2005 OREGON SPECIALTY LIFT CODE

Effective January 1, 2012

Oregon Specialty Lift Code

Based on:
2003 Vertical Reciprocating Lifts – Part I
2003 Portable Wheelchair Lifts – Part II

Revised in 2005

Effective January 1, 2012

Authorized by ORS 460.085

Oregon Department of Consumer and Business Services
Building Codes Division
P.O. Box 14470
1535 Edgewater Street NW
Salem, Oregon 97309-0404
bcd.oregon.gov

2003
VERTICAL
RECIPROCATING
LIFTS

PART I

OREGON ELEVAOTR SPECIALTY

LIFTS CODE

PART I

VERTICAL RECIPROCATING LIFTS (VRL)

ABBREVIATIONS USED IN THIS CODE

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.

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

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.

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

2.8.1. Constructed at each landing;

2.8.2. **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

2.8.3. 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.

2.8.4. 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.

2.9. **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.

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

2.9.2. 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.

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

2.10. **Comparison to Dumbwaiters.** Where the cross-sectional area of the hoistway is 0.84-m^2 (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.

2.11. **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.

2.12. **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.

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

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

2.13. **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.

3. Hoistway Doors and Gates

3.1. **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.

3.2. **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.).

3.3. **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.

3.4. **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.

3.5. **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.

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

3.6.1. The closing force shall not exceed 45-N (10-lbf.) for swing doors.

3.6.2. The closing force shall not exceed 133-N (30-lbf.) for horizontal sliding or vertical operating doors.

3.6.3. The maximum closing speed for doors shall not exceed 0.305-m/s (1-ft/sec.).

3.6.4. A means shall be provided to cause the door to stop and/or reopen if obstructed while closing.

3.6.5. 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.

4. Car Enclosures.

4.1. **Capacity Sign**. Each lift shall be equipped with a sign clearly visible on the car showing the maximum rated capacity.

4.2. **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 failing into or against the hoistway enclosure during operation and shall be a minimum of 1100-mm (43-in.) high.

4.3. **Snap Chains.** A snap chain, drop bar or similar device may be installed across all loading sides of the lift platform.

4.4. **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.

5. Driving Machines and Control Equipment.

5.1. **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.

5.2. **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.

5.3. **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.

5.4. **Illumination of Work Areas.** Areas containing machines and controls shall be provided with a minimum illumination of not less then 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.

5.5. **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.

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

6. Lift Operating Protective Devices.

6.1. **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.

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

6.2.1. Manufacturer's name
6.2.2. Breaking strength
6.2.3. Rope size or chain number
6.2.4. Rope or chain quantity
6.2.5. Date of installation

6.3. **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.

6.4. **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.

6.4.1. 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.

6.5. **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..

6.6. **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.

7. Installations in Sidewalk Applications

7.1. 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.

7.2. 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.

8. Operation, Maintenance and Testing

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

8.2. **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.

8.3. Reclassification of Freight or Passenger Elevators to VRL Classification

8.3.1. 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.

8.4. **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.

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

8.4.2. 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.

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

8.5.1. **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.

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

8.5.3. **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.

8.5.4. **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.

8.5.5. **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.

8.6. **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.

9. Alterations

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

2003
PORTABLE
WHEELCHAIR
LIFTS

PART II

PART II
2003 PORTABLE WHEELCHAIR LIFTS

NOTE: THIS DOCUMENT IS A NEW STANDARD DEVELOPED BY THE BUILDING CODES DIVISION AND EFFECTIVE MARCH 1, 2003.

OREGON ELEVATOR SPECIALTY LIFTS
PART II
PORTABLE WHEELCHAIR LIFTS

Scope

The purpose of this code is to provide for the construction, use and maintenance for portable wheelchair lifts. Code references are to ASME A18.1 unless otherwise indicated.

1. Platform Guarding and Runway Area

1.1. Platform Toe Guards.

1.1.1. Platform toe guards must comply with Rule 1.1.1.1 or Rule 1.1.1.2.

1.1.1.1. A smooth toe guard on all sides shall guard the underside of the platform. The height of the toe guard shall be at least equal to the maximum upward travel of the platform from the lower landing plus 75-mm (3-in.). The toe guard shall withstand, without permanent deformation, a force of 556-N (125-lbf) applied on any 100-mm (4-in.) by 100-mm (4-in.) area.

1.1.1.2. A shutter-type (telescoping) toe guard, when used, shall be securely fastened at their lower extremity. A collapsible boot may be used as a toe guard providing it is of a durable material that will resist tearing and punctures.

