

Chapter E 620

ELEVATORS, DUMBWAITERS, AND ESCALATORS

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A. SCOPE AND GENERAL

E 620.001 Scope. This chapter shall apply to electrical equipment and wiring used in connection with elevators, dumbwaiters, and escalators.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.002 Voltage limitations. The nominal voltage used for elevator, dumbwaiter or escalator operating control and signal circuits, operating equipment, driving machine motors, machine brakes, and motor-generator sets shall not exceed the following:

(1) For operating control and signal circuits and related equipment including door operator motors: 300 volts except that higher potentials may be used for frequencies of 25 through 60 cycles alternating current or for direct current provided the current in the system cannot, under any conditions, exceed 8 milliamperes for alternating current or 30 milliamperes for direct current.

(2) Driving machine motors, machine brakes, and motor-generator sets: 600 volts, except that higher potentials may be used for driving motors of motor-generator sets.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.003 Live parts enclosed. All live parts of electrical apparatus in the hoistways, at the landings, or in or on the cars of elevators and dumbwaiters or in the wellways or the landings of escalators shall be enclosed to protect against accidental contact.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

B. CONDUCTORS

E 620.011 Insulation of conductors. The insulation of conductors installed in connection with elevators, dumbwaiters or escalators shall comply with the following:

(1) **CONTROL PANEL WIRING.** Conductors from panels to main circuit resistors shall be flame-retardant and suitable for a temperature of not less than 90° C. (194° F.). All other wiring on control panels shall be flame-retardant, moisture-resistant.

(2) **TRAVELING CABLES.** Traveling cables used as flexible connections between the elevator or dumbwaiter car and the raceway shall be type E, EO, or ET elevator cable or other approved types and shall have a flame-retardant, moisture-resistant outer covering.

(3) **OTHER WIRING.** All conductors in the raceways and in or on the cars of elevators and dumbwaiters and in the wellways of escalators and in the machine room of elevators, dumbwaiters, and escalators shall have flame-retardant and moisture-resistant insulation.

(4) **THICKNESS OF INSULATION.** The thickness of the insulation of all conductors shall be suitable for the voltage to which the conductors are subjected.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.012 Minimum size of conductors. The minimum size of conductors used for elevator, dumbwaiter and escalator wiring, except for conductors which form an integral part of control equipment, shall be as follows:

(1) **TRAVELING CABLES.** (a) For lighting circuits: No. 14, except that No. 20 or larger conductors may be used in parallel provided the carrying capacity is equivalent to at least that of No. 14 wire.

(b) Operating control and signal circuits: No. 20.

(2) **OTHER WIRING.** All operating control and signal circuits: No. 20.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

C. WIRING

E 620.021 Wiring methods. Conductors located in hoistways and escalator wellways, in or on cars and machine and control rooms, not including the traveling cables connecting the car and hoistway wiring, shall be installed in rigid conduit, electrical metallic tubing, metal wireways, or type MI cable subject to the following exceptions:

(1) **EXCEPTION NO. 1.** Flexible conduit or armored cable may be used in hoistways and in escalator wellways between risers and limit switches, interlocks, operating buttons, and similar devices.

(2) **EXCEPTION NO. 2.** Short runs of flexible conduit or armored cable may be used on cars where so located as to be free from oil and if securely fastened in place.

(3) **EXCEPTION NO. 3.** Types S, SO, and ST cords may be used as flexible connections between the fixed wiring on the car and the switches on car doors or gates.

(4) **EXCEPTION NO. 4.** Conductors between control panels and machine motors, machine brakes, and motor generator sets, not exceeding 6 feet in length, may be grouped together and taped or corded without being installed in a raceway provided the taping or cording is painted with an insulating paint. Such cable groups shall be supported

at intervals of not more than 3 feet and so located as to be free from physical damage.

Note: Where motor generators and machine motors are located adjacent to or underneath control equipment, and are provided with extra length terminal leads not exceeding 6 feet in length, such leads may be extended to connect directly to controller terminal studs without regard to the carrying capacity requirements of chapters E 430 and E 445. Auxiliary gutters may be used in machine and control rooms between controllers, starters and similar apparatus.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

