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Vertical Wheelchair Lifts

Sec. 19-411-C1. Definitions

As used in this chapter “department” means the department of public safety; “commissioner” means the commissioner of public safety; “vertical wheelchair lifts” means a low rise special passenger elevator used to raise or lower a person in a wheelchair vertically from one level to another, in occupancies other than one and two family dwellings.

(Effective October 28, 1980)

Sec. 19-411-C2. General requirements

Each vertical wheelchair lift used or intended for use in the State of Connecticut shall be constructed, equipped, maintained and operated with respect to the supporting members; the platform or car, shaftway, guides, doors and gates, safety stops and mechanisms, electrical apparatus and all other appurtenances, so as to sustain safely the load which it is designed and intended to carry according to the provisions and regulations of the commissioner.

(Effective October 28, 1980)

Sec. 19-411-C3. Approval of plans

No vertical wheelchair lifts shall be erected or installed and no vertical wheelchair lift shall be relocated or altered until detailed plans and specifications of the proposed construction or other work have been submitted in triplicate to the department of public safety for approval.

(Effective October 28, 1980)

Sec. 19-411-C4. Registration of vertical wheelchair lifts

The owner or operator of each vertical wheelchair lift shall register with the department each vertical wheelchair lift owned or operated by him, giving the type and capacity, a description, and the name of the manufacturer and insurance carrier.

(Effective October 28, 1980)

Sec. 19-411-C5. Inspection by the department

Each vertical wheelchair lift shall be thoroughly inspected by a department elevator inspector at least once each twelve months.

(Effective October 28, 1980)

Sec. 19-411-C6. Issuance of operating certificate

As soon as the department of public safety approves any existing, new, relocated or altered vertical wheelchair lift as being fit for operation, it shall issue to the owner a certificate of operation. The fee for the certification of vertical wheelchair lifts shall be in accordance with Section 19.415 of the General Statutes. No vertical wheelchair lift may be lawfully operated without such certificate. Owners or operators of existing vertical wheelchair lifts shall comply to the provisions of this chapter within sixty (60) days after adoption of these regulations.

(Effective October 28, 1980)

Sec. 19-411-C7. Discontinuance of operation

If any vertical wheelchair lift is found which, in the judgment of the department is dangerous to life and property or is being operated without the operating certificate the department may require the owner or operator to discontinue its operation forthwith, and the department shall order a notice placed in the car stating that the vertical wheelchair lift is out-of-service. When a vertical wheelchair lift has been

placed out-of-service, the owner or operator of such vertical wheelchair lift shall not again operate the same until repairs have been made and permission given by the commissioner or his authorized agent to resume operation of such vertical wheelchair lift.

(Effective October 28, 1980)

Sec. 19-411-C8. Installers

All vertical wheelchair lifts installed in the State of Connecticut shall be by licensed trades (elevator mechanics) (electricians).

(Effective October 28, 1980)

Sec. 19-411-C9. Alternatives for installation

Vertical wheelchair lifts may be installed according to either Section 19-411-C9.01 or 19-411-C9.02.

(Effective October 28, 1980)

Sec. 19-411-C9.01.

(a) The hoistway shall be guarded by a solid enclosure extended from the lower landing to a height of at least forty-two (42) inches above the upper landing. The lift sides of the enclosure shall present a smooth surface.

(b) The hoistway entrance shall be guarded at the upper level by a self-closing door at least forty-two (42) inches high of unperforated construction and provided with a combination mechanical lock and electrical contact. The door may be opened only if the platform is within two (2) inches of that level, or it may permit the platform to move if the door or gate is in the closed position, but not locked provided the device will stop the platform if the door or gate fails to lock before the platform has moved more than two (2) inches, away from the landing. The hoistway side of the door shall present a smooth surface.

(c) The lower access to the platform or car shall be guarded by an unperforated metal self-closing door not wider than the entrance to the car or platform and provide a minimum vertical clearance of not less than six (6) feet eight (8) inches. The door shall be equipped with a combination mechanical lock and electrical contact and the door may be opened only if the platform is within two (2) inches of that level. The hoistway side of the door shall present a smooth surface.