1.1.2. Toe guards are not required where the unit is strictly attendant operated and the unit complies with Section 16.2 of this code.

2. Platform Doors and Stationary Sides

2.1. **Platform Doors.** A platform door of unperforated construction shall guard all sides of the platform providing access. The door shall not be permanently deformed when a force of 556-N (125-lbf) is applied on any 100-mm (4-in.) by 100-mm (4-in.) area. Each door shall be self-closing, at least 1100-mm (43-in.) high, and shall be provided with a combination mechanical lock and electric contact. The door may be opened if the platform is within 50-mm (2-in.) of the lower landing. Movement of the platform with the door lock open will cause the unit to stop if the door fails to lock before the platform has moved away from the landing more than 50-mm (2-in.).

2.2. **Side Guards.** The platform side guards on the sides not used for entrance or exit shall be of smooth construction to a height of 1100-mm (43-in.) above the platform or car floor with no openings, other than those necessary for operation. Openings necessary for operation shall reject a ball 13-mm (1/2-in.) in diameter.

2.3. **Grab Bar.** A round grab rail extending the full length of either side guard shall be provided at a height in conformance with the requirements of ANSI A117.1.

2.4. **External Surface Requirements.** Any surface that is 300-mm (12-in.) or less from the sides not used for loading and unloading shall be provided with a smooth continuous surface. The surface shall not be closer than 50-mm (2-in.) to the platform and extend to a height of not less than 1100-mm (43-in.) above the top landing.

2.5. **Platform Obstruction Device.** The underside of the platform shall be equipped with a device that will stop the lift in its downward travel within 50-mm (2-in.) if the platform is obstructed. The force necessary to activate the device shall not exceed 18-N (4-lbf) applied anywhere on its underside. Motion may resume when the force is removed.

2.6. **Lift Placement.** A means shall be provided to prevent lateral movement of the lift once set in place for operation. The clearance between the platform and the upper landing sill shall be not less than 10-mm (3/8-in.) or more than 20-mm (3/4-in.).

3. Lower Level Access Ramps

Ramps shall be provided in accordance with the requirements for ramps in ANSI A117.1 or as required by the Oregon Structural Specialty Code,.

4. Electrical Equipment and Wiring

4.1. The installation of electrical equipment and wiring shall conform to the requirements of ANSI/NFPA 70.

4.2. Electrical equipment shall be certified to the requirements of CSA B44.1/ASME A17.5.

5. Structural Support

The structure on which the equipment is installed shall be capable of safely supporting the loads imposed.

6. Driving Means and Sheaves

The driving means shall be one of the following:

6.1. winding drum
6.2. traction
6.3. roped sprocket
6.4. chain sprocket
6.5. screw
6.6. rack and pinion
6.7. direct-plunger hydraulic
6.8. roped-hydraulic
6.9. lever-hydraulic
6.10. scissors lift

7. General Requirements

7.1. **Factor of Safety.** The factor of safety, based on the static load (the rated load plus the weight of the car, ropes, counterweights, etc.), to be used in the design of driving machines and sheaves shall not be less than:

7.1.1. Eight (8) for steel, bronze, or other metals having an elongation of at least 14% in a length of 50-mm (2-in.);

7.1.2. Ten (10) for cast iron or other metals having an elongation of less than 14% in a length of 50-mm (2-in.).

7.2. **Fasteners.** Set screws and bolts shall conform to the requirements of ASME A18.1, 2.2.2.2. Shaft fillets and keys shall conform to the requirements of ASME A18.1, 2.3.1.2.

7.3. **Prohibited Drive Systems.** Friction gearing, clutch mechanisms, or couplings shall not be used to connect a driving machine drum or sheave to the main driving mechanism.

7.4. **Worm Gears.** Worm gearing having cast iron teeth shall not be used on the driving machine.

7.5. **Drive Chains.** Driving-machine chains and sprockets shall be of steel and shall conform in design and dimensions to the requirements of ANSI B29.1.

7.6. **Sheaves.** Winding drums, traction sheaves, overhead sheaves, and deflecting sheaves shall conform to the requirements of 2.24.2.1 and 2.24.2.3. Sheaves shall have a pitch diameter of not less than 30 times the diameter of the suspension ropes. Where 8x19 steel rope or 7x19 steel aircraft cable is used, the pitch diameter of the drums and sheaves may be reduced to 21 times the diameter of the rope or cable.

7.7. **Scissors Lift Requirements.** Scissors-type lifting mechanisms shall conform to ANSI MH29.1.