D. INSTALLATION OF CONDUCTORS

E 620.031 Raceway terminal fittings. Conductors leaving raceways shall comply with the provisions of section E 300.16. In no case shall the raceway terminate less than 6 inches from the floor.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.032 Metal wireways. Section E 362.05 shall not apply to wireways. The sum of the cross-sectional area of the individual conductors in a metallic raceway shall not be more than 50% of the interior cross-sectional area of the wireway.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.033 Number of conductors in other raceways. The number of operating and control circuit conductors in other raceways may be in accordance with table 1 of chapter E 900.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.034 Supports. Supports for conductor raceways in the hoistway or escalator wellway shall be securely fastened to the guide rail or to the hoistway or wellway construction.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.035 Auxiliary gutters (wiring troughs). Auxiliary gutters shall not be subject to the restrictions of section E 374.02 as to length or of section E 374.05 as to number of conductors.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.036 Different systems in one raceway or traveling cable. Conductors for operating, control, power, signal, and light circuits of 600 volts or less may be run in the same traveling cable or raceway system provided that all conductors are insulated for the maximum voltage found in the cables or raceway system and all live parts of the equipment are insulated from ground for this maximum voltage. Such a traveling cable or raceway may also include a pair of telephone conductors for the car telephone provided such conductors are insulated for the maximum voltage found in the cable or raceway system.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.037 Wiring in hoistways. (1) No wires, cables or conductor enclosures shall be installed in any elevator hoistway except those needed to serve the elevator or dumbwaiter equipment including wiring for heating, ventilating, and lighting the car or hoistway, wiring for signals, for communication with the car, for a work light and convenience outlet approximately level with the lowest terminal landing floor and for fire detection systems.

(2) Other wires, cables, or conductor enclosures may in exceptional cases be installed in the elevator or dumbwaiter, hoistway only if approved in writing by the Industrial Commission provided that no opening, terminal, outlet or junction box is within the hoistway and shall be continuous between outlets or terminals entirely outside the hoistway.

Note: It is not intended to prohibit the interruption of long runs for the purpose of supporting or pulling in conductors, and pull boxes may be installed for this purpose.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E. TRAVELING CABLES

E 620.041 Suspension. (1) Traveling cables shall be so suspended at the car and hoistway end as to reduce the strain on the individual copper conductors to a minimum.

(2) Cables exceeding 100 feet in length and which have steel supporting fillers shall be suspended directly by the steel supporting fillers.

(3) Where non-metallic fillers are used, the cables shall be suspended by looping the cables around the supports.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.042 Hazardous locations. In hazardous locations, traveling cables shall be type EO and shall be secured to explosion-proof cabinets by heavy-duty rubber-bushed threaded connector bushings sealed off at the enclosure as provided in section E 501.05.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.043 Location of and protection for cables. Traveling cable supports shall be so located as to reduce to a minimum the possibility of damage due to the cables coming in contact with the hoistway construction or equipment in the hoistway. Where necessary, suitable guards shall be provided to protect the cables against damage.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

F. CONTROL

E 620.051 Disconnecting means. (1) An externally operated circuit-breaker or fused switch of the enclosed type opening all lines shall be installed separately in the supply circuit of every elevator or escalator. This breaker or switch shall be provided with proper over-current protection, and shall be located in the machine room on the lock-jamb side of the entrance door and be visible from the elevator machine. This breaker or switch shall not be made to close from any other part of the building. The switch shall be a horsepower rated motor circuit switch for motors up to and including 50 HP.

(2) For power dumbwaiters, the circuit breaker or disconnect switch shall be located adjacent to the controller which shall be mounted on the outside of the hoistway on the hoistway wall.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.052 Electrical equipment in garages and similar occupancies. Electrical equipment and wiring used for elevators, dumbwaiters and escalators in garages shall conform to the requirements of chapter

E 511. Wiring and equipment located under the car platform shall be considered as being located in the hazardous area.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.053 **Phase protection.** Elevators driven by polyphase alternating current machine motors shall be provided with means to prevent starting of the elevator motor when:

- (1) The phase rotation is in the wrong direction, or
- (2) There is a failure in any phase.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

G. OVERCURRENT PROTECTION

E 620.061 **Overcurrent protection.** Overcurrent protection shall be provided as follows:

(1) **CONTROL AND OPERATING CIRCUITS.** Control and operating circuits and signal circuits shall be protected against overcurrent in accordance with the requirements of section E 725.18.

(2) **MOTORS.** (a) Duty on elevator, dumbwaiter, and driving motors of generator sets used with generator field control shall be classed as intermittent. These motors shall be protected against overcurrent in accordance with section E 430.033.

(b) Duty on escalator motors shall be classed as continuous. These motors shall be protected against overcurrent in accordance with section E 430.032.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

H. MACHINE ROOM

E 620.071 **Guarding equipment.** (1) Elevator, dumbwaiter and escalator driving machines, motor generator sets, controllers and auxiliary control equipment shall be installed in a space secured against unauthorized access.

(2) Such equipment may be located in rooms or spaces containing other equipment essential to the operation of the building provided it is separated therefrom by a substantial metal grille enclosure of a design which will reject a ball 2 inches in diameter and is at least 6 feet high equipped with a self-closing and self-locking door.