(d) The platform side of the landing doors shall not project beyond the vertical line of travel of the platform. No hardware, except that required for door locking or contacts, shall project beyond the vertical line of travel of the platform.

(e) The running clearance between the platform and any enclosure shall be no less than three-eighths ($\frac{3}{8}$) inch. The clearance between the platform and doors shall not exceed three (3) inches.

(f) The platform side guards on the sides not used for access or exit shall be of smooth construction with no openings other than those necessary for operation to a height of forty-two (42) inches above the platform or car floor. Those openings necessary for operation shall reject a ball one-half ($\frac{1}{2}$) inch in diameter. A grab rail extending the full length of the side guards shall be provided at a height of thirty-six (36) inches. The running clearance between the side guards and the enclosure shall be not less than two (2) inches or more than three (3) inches.

(Effective October 28, 1980)

Sec. 19-411-C9.02.

(a) The underside of the platform or car shall be guarded by a smooth toeguard on all accessible sides. The toeguard shall be braced to withstand the pressure at

any point of one hundred twenty-five (125) pounds applied on a four by four (4 x 4) inch surface without permanent deformation.

(b) The platform shall be equipped with a self-closing door on the side of access to the lower landing. The door shall be of solid metal construction and provided with a combination mechanical lock and electrical contact and shall only be operable within two (2) inches of the lower landing. It may permit the platform to move if the door or gate is in the closed position, but not locked provided the device will stop the platform if the door or gate fails to lock before the platform has moved more than two (2) inches away from the landing. The door shall be located at a point not greater than two (2) inches away from the landing. The door shall be located at a point not greater than two (2) inches inward from the platform sill, nor shall it extend beyond the platform sill.

(c) The hoistway entrance shall be guarded at the upper level by a self-closing door at least forty-two (42) inches high of unperforated construction and provided with a combination mechanical lock and electrical contact. The door may be opened only if the platform is within two (2) inches of that level. It may permit the platform to move if the door or gate is in the closed position, but not locked provided the device will stop the platform if the door or gate fails to lock before the platform has moved more than two (2) inches away from the landing. The door at the upper access landing shall be located not more than three (3) inches from the platform sill.

(d) The platform side of the landing doors shall not project beyond the vertical line of travel of the platform. No hardware, except that required for door locking or contacts, shall project beyond the vertical line of travel of the platform.

(e) A smooth metal face plate of solid construction not less than sixteen (16) gauge shall be fastened securely from the lower landing to the upper landing sill to protect the full width of the platform

(f) The platform side guards on the sides not used for access or exit shall be of smooth construction with no openings other than those necessary for operation to a height of forty-two (42) inches above the platform or car floor. These openings necessary for operation shall reject a ball one-half ($\frac{1}{2}$) inch in diameter. A grab rail extending the full length of the side guards shall be provided at a height of thirty-six (36) inches. The running clearance between the side guards and the enclosure shall be not less than two (2) inches or more than three (3) inches.

(Effective October 28, 1980)

Sec. 19-411-C10. Capacity and rated load

(a) The rated load shall not exceed four hundred fifty pounds (450#). The capacity shall be limited to one person; and one attendant if necessary.

(b) Vertical wheelchair lifts shall not have a speed exceeding thirty feet (30) per minute. In no case shall the vertical lift provide transportation between more than two consecutive floors. Travel shall be limited to seventy-two inches (72").

(Effective October 28, 1980)

Sec. 19-411-C11. Electrical wiring

(a) **Electrical requirements** shall conform to the requirements of the National Fire Protection Association 70-1978.

(b) **Pipes in platform vicinity**—pipes conveying steam, gas or liquids which if discharged into the vicinity of the platform would endanger life or health shall not be permitted.

(c) **Maximum voltage** of motor, control and operating circuits shall conform to the requirements of the American National Standards Institute-C1-1978, National Fire Protection Association 70-1978.