8. Machines Types

8.1. Hydraulic Driving Machines.

8.1.1. Direct-plunger hydraulic driving machines, where used, shall conform to the requirements of ASME A18.1, Section 8.1.

8.1.2. Roped-hydraulic machines shall conform to the requirements of ASME A18.1, Section 8.1.2.

8.2. Screw Machines.

8.2.1. Screw machines, where used, shall conform to ASME A18.1, Section 8.2.

8.2.2. Rated speed shall not exceed 0.15 m/s (30-ft/min). Overspeed shall not exceed 0.38 m/s (75-ft/min).

8.3. Machine Framework and Base.

8.3.1. The machine framework and base shall:

8.3.1.1. be of metal construction;

8.3.1.2. have a factor of safety of not less than 5 based on the rated load; and

8.3.1.3. shall be secured in place with support provided to limit their deflections to 6-mm (¼-in.) maximum in any direction under rated load. Cast iron shall not be used.

9. Guarding of Driving Machines and Suspension Means.

The driving machine and suspension means shall be enclosed with a solid enclosure. Any opening required for operation shall reject a ball 20-mm (3/4-in.) in diameter. A removable panel shall provide access for inspecting and servicing. The panel shall be screwed, locked, or bolted in place.

10. Driving-Machine Brakes

10.1. Driving machines, except hydraulic, shall be equipped with friction brakes directly attached to the driving means through a continuous shaft, mechanical coupling, or toothed gearing applied by springs, or by gravity, and released electrically.

10.2. A single ground or short circuit, a counter-voltage or a motor-field discharge shall not prevent the brake magnet from allowing the brake to set when the operating device is placed in the stop position.

10.3. A machine brake is not required if a self-locking drive utilizing a lead screw, worm, or other positive gearing which will stop and hold the platform with the rated load within 100-mm (4-in.) of down travel after the power is removed is provided.

11. Suspension and Support Means

Suspension and support means shall be one of the following:

11.1. steel or iron wire rope

11.2. steel aircraft cable

11.3. roller chain

11.4. direct-plunger hydraulic

11.5. roped-hydraulic

11.6. rack and pinion

11.7. screw

11.8. scissors type-support conforming to ANSI MH29.1

11.9. Steel tapes or welded link chains shall not be used as suspension means.

11.10. Where ropes or chains are used, not less than two shall be provided.

11.11. For rated loads up to 227-kg (500-lb.), ropes shall have a minimum diameter of 6-mm (¼-in) and chains shall have a minimum pitch of 13-mm (½-in.). For higher rated loads, ropes shall have a minimum diameter of 10-mm (3/8-in.) and chains shall have a minimum pitch of 16-mm (5/8-in.).

11.12. Factors of Safety.

The suspension and support means shall have a factor of safety of not less than 7 based on the tension in the rope, cable, chain, or forces exerted on the hydraulic cylinder, screw drive, or rack and pinion when raising the rated load. When steel ropes suspend the car and counterweight and the driving means between the machine and the counterweight is an endless roller-type chain, the factor of safety of such chain shall be not less than 8, based on the rated load.

11.13. Arc of Contact of Suspension Means on Sheaves and Sprockets.

The arc of contact of a wire rope on a traction sheave shall be sufficient to produce adequate traction under all load conditions. The arc of contact of a chain on a driving sprocket shall be not less than 140 degrees.

11.14. Spare Rope Turns on Winding Drums.

All wire ropes of winding drum machines shall have not less than one full turn of the rope on the drum when the car or counterweight has reached its limit of possible overtravel.

11.15. Securing Suspension Ropes to Winding Drums.

The drum ends of wire ropes shall be secured on the inside of the drum of winding drum machines by clamps or by one of the other methods such as specified in ASME A18.1, 5.5.5 for fastening wire ropes.

11.16. Lengthening, Splicing, Repairing, or Replacing Suspension Means.

Suspension ropes shall not be lengthened or repaired by splicing. Broken or worn suspension chains shall not be repaired. If one rope or chain of a set is worn or damaged and requires replacement, the entire set of ropes or chains shall be replaced. If a chain or sprocket is replaced due to wear all chains and sprockets shall be replaced.

11.17. Fastening of Rope Suspension Means to Platform.

The platform ends of wire ropes shall be fastened in a return loop by properly made individual tapered babbitted sockets or by properly attached fittings as recommended by wire rope manufacturers. Clips of the U-bolt type shall not be used. Tapered babbitted rope sockets and the method of babbitting shall conform to the requirements of ASME A18.1 Section 5.5. The diameter of the hole in the small end of the socket shall not exceed the nominal diameter of the rope by more than 2.4-mm (3/32 in.).

