

**RULES
OF
THE TENNESSEE DEPARTMENT OF LABOR
BOILER INSPECTION AND CODES**

**CHAPTER 0800—3—7
SEWER LIFT STATION, PERSONNEL ELEVATORS**

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0800—3—7—.01 APPLICABILITY

- (1) This Chapter applies to electric powered elevators used in sewage lift stations where conformity to the requirements for passenger or freight elevators would impose difficulty or hardship not warranted because of their limited use.
- (2) Sewage lift station personnel elevators shall not be accessible to the general public and shall be limited to use by employees only.

Authority: T.C.A. Title 68, Chapter 121. *Administrative History:* Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.02 HOISTWAYS. The elevator may be installed in the entrance well.

Authority: T.C.A. Title 68, Chapter 121. *Administrative History:* Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.03 COUNTERWEIGHTS. When counterweights are provided, the rules as specified herein shall apply.

Authority: T.C.A. Title 68, Chapter 121. *Administrative History:* Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.04. GUARDING OF EXPOSED EQUIPMENT. Exposed gears, sprockets, tape or rope sheaves or drums of selectors, floor controllers or signal machines, and the ropes, chains, or tapes for driving same, in machine rooms and secondary machinery spaces, shall be guarded to protect against accidental contact.

Authority: T.C.A. Title 68, Chapter 121. *Administrative History:* Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.05 MACHINERY AND SHEAVE BEAMS SUPPORTS AND FOUNDATIONS

- (1) Machines, machinery and sheaves shall be so supported and maintained in place as to effectually prevent any part from becoming loose or displaced under the conditions imposed in service.

(Rule 0800—3—7—.05, continued)

- (2) Supporting beams, if used, shall be of steel. Beams are not required under machines, sheaves, and machinery or control equipment which are supported on floors provided such floors are designed and installed to support the load imposed thereon.

Authority: T.C.A. Title 68, Chapter 121. *Administrative History:* Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.06 DISTANCE AT LOWEST LANDING. The maximum distance from the top of the car platform at the lowest landing shall not exceed 20 inches above the floor level. The means of descent from the car platform shall not constitute a hazard.

Authority: T.C.A. Title 68, Chapter 121. *Administrative History:* Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.07 CAR AND COUNTERWEIGHT CLEARANCES

- (1) When the car platform is level with the lowest landing, the car buffer striker plates shall not be in contact with the buffers.
- (2) When the car is at its extreme limit of normal travel there shall be at least 6 inches between the top of the car crosshead and the nearest obstruction.
- (3) When the counterweights are resting on their buffers there shall be at least 3 inches between the top of the car crosshead and the nearest obstruction.
- (4) When the car is resting on its buffers, there shall be at least 3 inches clearance between the top of the counterweights and the nearest obstruction.
- (5) The clearance between the car and the hoistway enclosure, hoistway sill or any obstruction shall be not less than $(\frac{3}{4})$ three-fourths of an inch.
- (6) The clearance between the car platform sill and the hoistway edge shall be not greater than 5 inches.
- (7) The underside of any projection into the hatch shall be beveled at an angle of not less than 75 degrees with the horizontal unless protected by a safety device to stop the ascending car.
- (8) The shear hazard at the top of the lower landing entrance shall be provided with a safety device to stop the ascending car if for any reason any overhanging obstruction on the car comes in contact with the shear hazard.

Authority: T.C.A. Title 68, Chapter 121. *Administrative History:* Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.08 LANDING OPENING

- (1) When an upper landing side entrance door is provided it shall be not less than 6¼ feet in height.
- (2) The top of the hoistway shall be provided with an over-lapping, self-locking hinged cover, designed to lock the closed side entrance door when the lift station is unoccupied.

Authority: T.C.A. Title 68, Chapter 121. *Administrative History:* Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.09 LOCKING DEVICES

- (1) The hinged cover, and the upper landing side entrance door when provided, shall be provided with a mechanical latch and electrical contact designed to be operated from inside the hoistway.

(Rule 0800—3—7—.05, continued)

- (2) Means shall be provided to prevent the top hinged cover from locking the upper landing side entrance door when the lift station is occupied.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.10 CARS AND COUNTERWEIGHT GUIDE RAILS, GUARD SUPPORTS AND FASTENINGS

- (1) Cars and counterweights shall be provided with guide rails of steel.
- (2) Guide rails shall be securely fastened with through bolts or clips of strength, design and spacing as follows:
 - (a) Guide rails and their fastenings shall not deflect more than ¼ inch under normal operations.
 - (b) Guide rails and their fastenings shall withstand the application of the safety, when stopping the counterweights.
 - (c) Guide rails shall rest on suitable supports and extend at the top of the hoistway to prevent the guide shoes from running off the guide rails in case the car or the counterweight travels beyond the terminal landings.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.11 CAR AND COUNTERWEIGHT BUFFERS. When buffers are provided, the rules herein specified shall apply.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.12 CAR FRAMES, ENCLOSURES, PLATFORM SIZE AND CAPACITY