(d) **Enclosing of electrical apparatus in hoistway.** All live parts of electrical apparatus in the hoistway shall be suitably enclosed to protect against accidental contact.

(e) **Grounding of electrical equipment.** All metal coverings or enclosures of electrical equipment and all motors shall be permanently grounded.

(f) **Gas or sewer lines below platform.** There shall be no unprotected gas or sewer lines immediately below the platform.

(g) **Emergency stop switch.** A stop switch conforming to Rule 210.2e American National Standard Institute A-17-1-1978 shall be provided on every platform.

(h) **Emergency signal device.** If a vertical wheelchair lift is installed in an area not visible to personnel at all times an emergency signal shall be installed. The emergency signal shall consist of a telephone connected to a central telephone exchange and an audible signal operated from the platform shall be provided.

(Effective October 28, 1980)

Sec. 19-411-C12. Electrical wiring in the machinery space and hoistways

(a) **Method of installation of wiring in hoistways.** Stationary electrical conductors located in hoistways shall be encased in rigid metal conduits or electrical metallic tubing or metal conduits or metal wireways.

Exception: Flexible conduit or armored cables may be used between hoistway risers and limit switches, hoistway door interlocks or contacts and signal or stop buttons and similar devices. All conduits, armored cable, electrical metallic tubing, metal wireways and flexible conduits carrying electrical conductors located within hoistways shall be securely fastened to the hoistway construction or to the guide rails or to the guide rail supports.

(b) **Wiring methods in hoistways and machinery spaces.** The installation of all electrical wiring in hoistways and machinery spaces except as may be provided elsewhere in these rules shall conform to the requirements of the National Electrical Code, National Fire Protection Association 7-1978.

The flexible traveling cable, connecting the platform to the stationary hoistway wiring, shall be provided in a flame retardant and moisture resistant outer cover.

(c) **Enclosure of live parts on platform and hoistway.** All live parts of electrical apparatus, located in or on a platform or in their hoistways, shall be suitably enclosed to protect against accidental contact.

(Effective October 28, 1980)

Sec. 19-411-C13. Weatherproofing

(a) All exterior electrical wiring shall be in rigid metal conduit or electrical metallic tubing and all electrical outlets, switches, and junction boxes and fittings shall be weatherproof.

(b) Traveling cables where used between the platform and the hoistway wiring shall be of the type specified in the National Electrical Code 1978.

(c) Any electrical devices shall be kept as far above grade level as is practical.

(Effective October 28, 1980)

Sec. 19-411-C14. Machine framework and base

(a) All machine frames shall be of metal construction and have a safety factor of not less than five (5) based on the rated load. Cast iron shall not be used.

(b) The machine framework and base shall be secured in place with adequate support provided to maintain the device in level position.

(Effective October 28, 1980)

Sec. 19-411-C15. Machinery beams and support

(a) **Securing of machine beams and type of supports.** All machinery and sheaves shall be so supported and secured as to effectively prevent any part from becoming loose or displaced. Beams directly supporting machinery shall be of steel or reinforced concrete.

(Effective October 28, 1980)

Sec. 19-411-C16. Pits

(a) A pit is not required at the lower terminal. The platform may stop on or at the bottom landing floor or a pit may be provided to permit the platform to stop flush with the landing floor.

(Effective October 28, 1980)

Sec. 19-411-C17. Guide rail and guide rail fastening

(a) **Material.** Platform guide rails shall be of metal construction. Steel construction shall conform to the requirements of Rule 200.2a (American National Standard Institute A-17-1-78). Metal other than steel shall conform to the requirements of Rule 200.2b (American National Standard Institute A-17-1-1978).

(b) **Extension of guide rails.** The top and bottom of each run of guide rails shall be so located in relation to the extreme positions of travel of the car that the car guiding members cannot travel beyond the ends of the guide rails.