12. Cars and Platforms

12.1. Car Frame and Platform.

The car frame shall be of metal construction and have a factor of safety of not less than 5 based on the rated load. The platform shall be of metal or wood construction with a nonskid surface. Construction shall conform to the requirements of ASME A18.1, Section 5.6.

12.2. Use of Cast Iron.

Cast iron shall not be used in the construction of any load-bearing member of the car frame or platform other than for guide shoes and guide shoe brackets.

12.3. Platform Size.

The inside net platform area shall not exceed 1.67-m^2 (18-ft^2).

12.4. Car Illumination

12.4.1. The lift shall be placed in an area that provides a minimum illumination of not less than 54-lx (5-ftc); at the thresholds of the platform.

12.4.2. **Auxiliary Lighting.** An auxiliary illumination source, when provided, shall conform to the following:

12.4.2.1. The auxiliary system shall provide general illumination of not less than 2.2-lx (0.2-ftc) on the platform and controls.

12.4.2.2. The auxiliary system shall be automatically activated when normal illumination power fails.

12.4.2.3. The auxiliary system shall be capable of maintaining the above illumination intensity for a period of not less than 4 hours and shall use not less than two lamps of approximately equal wattage.

13. Capacity, Speed, and Travel

13.1. Limitation of Load, Speed, and Travel.

13.1.1. **Rated Load.** The rated load shall be not less than 204-kg (450-lb.) or more than 340-kg (750-lb.). The lift shall be capable of sustaining and lowering a load as specified in ASME A18.1, 5.7. Platforms with an area greater than 1.39-m^2 (15-ft^2) shall have a rated load of not less than 340-kg (750-lb.).

13.1.2. **Rated Speed.** The rated speed shall not exceed 0.15-m/s (30-ft/min).

13.1.3. **Travel.** The travel shall not exceed a nominal 1270-mm (50-in.).

13.2. Capacity Plates.

A capacity plate stating the rated load shall be provided by the manufacturer and fastened in a conspicuous place. The letters and numerals used shall be not less than 6.5-mm (¼-in.) in height.

13.3. Data Plates.

A data plate shall be provided by the manufacturer and securely fastened to the machine. The plate shall state the rated speed, rated load, weight of car, suspension and support means, date of manufacture, and manufacturer's name. Letters and numerals shall be not less than 6.4-mm (¼-in.) in height

14. Safeties and Speed Governors

14.1. **Platform Safeties.** All cars shall be provided with a safety, except cars of direct-plunger or scissor-type lifts. The safety shall be actuated by the action of a speed governor or by the breakage or slackening of the suspension or support means. Where actuation is by a governor, the safety shall be set at a maximum speed of 0.38-m/s (75-ft/min). Where actuation is by breakage or slackening of the suspension or support means, the safety shall be set without delay, and independent of the speed governor, if provided. When screw drive machines are used, safeties and speed governors shall be provided as required by ASME A18.1, 5.8.1.

14.2. **Governor Ropes.** Safety parts shall conform to the requirements of ASME A18.1, 5.8.2 except that, where provided, the rope used as a connection from the safety to the governor rope shall be not less than 3.2-mm (1/8-in.) in diameter. Governor ropes, where provided, shall conform to the requirements of ASME A18.1, 5.8.3, except that the diameter shall be not less than 6-mm (1/4-in.).

14.3. **Hoist Ropes.** Where hoisting ropes are used, the application of safeties shall conform to the requirements of ASME A18.1, Section 5.5.

14.4. **Application and Release of Safeties.** The application and release of safeties shall conform to the requirements of ASME A18.1, 5.8.5.

15. Terminal Stopping Devices

15.1. Terminal stopping devices shall conform to the requirements of ASME A18.1, Section 5.9.

15.2. **Directional Stopping Devices.** Upper and lower terminal stopping devices operated by the car shall be provided, and shall be set to stop the car within a tolerance of 13-mm (1/2-in.) of the upper and lower terminal landings under rated loading to zero loading conditions.

15.3. **Final Terminal Stopping Devices.** Upper and lower final terminal stopping devices operated by the car to remove power from the motor and the brake shall be provided, except as specified in Rule 15.7. They shall be set to stop the car after it travels past the normal terminal stopping device and before striking an obstruction. A slack-rope device conforming to the requirements of ASME A18.1, 5.10.7 may be used as the lower final terminal-stopping device.