- (1) A car frame and platform shall be of metal. Frame members shall be securely bolted and braced. With a uniformly distributed rated load the factor of safety shall not be less than 4. Solid steel toe board with a minimum height of one (1) inch shall be provided across the base of the guardwork on both sides and the lift shall be so constructed as to operate with a minimum clearance directly to the front, of at least 4 inches, measured from any point between the toe board.
- (2) The car shall be enclosed to the extent necessary to afford reasonable protection.
- (3) The platform area shall not exceed 5 square feet.
- (4) The rated capacity shall not be less than 300 pounds.
- (5) The limit of travel for any personnel elevator installed in a sewage lift station shall not be more than 50 feet.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.13 ILLUMINATION. Hoistway lighting shall be provided.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

(Rule 0800—3—7—.05, continued)

0800—3—7—.14 EMERGENCY EXITS. A car shall be provided with emergency exit providing egress from the car to the emergency ladder from any location in the hoistway, and shall be provided with electrical contacts to prevent movement of the car while emergency exit is open.

Authority: T.C.A. Title 68, Chapter 121. Administrative History: Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.15 CAR SAFETIES AND GOVERNORS

- (1) Elevator cars shall be provided with a car safety capable of stopping and sustaining the car with rated load.
- (2) The car safety shall be of the inertia or other approved type operated as a result of the breakage of the hoisting mechanism or by a speed governor. If of the speed-governor type, the governor shall operate to set the safety at a maximum speed of 75 feet per minute and on breakage of the suspension means, the safety shall operate without appreciable delay and independently of the governor speed action.
- (3) Where a speed governor is used, it shall be located where it cannot be struck by the car or the counterweight in case of over travel and where there is sufficient space for full movement of the governor parts.
- (4) A safety operated switch shall be provided to open the motor-control circuit and the brake-control circuit before or at the time the safety applies.
- (5) The governor ropes shall be of iron, steel, monel metal or phosphor bronze not less than ¼ inch in diameter. Tiller-rope construction shall not be used for governor ropes.
- (6) Elevators of the winding-drum type or roller chain drive type shall be provided with a slack-rope device of the manually reset type which will remove the power from the motor and brake if the car is obstructed in its descent and hoisting chains or ropes slacken.
- (7) A car safety device which depends upon the completion or maintenance of an electric circuit for the application of the safety shall not be used. Car safeties shall be applied mechanically.
- (8) Cast iron shall not be used in the construction of any part of a car safety, the breakage of which would result in failure of the safety to function to stop and sustain the car.
- (9) A test of the car safety shall be made with rated load in the car before the elevator is put into service. Governor operation of instantaneous-type safeties shall be tested at rated speed by tripping the governor by hand. Safeties operated as the result of the breaking of the hoisting mechanism shall be tested by obtaining the necessary slack-rope to cause them to function.
- (10) Where a traction machine is provided, an overspeed governor shall be required.

Authority: T.C.A. Title 68, Chapter 121. Administrative History: Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.16 SPEED. The rated speed shall not exceed 35 feet per minute.

Authority: T.C.A. Title 68, Chapter 121. Administrative History: Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.17 DRIVING MACHINE AND SHEAVES

- (1) Sprockets, winding drums, traction sheaves and overhead and deflecting sheaves shall be of cast iron or steel the diameter of the wire hoisting ropes. The rope grooves shall be machined.

(Rule 0800-3-15, continued)

EXCEPTION: Where 8 x 19 steel ropes are used, the diameter of drums and sheaves may be reduced to 21 times the diameter of the rope.

- (2) The factor of safety, based on the static load (the rated load plus the weight of the car or chains, ropes, counterweights, etc.) to be used in the design of driving machines and sheaves shall not be less than:
 - Eight (8) for wrought iron and steel
 - Ten (10) for cast iron, cast steel and other material
- (3) Set-screw fastenings shall not be used in lieu of keys or pins if the connection is subject to torque or tension.
- (4) Friction-gearing or clutch mechanisms shall not be used for connecting the sprockets, drum or sheaves to the main driving gear.
- (5) Worm gearing having cast-iron teeth shall not be used.
- (6) Driving machines shall be equipped with electrically released spring-applied brakes.
- (7) 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.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—18 TERMINAL STOPPING DEVICES

- (1) Upper and lower terminal stopping devices operated 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 and shall be set to stop it before it strikes the overhead or obstruction at lower floor level. If the driving machine is of the winding-drum type, a final terminal stopping device shall also be provided on and operated by the driving machine.
- (2) The final terminal stopping device shall act to prevent movement of the car 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.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—19 OPERATION, OPERATION DEVICES AND CONTROL EQUIPMENT

- (1) Operation at top and bottom landings shall be of the constant pressure type.
- (2) Car operating device shall be of the constant pressure push button type with face of button not to project beyond face on button plate, and shall be of the two (2) hand control type.
- (3) An emergency stop switch shall be provided on or adjacent to the car operating panel. Stop switches shall be of the manually opened or manually closed type with red handles or buttons and conspicuously marked "Stop." Where springs are used their failure shall not prevent opening of the switch. The emergency stop switch when activated shall stop the movement of the car in any direction.
- (4) A pressure-operated safety switch shall be installed under the lift platform. This safety switch shall cover the entire area of the bottom of the lift and operate if the lift is obstructed in its downward travel by a force exceeding 4 pounds. The under-car safety switch shall be normally closed and momentary operation shall de-energize a normally "ON" control system to stop movement of the lift in downward direction.