(c) **Guiding mechanism enclosures.** The guiding mechanism shall be enclosed with a solid enclosure to prevent accidental contact. If openings are necessary in this enclosure for operation, they must reject a ball three-fourths ($\frac{3}{4}$) inch in diameter.

(d) **Fastening, deflection and joints.** Fastening, deflections, and joints shall conform to the requirement set forth in Rule 705.4 (American National Standard Institute A-17-1-1978).

(Effective October 28, 1980)

Sec. 19-411-C18. Car construction

(a) **Car frame and platform.** The car frame shall be metal construction and have a safety factor of not less than five (5) based on a rated load. The platform shall be of metal or wood construction with a non-skid surface.

(b) **Use of cast iron.** Cast iron shall not be used in the construction of any member of the car frame or platform.

(c) **Platform size.** The net platform area shall not exceed 12 square feet.

(d) The minimum illumination at the landing edge of the platform with the landing door open shall be not less than five (5) foot candles.

(e) **Use of glass.** Glass shall not be used for platform enclosures, but may be used for the car light and appliances necessary for the operation of the car.

(Effective October 28, 1980)

Sec. 19-411-C19. Platform safeties and governors

(a) All devices shall be provided with a platform safety. The safety may be of the inertia type or operated by a speed governor, the safety may be of the type "A" design. If the platform is driven by a screw drive, a follower nut may be used in lieu of the inertia or governor operated safety.

(b) **Data plates.** A data plate shall be provided by the manufacturer (installer) and fastened in a conspicuous place stating the speed, suspension means, manufacturer's name and date of manufacture. The letters and numerals used shall not be less than one-fourth inch ($\frac{1}{4}$ ") in height.

(c) A capacity shall be furnished by the manufacturer and placed at a conspicuous place on the device stating the rated load in pounds. Letters and numbers used shall be not less than one-fourth ($\frac{1}{4}$) inch in height.

(Effective October 28, 1980)

Sec. 19-411-C20. Driving means

The driving means may be a winding drum, chain drive, screw drive, rack and pinion drive, direct plunger, rope or lever action hydraulic.

(Effective October 28, 1980)

Sec. 19-411-C21. Driving machines and sheaves

(a) **Materials and minimum drum diameters.** Winding drums and overhead deflecting sheaves shall be of cast iron or steel, of a diameter not less than thirty (30) times the diameter of the hoisting ropes. The rope grooves shall be machined.

Exception: Where eight by nineteen (8 x 19) steel ropes and seven by nineteen (7 x 19) aircraft cable are used, the diameter of drum and sheaves may be reduced to twenty-one (21) times the diameter of the rope or cable.

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

(1) Eight (8) for wrought iron and steel:

(2) Ten (10) for cast iron, cast steel and other material.

(c) **Set-screw fastenings.** Set-screw fastenings shall not be used in lieu of keys or pins if the connection is subject to torque or tension.

(d) **Friction-gearing, clutch mechanism, or coupling.** Friction-gearing, clutch mechanisms, or couplings shall not be used in connecting the drum or sheaves to the main drying gear.

(e) **Use of cast iron in gears.** Worm gearing having cast iron teeth shall not be used.

(f) **Driving machine brake.** Driving machines shall be equipped with electrically released spring-applied brakes.

(g) **Operation of brake.** 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.

(Effective October 28, 1980)

Sec. 19-411-C22. Terminal stopping devices

(a) **Stopping devices.** Upper and lower terminal stopping devices operating by the car shall be provided and shall be set to stop the car at or near the upper and lower terminal landings. Upper and lower final terminal stopping devices operated by the car shall also be provided which will remove power from the motor brake.

(b) **Operation of stopping devices.** The final terminal stopping device shall act to prevent movement of the platform in both directions of travel. The normal and final terminal stopping devices shall not control the same switches on the controller unless two or more separate and independent switches are provided, two of which shall be closed to complete the motor and brake circuit in each direction of travel.

(c) **Assurance of motor reversal.** A protective circuit or device shall be provided where a non-instantly reversible motor is used that will prevent the motor from continuing in the same direction if the reversing control is activated.