15.3.1. Final terminal stopping devices shall conform to the requirements of ASME A18.1, Section 5.9 .

15.4. **Winding Drum Machines.** If the driving machine is of the winding drum or sprocket and chain suspension type, a final terminal-stopping device operated by the driving machine shall also be provided.

15.5. The final terminal stopping device shall conform to the requirements of ASME A18.1, 5.9.4.

15.6. **Hydraulic Machines.** Final terminal stopping devices are not required for direct-plunger hydraulic driving machines. Lower final terminal stopping devices are not required where the limitations of the machine or runway limit the travel of the car (e.g., a platform at rest on the bottom terminal landing).

16. Operating Devices and Control Equipment

16.1. Key Operation.

A key may control operation of the car from the upper or lower landing and from the car. Where provided, a lock having a five-pin or five-disk combination with the key removable only from the “OFF” position shall operate the key-operated control. A key-operated switch shall be provided at each station that will allow a control switch at that station to become effective only when the key is in the "ON" position. "UP" and "DOWN" control switches at all stations shall be by means of a continuous-pressure device. Controls shall be in accordance with the requirements of ANSI A117.1. Operating devices shall be designed so that both the "UP" and "DOWN" circuits cannot be operated at the same time.

16.2. Attendant Operation

16.2.1. **Applicability.** Where applicable, and where approved by the authority having jurisdiction, the lift may be attendant-operated. The attendant shall be summoned by means of a clearly labeled attendant-call device located at each landing.

16.2.2. **Operation.** The attendant shall operate the lift by means of a continuous-pressure switch so located that the attendant has full view of the floor area under the lift and full view of the lift throughout its travel. A manually reset emergency stop switch shall also be provided at that location.

16.2.3. **Controls.** No controls, other than an emergency stop switch, shall be provided in the car.

16.2.3.1. Car controls may be allowed providing they are disabled when operating the lift in attendant mode.

17. Control and Operating Circuit Requirements.

17.1. Design and Installation.
The design and installation of the control and operating circuits shall conform to the following.

17.1.1. **Control Systems.** Control systems that depend on the completion or maintenance of an electric circuit shall not be used for:

17.1.1.1. Interruption of the power and application of the machine brake at terminal landings;

17.1.1.2. Stopping the machine when the safety applies.

17.1.2. **Switch Actuation.** If springs are used to actuate switches, contactors, or relays to break the circuit to stop the lift at the terminal landings, they shall be of the restrained compression type.

17.1.3. **Equipment Failure.** The failure of any single magnetically operated switch, relay, or contactor to release in the intended manner, or the occurrence of a single accidental ground shall not permit the car to start if the runway door or car door or gate is not in the closed position. It shall not permit the platform to move more than 50-mm (2-in.) away from a landing sill with the entrance door unlocked.

17.2. Motor Reversal Protection.
Where a non-instantaneous reversible motor is used, a protective circuit or device shall be provided to prevent the motor from continuing in the same direction if the reversing control is activated.

17.3. Phase Reversal and Failure Protection.
If a polyphase alternating current power supply is used, phase reversal and failure protection shall be provided in accordance with ASME A18.1, 5.10.5.

17.4. Emergency Stop Switch.
An emergency stop switch conforming to ASME A18.1, 5.10.6 shall be provided in the car.

17.5. Slack-Rope and Slack-Chain Devices for Winding Drum and Roller-Chain-Type Driving Machines.

17.5.1. **Winding Drum Machines.** Winding drum driving machines with rope suspension shall be provided with a slack-rope device of the manually reset type that will remove power from the motor and brake if the car is obstructed in its descent and the suspension ropes slacken.

17.5.2. **Roller Chains.** Lifts with roller chain suspension means shall be provided with a slack-chain device which will remove power from the motor and brake if the car is obstructed in its descent and the suspension means slacken. This device is not required to be of the manually reset type if the chain sprockets are guarded to prevent the chain from becoming disengaged from the sprockets.

17.6. Anti-creep Operation
Hydraulically controlled units shall be provided with a means to maintain floor level at the upper landing within ±13-mm (½-in).

18. Release and Application of Driving-Machine Brake.
Driving-machine brakes shall not be electrically released until power has been applied to the driving-machine motor. All power feed lines to the brake shall be opened and the brake shall apply automatically when:

18.1. any operating device in ASME A18.1, 5.10.8 is in the stop position;

18.2. any electrical protective device functions.

19. Maintenance and Testing

Periodic maintenance and testing shall conform to the requirements of ASME A18.1, Section 10.