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## 437-004-0570 Manlifts.

**(1) Application.** Manlifts covered here have platforms or brackets and handholds mounted on or attached to an endless belt that runs vertically in one direction only. Its support and drive are through top and bottom pulleys. Manlifts are for moving people only. This does not cover moving stairways, elevators with enclosed platforms ("Paternoster" elevators), gravity lifts nor conveyors used only to convey material.

### (2) Definitions.

**Closed type.** A cup-shaped device, open at the top in the direction of travel, and closed at the bottom.

**Handhold (Handgrip).** A device attached to the belt for the passenger to hold.

**Limit switch.** A device to cut off the power to the motor and apply the brake to stop the carrier when a loaded step passes the terminal landing.

**Manlift.** A power-driven endless belt moving only in one direction and with steps or platforms and handholds for the transportation of personnel from floor to floor.

**Open type.** One with a fully exposed handgrip surface that can be encircled by the passenger's fingers.

**Rated speed.** The designed speed of the device.

**Split-rail switch.** An electric limit switch operated mechanically by the rollers on the manlift steps. It has an additional hinged or "split" rail, mounted on the regular guide rail, over which the step rollers pass. It is spring loaded in the "split" position. If the step supports no load, the rollers will "bump" over the switch. If a loaded step passes over it, the split rail will be forced straight, tripping the switch and opening the electrical circuit.

**Step (platform).** A step is a passenger carrying unit.

**Travel.** The travel is the distance between the centers of the top and bottom pulleys.

### (3) General requirements.

**(a) Design requirements.** Equipment installed after June 27, 1974 must comply with "American National Standard for Manlifts ANSI A90.1-1969."

#### (b) Floor openings.

**(A) Allowable size.** Floor openings for both the "up" and "down" runs must be between 28 inches and 36 inches wide for a 12-inch belt; between 34 inches and 38 inches wide for a 14-inch belt; and between 36 inches and 40 inches wide for a 16-inch belt. They must extend at least 24 inches, but not more than 28 inches from the face of the belt.

**(B) Uniformity.** All floor openings for a manlift must be the same size and approximately circular.

**(c) Landing.**

**(A) Vertical clearance.** The clearance between the floor or mounting platform and the lower edge for the conical guard above it required by **(d)** below must be at least 7 feet 6 inches. Do not allow access to the manlift if this clearance is not possible. Enclose the manlift runway where it passes through the floor.

**(B) Clear landing space.** Keep the landing space around the floor openings unobstructed and clear. This landing space will be at least 2 feet wide from the edge of the floor opening.

**(C) Lighting and landing.** Lighting must be not less than 5 foot-candles, at each floor landing when the lift running.

**Note:** A 40-watt or larger light bulb should provide the equivalent to 5 foot-candles.

**(D) Landing surface.** There must be safe footing at landing surfaces.

**(E) Emergency landings.** If the travel is 50 feet or more between floor landings, there must be one or more emergency landings. There must be a landing (either floor or emergency) for every 25 feet or less of manlift travel.

**(i)** Emergency landings must be accessible from both the “up” and “down” rungs of the manlift. They must give access to the ladder as required in **OAR 437-004-0570(i)**.

**(ii)** Completely enclose emergency landings with a standard railing and toeboard.

**(iii)** Platforms built for access to bucket elevators or other equipment for inspection or maintenance may also be emergency landings. All such platforms are then part of the emergency landing and must have standard railings and toeboards.

**(d) Guards on underside of floor openings.**

**(A) Fixed type.** The ascending side of the manlift floor openings must have a bevel guard or cone meeting the following requirements:

**(i)** The cone must be at an angle of not less than 45 degrees with the horizontal. Use an angle of 60 degrees or greater where ceiling heights permit.

**(ii)** The lower edge of this guard must extend at least 42 inches outward from any handhold on the belt. It must not extend beyond the upper surface of the floor above.

(iii) The cone must be at least No. 18 U.S. gauge sheet steel or material of equivalent strength or stiffness. Roll the lower edge to a minimum diameter of 1/2-inch. The interior must be smooth with no rivets, bolts or screws protruding.

**(B) Floating type.** A floating safety cone is acceptable instead of the fixed guards in (A) above. They must be mounted on hinges at least 6 inches below the underside of the floor. A force of 2 pounds on the edge of the cone closest to the hinge must actuate a limit switch. The maximum depth of this floating cone is 12 inches.

**(e) Protection of entrances and exits.**

**(A) Guardrail requirement.** Guard the entrances and exits at all floor landings with access to the manlift with a maze (staggered railing) or a standard guardrail with self-closing gates.

**(B) Construction.** The rails will be standard guardrails with toeboards as described in OAR 437-004-0320(6).

**(C) Gates.** Gates must open outward and be self-closing. Round the corners of gates.

**(D) Maze.** Maze or staggered openings must offer no direct passage between enclosure and outer floor space.

**(E)** Except where building layout prevents it, entrances at all landings must be in the same relative position.

**(f) Guards for openings.**

**(A) Construction.** Use a wall, standard guardrail and toeboard or wire mesh panels to guard the floor opening at each landing on sides not used for entrance or exit.