(Effective October 28, 1980)

Sec. 19-411-C23. Hydraulic driving machines

Hydraulic driving machines shall conform to the requirements of Section 302. (American National Standard Institute A-17-1-1978).

Exception: Roped hydraulic machines may be used and the design need not conform to the requirements of rules 302.1, 302.2, 302.3c, and 302.3g (American National Standard Institute A-17-1-1978).

(Effective October 28, 1980)

Sec. 19-411 C24. Operating devices

(a) **Types of operation.** Operation of the platform from the upper or lower landings and on the platform shall be controlled by a key. The key operated control shall be operated by a lock having five (5) pins with the key removable only from the "off" position. A key switch shall be provided at each station which 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 constant pressure device.

(b) **Control and operating circuit requirements.** The design and installation of the control and operating circuits shall conform to the following:

(1) Control systems which depend on the completion or maintenance of an electric circuit shall not be used for:

- A. Interruption of the power and application of the machine brake at terminals.
- B. Stopping the machine when the safety applies.

(2) If springs are used to actuate switches, contractors, or relays to break the circuit to stop an elevator at the terminal, they shall be of the restrained compression type.

(3) The failure of any single magnetically operated switch, relay or contractor, to release in the intended manner or the occurrence of a single accidental ground shall not permit the car to start if the hoistway door or platform door or gate is not in the closed position. It shall not permit the platform to move more than two inches away from a floor with the entrance door unlocked.

(Effective October 28, 1980)

Sec. 19-411-C25. Suspension means

(a) **Types permitted.** Suspension means shall be any one of the following:

1. Steel or iron elevator wire rope
2. Steel aircraft cable
3. Roller chain
4. Direct plunger hydraulic
5. Roped hydraulic
6. Rack and pinion
7. Screw drive

(b) **Types prohibited.** Steel tapes or welded link chains shall not be used as suspension means.

(c) **Factors of safety of suspension means.** The suspension means shall have a safety factor of not less than seven (7) based on the tension in the rope, cable, chain or forces exerted on the hydraulic cylinder, screw drive or a rack and pinion when raising the rated load. When the car and counterweight are suspended by steel ropes and the driving means between the machine and the counterweight is an endless roller type chain, the factor of safety of such chain with rated load on the platform shall not be less than eight (8).

(d) **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 with a driving sprocket shall be not less than 140 degrees.

(e) **Idle turns of ropes on winding drums.** All wire ropes anchored to a winding drum shall have not less than one (1) full turn of rope on the drum when the car or counterweight has reached its limit of possible overtravel.

(f) **Lengthening, splicing, repairing, or replacing suspension means.** No suspension wire rope shall be lengthened or repaired by splicing. Broken or worn suspension chains shall not be repaired. If one wire rope or a chain set is worn or damaged and requires replacement, the entire set of ropes or chains shall be replaced. If a chain is replaced due to wear, all sprockets must be replaced.

(g) **Securing ends of suspension ropes in winding drums.** The winding drum ends of platform and/or counterweight wire ropes shall be secured by clamps on the inside of the drum or by one of the methods specified in rule 501.12i for fastening wire ropes to car platform. (American National Standard Institute A-17-1-1978).

(h) **Fastening or rope suspension means to platform.** The platform ends of wire ropes shall be fastened by return loop, by properly made individual tapered babbitted sockets or by properly attached fittings as recommended by wire rope manufacturers. Clamps of the u-bolt type shall not be used. Tapered babbitted rope sockets and the method of babbitting shall conform to the requirements of rules 212.9d and 212.9f. (American National Standard Institute A-17-1-1978). The diameter of the hold in the small end of the socket shall not exceed the nominal diameter of the rope by more than 3/32 of an inch.

(i) **All suspension means shall be guarded against accidental contact.**

Exception: Suspension means which operate within a guide or track and travel at the same speed and in the same direction as the car or platform shall be considered suitably guarded.

(Effective October 28, 1980)