(3) It is not intended to prohibit the installation of dumbwaiter or escalator controllers outside the spaces herein specified, provided they are enclosed in cabinets with doors or removable panels capable of being locked in the closed position; nor is it intended to prevent the installation of dumbwaiter controllers within the hoistway without cabinets, provided removable or hinged panels capable of being locked in the closed position are installed in the hoistway enclosures to provide access to the controllers.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.072 **Clearance around control panels.** (1) There shall be provided sufficient clear working space around control panels to provide safe and convenient access to all live parts of the equipment necessary for maintenance and adjustment. The minimum clear working space about live parts on control panels shall be not less than set forth in subsections E 620.072 (1) (a) and (b) unless otherwise specified.

(a) *Elevator and dumbwaiter panels.*

1. In the front—30 inches to live panel parts.
2. In the rear—24 inches to live panel parts.
3. On one side of a panel or a group of panels—18 inches except this clearance can be waived if there is a clear passageway, not less than 18 inches wide at any point, from the front to the rear of the panel or panels.

Note 1. It shall be permissible to mount control panels on, over or against the hoisting machine or motor generator set or to place auxiliary control equipment in the front or rear of control panels provided the clearances to the live parts are not less than specified and provided there is safe access to the front and/or back of the controller from at least one side.

Note 2. Where control panels are mounted in cabinets with swing doors or removable panels, sufficient clear space shall be provided to fully open the doors or remove the panels.

(b) *Escalator control panels.* 1. The minimum working clearance for escalator control panels shall be as specified in subsection E 620.072 (1) (a) provided that where the control panel is mounted in the same space as the escalator drive machine and the clearances specified cannot be provided, they may be waived where the entire panel is arranged so that it can be readily removed from the machine space and is provided with flexible leads to all external connections.

2. Where control panels are not located in the same space as the drive machine they shall be so located in cabinets with doors or removable panels capable of being locked in the closed position. Such cabinets may be mounted in the balustrading on the side away from the moving steps.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

J. GROUNDING

E 620.081 Metal raceways attached to cars. Conduit or armored cable attached to elevator cars shall be bonded to grounded metal parts of the car with which they come in contact.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.082 Electric elevators. For electric elevators, the frames of all motors, elevator machines, controllers and the metal enclosures for all electrical devices in or on the car or in the hoistway shall be grounded.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.083 Non-electric elevators. For elevators other than electric, when any electrical conductors are attached to the car, the metal frame of the car, where normally accessible to persons, shall be grounded.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.084 Hand-operated cables. All hand-operated metallic shifting ropes or cables shall be grounded.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.085 Inherent ground. Equipment mounted on members of the structural metal frame of a building shall be deemed to be grounded. Metal car frames supported by metal hoisting cables attached to or

running over sheaves or drums of elevator machines shall be deemed to be grounded when the machine is grounded in accordance with chapter E 250.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

K. OVERSPEED

E 620.091 Power rectifiers for direct current elevators. Where dry plate rectifiers or other types of rectifiers which are incapable of absorbing electrical energy are used to transform alternating current to direct current for the operation of a direct current elevator motor or motors, means shall be provided to absorb a sufficient amount of the energy regenerated by the elevator motor or motors under overhauling load conditions to prevent any elevator from attaining at any time a speed of more than 125% of its rated speed (speed in the up direction with rated load in the car).

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

E 620.092 Motor generator overspeed device. Motor generators driven by direct current motors and used to supply direct current for the operation of elevator machine motors shall be provided with speed limiting devices as required by subsection E 430.089 (3), which will prevent the elevator from attaining at any time a speed of more than 125% of its rated speed.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.

L. LIGHTING

E 620.101 Lighting. The following required lights and convenience outlets are in addition to those required in the car (See Wis. Adm. Code section Ind 4.76):

(1) **LANDING LIGHT.** Every elevator hoistway landing within or in connection with an occupied building shall be provided with sufficient light to clearly see small objects at the threshold.

(2) **MACHINE ROOMS AND OVERHEAD LIGHTING.** Every machine room shall be provided with artificial lighting having an intensity of not less than 2-foot candles at the floor. Every area about a ceiling type machine, including overhead sheave rooms or lofts, shall be amply lighted. Control of such lighting shall be in the approach to the machine room or overhead equipment.

(3) **WORK LIGHTS.** Every power elevator hereafter installed shall be equipped with a work light and convenience outlet located in the hoistway approximately level with the lowest terminal landing floor if hoistway landing doors are used.

History: Cr. Register, November, 1961, No. 71, eff. 12-1-61.