

524 CMR: BOARD OF ELEVATOR REGULATIONS

524 CMR 32.00: VERTICAL RECIPROCATING CONVEYORS

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32.01: Scope and Application

- (1) 524 CMR 32.00 is promulgated by the Board of Elevator Regulations pursuant to the authority granted by M.G.L. c. 143, §§ 68 and 71E.
- (2) The standards in 524 CMR 32.00 shall apply to the new installation, alteration, and maintenance of power-driven Vertical Reciprocating Conveyors (VRC) as defined in 524 CMR 32.02. A licensed structural engineer shall indicate conformance to these requirements and any additional requirements under the Massachusetts State Building Code (780 CMR) verifying a safety factor of three for all structural components.
- (3) Vertical Reciprocating Conveyors shall be subject to inspection as provided in M.G.L. c. 143, § 64. Vertical Reciprocating Conveyors installed prior to April 15, 2009 shall be in full compliance with the applicable edition of ASME B20.1 in effect at the time of the installation by April 15, 2010. Prior to April 15, 2010, a state inspector may take appropriate action against a vertical reciprocating conveyor pursuant to 524 CMR 8.02, 8.03, or 8.06 or when any obvious safety hazards exist. Obvious safety hazards shall include, but not be limited to: lack of hoistway enclosure gates, lack of hoistway electrical door locks, ability to operate the conveyor from the platform, no travel or final limits.
- (4) Vertical Reciprocating Conveyor wiring and electrical equipment shall be installed in accordance with 527 CMR 12.00.
- (5) No riders shall be permitted on Vertical Reciprocating Conveyors while the lift is in operation.
- (6) Individuals performing work relative to the construction, maintenance, or repair of Vertical Reciprocating Conveyors within the Commonwealth shall be subject to the licensing requirements of M.G.L. c. 143, § 71B.
- (7) A permit for installation, alteration, relocation, or material change of a Vertical Reciprocating Conveyor must be obtained from the Department of Public Safety in accordance with 524 CMR 1.01, 1.02, 1.03, 1.04, and 1.05 prior to the commencement of any such work.

32.02: Definitions

The following definitions shall apply to the installation, alteration, repair and maintenance of equipment covered by 524 CMR 32.01:

ASME. American Society of Mechanical Engineers.

Controlled Access Facility. Any facility where the use of facility and access thereto is restricted only to persons leasing or otherwise using space.

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Doubled-ended Platform. A lift that is capable of being loaded and unloaded from more than one side of the platform.

Electromechanical Interlock. A device that prevents the operation of the VRC unless all hoistway doors and car gates (when provided) are closed and locked when locking is possible when the lift is away from landing.

Final Limit Switch. 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.

General Public. People other than employees or owner's agent of the facility where a VRC is installed and operated.

Travel Limit Switch. 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.

Vertical Reciprocating Conveyor or VRC. 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. VRCs are normally installed in a commercial or industrial area not accessible to the general public or intended to be operated by the general public.

32.03: Hoistway Enclosure

- (1) The hoistways of all VRCs that penetrate any fully enclosed solid floor above the bottom landing shall be enclosed throughout their height and constructed in accordance with 780 CMR (Massachusetts State Building Code) in effect at that time of installation.
- (2) Where 524 CMR 32.03(1) does not apply, hoistway enclosures shall be constructed at each landing according to the following standards:
 - (a) Enclosure Height of the hoistway shall be not less than 96 inches (2440-mm) and shall terminate as determined by the highest part of the lift, machinery or relating support structure.
 - (b) Enclosures shall be constructed with material having the ability to withstand a 100 pound lateral force without deflection and reject a ball two inches (50-mm) in diameter.
 - (c) Where the VRC is adjacent to a stairway, the enclosure shall be of solid or perforated construction and shall not be less than 96 inches (2440-mm) above any step. Perforated construction shall reject a ball one inch (25-mm) in diameter.

32.04: Backstops

- (1) 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.
- (2) The strength of the material used for the backstop shall be sufficient to withstand normal load impacts.
- (3) The backstop shall extend a minimum of 43 inches (1100-mm) high and not less than two inches (50-mm) below the platform or to floor level, as measured with the lift at floor level. The width of the backstop shall be not less than the clear opening.
- (4) The distance measured horizontally from the platform to the backstop shall not exceed 1½ inches (38-mm).

32.05: Machine Rooms

Machine rooms or suitable enclosures around machinery and control equipment shall be required and shall meet the requirements of A.17.1-2004 Section 2.7 except as modified by 524 CMR 35.00.