**(B) Height and location.** Guards for openings must be at least 42 inches high on the up-running side and 66 inches on the down-running side.

**(g) Bottom arrangement.**

**(A) Bottom landing.** At the bottom landing the clear area must not be smaller than the area enclosed by the guardrails on the floors above. Any wall in front of the down-running side of the belt must be at least 48 inches from the face of the belt. There must be no stairs or ladders in this space.

**(B) Location of lower pulley.** The lower (boot) pulley must be supported by the lowest landing served. Guard the sides of the pulley support to prevent contact with the pulley or the steps.

**(C) Mounting platform.** There must be a mounting platform in front or to one side of the up run at the lowest landing. This is not necessary if the floor level allows the floor or platform to be at or above the point where the upper surface of the ascending step completes its turn and becomes horizontal.

**(D) Guardrails.** Guard the area on the downside of the manlift according to **OAR 437-004-0570(e)**. Protect the area between the belt and the platform with a standard guardrail.

**(h) Top arrangements.**

**(A) Clearance from floor.** There must be at least 11 feet of top clearance above the top terminal landing. This clearance must be from a plane through each face of the belt to a vertical cylindrical plane having a diameter 2 feet greater than the diameter of the floor opening, extending upward from the top floor to the ceiling on the up-running side of the belt. There must be no encroachment of structural or machine supporting members within this space.

**(B) Pulley clearance.**

**(i)** There must be at least 5 feet between the center of the head pulley shaft and any ceiling obstruction.

**(ii)** The center of the head pulley shaft must be at least 6 feet above the top terminal landing.

**(C) Emergency grab rail.** There must be an emergency grab bar or rail and platform at the head pulley when the distance to the head pulley is more than 6 feet above the top landing. Otherwise there must be only a grab bar or rail to allow the rider to swing free if the emergency stops do not work.

**(i) Emergency exit ladder.** Provide a fixed metal ladder accessible from both the “up” and “down” run of the manlift for the entire travel of the manlift. The ladder must meet ANSI A14.3-1956, Safety Code for Fixed Ladders.

**(j) Superstructure bracing.** Secure manlift rails to avoid spreading, vibration, and misalignment.

**(k) Lighting.**

**(A) General.** There must be adequate lighting for both runs of the manlift when it is running. (See **OAR 437-004-0570(3)(c)(C)** for lighting requirements at landings.)

**(B) Control of lighting.** Circuits for lighting of manlift runways must be permanently tied to the building circuits with no switches or there must be switches at each landing. Where there are separate switches at each landing, every switch must work all lights for the entire runway.

**(l) Weather protection.** Protect the manlift and its driving mechanism from the weather.

## (4) Mechanical requirements.

### (a) Machines, general.

**(A) Brakes.** Brakes for stopping and holding a manlift must be inherently self-engaging, require power or force from an external source to cause disengagement. The brake must release electrically and work on the motor shaft for direct-connected units or the input shaft for belt-driven units. The brake must be able to stop and hold the manlift when the descending side is loaded with 250 pounds on each step.

### (B) Belt.

(i) The belts must be of hard-woven canvas, rubber-coated canvas, leather or other material meeting the strength requirements of **OAR 437-004-0570(3)(a)**. It must also have a coefficient of friction that when used with an adequate tension device will meet the brake test in **(4)(a)(A)** above.

(ii) The belt must be at least 12 inches wide for travel up to 100 feet, at least 14 inches wide for travel more than 100 feet and up to 150 feet and 16 inches wide for travel more than 150 feet.

**(C)** Do not splice or use repaired manlift belts.

**(b) Maximum speed.** Do not install or use a manlift designed for a speed over 80 feet per minute.

### (c) Platforms or steps.

**(A) Minimum depth.** Steps or platforms must be 12 inches to 14 inches deep, measured from the belt to the edge of the step or platform.

**(B) Width.** The width of the step or platform must be at least as wide as the belt to which it is attached.

**(C) Distance between steps.** The distance between steps must be equal and at least 16 feet measured from the upper surface of one step to the upper surface of the next step above it.

**(D) Angle of step.** The surface of the step must be at approximately a right angle with the “up” and “down” run of the belt and must travel an approximate horizontal position with the “up” and “down” run of the belt.

**(E) Surfaces.** The upper or working surfaces of the step must be nonslip (coefficient of friction not less than 0.5) or have a secure nonslip covering.

**(F) Strength of step supports.** When loaded with 400 pounds at the approximate center of the step, step frames or supports and their guides must be strong enough to:

- (i) Prevent the disengagement of any step roller.
- (ii) Prevent any appreciable misalignment.
- (iii) Prevent any visible deformation of the steps or its support.