(Rule 0800-3-17, continued)

- (5) The design and installation of the control and operating circuits shall conform to the following:
- (a) Control systems which depend on the completion or maintenance of an electric circuit shall not be used for:
 - 1. Interruption of the power and application of the machine brake at the terminals.
 - 2. Stopping of the car when the emergency stop switch in the car is opened or any of the electrical protective devices operate.
 - 3. Stopping the machine when safety applies.
 - (b) 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 compression type.
 - (c) 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 run.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.20 HOISTING CABLES

- (1) Only iron (low carbon steel) or steel wire cables with fiber cores, having the commercial classification "elevator wire cable," shall be used for the suspension of elevator cars and counterweights. The wire material for cables shall be manufactured by the open-hearth or electric-furnace process or their equivalent.
- (2) Suspension means shall be not less than 2 iron or steel wire cables having a minimum diameter of ¼ inch.
- (3) The factor of safety of the suspension means shall be not less than seven.
- (4) The arc of contact of a wire rope on a traction sheave shall be sufficient to produce adequate traction under all load conditions.
- (5) All wire ropes anchored to a winding drum shall have not less than one full turn of rope on the drum when the car or counterweight has reached its limit of possible overtravel.
- (6) No car or counterweight wire rope shall be lengthened or repaired by splicing.
- (7) The winding-drum ends of car and counterweight wire ropes shall be secured by clamps on the inside of the drum.
- (8) The car or counterweight 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.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.21 HOISTING CHAINS

- (1) Only roller chain made of high quality alloy, heat treated steel with the following characteristics will be acceptable.

- (a) Prestressed
 - (b) Shot Peened
 - (c) In-Line Blanking
 - (d) Deep Case Hardening of Pins and Bushings
- (2) Suspension means shall not be less than two separate roller chains; each chain having a minimum tensile strength of 3,500 pounds.
 - (3) The factor of safety of the suspension means shall be not less than seven.
 - (4) All chains shall have not less than six inches of chain available beyond the normal stopping point when the car has reached its extreme limits of travel.
 - (5) All chain ends must be fastened by standard master links as supplied by chain manufacturer.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—22 WIRING METHODS

- (1) All electric wiring shall be rigid metal conduit or electrical metallic tubing.
- (2) Traveling cables, where used between the car and hoistway wiring, shall be type S.O. See National Electrical Code (ASME-CI-1999).
- (3) A fused disconnect main line switch or circuit breaker main line switch, externally operated shall be provided adjacent to the controller.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—23 INSPECTION AND TESTS

- (1) All existing installations, and all new elevator installations after being placed in service, shall be subjected to maintenance inspections and tests.
- (2) Maintenance inspection and tests of elevator car and counterweight safeties and governors shall be made at intervals not exceeding twelve months.
- (2) The owner or his authorized agent shall have maintenance inspections and tests made by a person qualified to perform such service in the presence of an inspector in the employ of or authorized by the enforcing authority.

EXCEPTIONS: Where an inspector in the employ of or authorized by the enforcing authority is not available at the time the required tests are made the person or firm conducting the tests shall:

- (a) Submit to the enforcing authority a statement upon a form furnished by them certifying that the tests have been conducted and the results thereof.
 - (b) Attach to the governor rope a tag marked to show the date of the test and the name of the person or firm who conducted it.
- (4) Pitch length for chain being tested must be determined from the chain manufacturer.

(Example: Browning Standard series single strand #40 roller chain has pitch length of one-half inch.)

- (5) Distance from centerline of pin spanning a given number of links is measured. We suggest one hundred links.
(Example: $100 \times \frac{1}{2} = 50$ inches, when one hundred links of Browning #40 roller chain is being checked.)
- (6) The distance between any one hundred continuous links shall not exceed an increase of more than one percent.
(Example: One hundred links of Browning #40 roller chain shall not exceed fifty and one-half inches.)
- (7) The above inspection shall be made at a minimum of three points picked at random on each chain. Any chains indicating an increase in length of more than one per cent must be replaced.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.

0800—3—7—.24 RESHACKLING OF CAR HOISTING ROPES OF DRUM-TYPE MACHINES. The hoisting ropes of power elevators having drum-type driving machines with one-to-one (1:1) roping shall be reshackled at the car ends at intervals not longer than twenty-four months for machines located below or at side of the hoistway.

Authority: T.C.A. Title 68, Chapter 121. **Administrative History:** Amendment filed July 24, 2000; effective November 28, 2000.