not less than once every 12 months.

9.4.2. Equipment shall be maintained and adjusted to meet the requirements of this code. Equipment operating within tolerances of the manufacturer are deemed to be in compliance with this requirement.

9.5. **Conditional Operation.** Operation of a lift by other than employees in a controlled access facility shall be as follows:

9.5.1. **Lift Operating Agreement.** A tenant lease agreement shall be created that stipulates the tenant is to operate this lift only after receiving instructions and supervised training by the owner. This signed agreement shall be subject to periodic inspection by the Department.

9.5.2. **Surveillance.** Video and audio surveillance shall be provided for owner monitoring of the lift during operation.

9.5.3. **Control Stations.** The landing control call-send station shall be activated by a keyed switch or by a keyless security device. The landing control stations shall require reactivation by the keyed switch or security system after each single trip of the lift.

9.5.4. **Car Top.** The lift shall be provided with a car top equal in area to the platform. The sides shall extend from the platform to the car top. The top and sides may be made of open grillwork providing any opening will reject a ball 50-mm (2-in.) in diameter.

9.5.5. **Compliance.** Failure to maintain any items required by this rule may result in the termination or suspension of lift operation by tenants until the lift complies with Section 9.3.

9.6. Damaged Backstops.

Damaged backstops shall be repaired or replaced when they no longer meet the dimensions specified in Rule 3.2.2, or where the horizontal clearance is greater than that required by Rule 3.2.3.

10. Alterations

Alterations to existing lifts shall cause the equipment affected by the alteration to comply with the latest standard of this code.