32.06: Hoistway Doors and Gates

- (1) 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 two inches (50-mm) from the landing threshold and to a minimum height of 72 inches (1830-mm) above the landing threshold.
- (2) The horizontal running clearance between the platform and landing threshold shall not be less than ½ inch (13 mm) nor greater than 1½ inches (40-mm).
- (3) The horizontal clearance between the platform edge and the inside surface of the hoistway door shall not exceed five inches (130-mm).
- (4) 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 84 inches (2130-mm) from floor level.
- (5) There shall be a sign on each landing door or gate reading "NO RIDERS." Letters on the sign shall be a minimum of two inches (50-mm) high and be a contrasting color to the surrounding background.
- (6) Power doors, when provided, shall conform to the following:
 - (a) Swing door closing force shall not exceed 10-lbf (45-N).
 - (b) Horizontal sliding or vertical operating doors closing force shall not exceed 30-lbf (133-N).
 - (c) The maximum closing speed for doors shall not exceed 1-ft/sec (0.305-m/s).
 - (d) The control device to open and close the door shall be within sight of the hoistway door it controls. Door control shall be of the constant pressure type and shall not be controlled automatically.

32.07: Car Enclosures

- (1) The enclosure on the sides not used for loading and unloading shall be constructed to prevent material from falling into or against the hoistway enclosure during operation and will be constructed to reject a two inches (50 mm) ball. In no case shall the enclosure be less than 43 inches (1100 mm) high.
- (2) Car Gates are not Required. Where provided, car gates shall be a minimum of 43 inches (1100-mm) high and provided with a gate switch contact to prevent operation of the lift unless the car gate is in the closed position.
- (3) A snap chain, drop bar or similar device may be installed across all loading sides of the lift platform.
- (4) A capacity sign shall be installed on conveyor and clearly visible showing the maximum rated capacity. The capacity sign lettering shall not be less than ¾ inch high.
- (5) A "NO RIDERS" sign shall be installed on the conveyor. The lettering shall not be less than ¾ inch high.

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(6) Conveyors shall be equipped with an electric light or lights; not less than two lamps shall be provided. The minimum illumination at the landing edge of the conveyor platform when the landing doors are open shall not be less than five foot candles.

(7) A car light switch is not required on the conveyor, but it shall be required in the machine room.

32.08: Driving Machines and Control Equipment

(1) 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.

(2) 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.

(3) 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 72 inches (1830-mm) above floor level, stairs or fixed ladders shall be provided. Stairs and fixed ladders shall comply with ASME A17.1.2.7.3.3.1.

(4) Illumination of work areas containing machines and controls shall be provided with an electric light or lights; not less than two lamps shall be provided. The minimum illumination of not less than ten foot candles as measured at a point in front of the equipment. An electrical outlet conforming to 527 CMR shall be provided within 72 inches of the control equipment.

(5) Controllers shall not be located in the hoistway and shall be located in a control room.

(6) Machine rooms and/or control rooms shall meet the requirements of 524 CMR 35.00: Section 2.26.

(7) Machines located in a hoistway shall meet the minimum guidelines for a Machine Roomless (MRL) installation.

(8) By-pass pressure on hydraulic units shall be set not to exceed 150% of working pressure and shall be sealed.

(9) An overspeed valve (rupture valve) shall be installed in the oil line of hydraulic units between the overspeed valve and the jack. Only threaded or welded pipe may be used between the overspeed valve and the jack.

32.09: Operating Protective Devices

(1) Each conveyor 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% 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.

(2) Each lift shall be provided with top and bottom travel limits and final limit switches.

(3) 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. 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.

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(4) A lift with a winding drum machine shall be provided with a slack rope switch or slack chain that will cause the main power to be removed from the driving machine. The device shall be of the manually reset type.

32.10: Practical Tests and Inspections

Before a conveyor is allowed to operate, the requirements of 524 CMR 7.00 and 524 CMR 8.00 shall be met, where applicable.

32.11: Controlled Access Facility

All employees who intend to use a VRC in a controlled access facility shall be trained as to its safe operation. A record shall be kept on file by the facility documenting the individuals who have received such training. No employee of said facility may operate a VRC unless he or she has been trained on its safe operation.

32.12: Non-controlled Access Facility

VRCs may not be operated by the general public. If a VRC is located in a non-controlled access facility, the area surrounding the VRC shall be secured so that members of the public do not have access to the unit. There shall be a sign on or adjacent to the unit reading "NO RIDERS." Letters on the sign shall be a minimum of two inches (50-mm) high and be a contrasting color to the surrounding background.

32.13: Alterations

Alterations to existing lifts shall cause the equipment affected by the alteration to comply with 524 CMR 32.00.

REGULATORY AUTHORITY

524 CMR 32.00: M.G.L. c. 143, §§ 68 and 71E.

NON-TEXT PAGE