**(G) Prohibition of steps without handholds.** All steps must have a corresponding handhold above or below them meeting the requirements of **OAR 437-004-0570(4)**

**(d).** When removing a step or steps, remove corresponding handholds before the lift is restarted.

**(d) Handholds.**

**(A) Location.** Handholds attached to the belt must be at least 4 feet but not more than 4 feet 8 inches above the step tread. Locate them on both “up” and “down” run of the belt.

**(B) Size.** The grab surface of the handhold must be at least 4 1/2 inches wide, at least 3 inches deep and have 2 inches of clearance from the belt. Fastenings for handholds must be at least 1-inch from the edge of the belt.

**(C) Strength.** The handhold must withstand a load of 300 pounds applied parallel to the run of the belt.

**(D) Prohibition of handhold without steps.** All handholds must have a corresponding step. When removing handholds permanently or temporarily, remove the corresponding steps and handholds for the opposite direction of travel before restarting the lift.

**(E) Type.** All handholds must be of the closed type.

**(e) Up limit stops.**

**(A) Requirements.** There must be two separate automatic stop devices to cut off the power and apply the brake when a loaded step passes the upper terminal landing. One of these must be a split-rail switch mechanically operated by the step roller and located not more than 6 inches above the top terminal landing. The second automatic stop device may have any of the following:

- (i) Any split-rail switch placed 6 inches above and on the side opposite the first limit switch.
- (ii) An electronic device.
- (iii) A switch actuated by a lever, rod or plate, the latter to be on the “up” side of the head pulley so as to just clear a passing step.



**(B) Manual reset location.** After a stop device halts the manlift reset must be done manually. The device must be where a person resetting it would have a clear view of both the “up” and “down” runs of the manlift. It must be impossible to reset the device from any step or platform.

**(C) Cut-off point.** The initial limit stop device must stop the manlift before the loaded step has reached a point 24 inches above the top terminal landing.

**(D) Electrical requirements.**

(i) When switches open the main motor circuit directly they must be the multi-pole type.

(ii) When using electronic devices they must be designed and installed so that failure will shut off the power to the driving motor.

(iii) Where flammable vapors or combustible dusts may be present, electrical installations must be according to the requirements of Division 4/S for such locations.

(iv) Controller contacts carrying the main motor current must be oil immersed, copper to carbon or equal, except where the circuit is broken at two or more points at once.

**(f) Emergency stop.**

**(A) General.** There must be an emergency stop device.

**(B) Location.** It must be easy reach from the ascending and descending runs of the belt.

**(C) Operation.** This stop device must cut off the power and apply the brake when pulled in the direction of travel.

**(D) Rope.** If made of rope, it must be at least 3/8-inch in diameter. Do not use wire rope unless it has plastic covering or equivalent.

**(g) Instruction and warning signs.**

**(A) Instruction signs at landings or belts.** At each landing or stenciled on the belt there must be conspicuous and easily read instruction signs for the use of the manlift.

(i) The instructions must read as follows:

**Face the Belt.  
Use the Handholds.  
To Stop - Pull Rope.**

**(B) Top floor warning sign and light.**

(i) At the top floor there must be a lighted sign with the following wording:

**“TOP FLOOR – GET OFF”**

Signs must have block letters at least 2 inches high. Locate the sign within easy view of an ascending passenger and not more than 2 feet above the top terminal landing.

(ii) In addition to the sign required by **(4)(g)(B)(i)** above, a red warning light of at least 40 watts must be immediately below the upper landing terminal so as to shine in the passenger’s face.

**(C) Visitor warning.** The following conspicuous sign must be at each landing.

**- AUTHORIZED PERSONNEL ONLY -**

**(5) People only.** Do not move objects or material on a manlift. Manlifts are for people only.

**(6) Periodic inspection.**

**(a) Frequency.** A competent designated person must inspect manlifts at least every 30 days. Check limit switches weekly. Do not use unsafe manlifts until repairs make them safe again.

**(b) Items covered.** This periodic inspection must cover at least the following items:

Steps	Step Fastenings
Rails	Rail Supports and Fastenings
Rollers and Slides	Belt and Belt Tension
Handholds and Fastenings	Floor Landings
Guardrails	Lubrication
Limit Switches	Warning Signs and Lights
Illumination	Drive Pulley
Bottom (boot) Pulley and Clearance	Pulley Supports
Motor	Driving Mechanism
Brake	Electrical Switches
Vibration and Misalignment	“Skip” on up or down run when mounting step (indicating worn gears).

**(c) Inspection record.** Keep a certification record of each inspection. It must include the date of the inspection, the signature of the inspector and the serial number or other identifier of the manlift. On request, this record must be made available to OR-OSHA.

**Stat. Auth.:** ORS 654.025(2) and 656.726(4).

**Stats. Implemented:** ORS 654.001 through 654.295.

**Hist:** OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.

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