

# **Wisconsin Administrative Code**

## **Rules of INDUSTRIAL COMMISSION**

### **ELEVATOR CODE**

**Cite the rules in this Code as**

**(for example)**

**Wis. Adm. Code section Ind 4.001**

**INDUSTRIAL COMMISSION**

**State Office Building, Madison 2, Wisconsin**



**Ind 4.03 Exemptions.** This code does not apply to belt, bucket, scoop, roller, or similar inclined or vertical freight conveyors, portable tiering or piling machines when not passing through a floor unless serving more than the floor on which the portable tiering or piling machine is located, skip hoists, man hoists, mine hoists, lumber lifts, wharf ramps or apparatus in kindred classes, amusement devices, stage curtain hoists or lift bridges, nor to elevators used only for handling building material during the period of building construction and elevators with a travel less than 56 inches.

(1) For regulations relative to the use of elevators, hoists, derricks and similar equipment during the period of construction of a building or any other structure, see section Ind 35.28 to 35.31 inclusive of the general orders on Safety in Construction issued by the industrial commission.

(2) For man lift requirements, see general orders on Safety.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

### Plans

**Ind 4.04 Plans; new installations.** (1) Before starting work on any new installation of an elevator, power dumbwaiter or escalator, 3 copies of the plans shall be submitted to the industrial commission for approval, with 2 copies of application for each unit, properly filled out, on blank forms furnished by the commission.

(2) A plan examination fee in the amount established under section 101.10 (13) (g), Wis. Stats., shall be paid for each installation requiring approval.

(3) Section Ind 4.04 (1) shall not apply in cities where elevator permits are issued by the city in a manner approved by the industrial commission. Every elevator manufacturer who furnishes an elevator, power dumbwaiter, or escalator to be installed by the owner, or an agent of the owner, shall submit plans and file an application in compliance with this order.

(4) Plans shall include: (a) Sectional plan of car and hoistway; (b) Sectional elevation of hoistway, machine room (showing machinery) and pit; (c) Plan of machine and supports showing details of materials, size of beams. If the hoistway has more than one entrance on any floor, all entrances shall be clearly shown.

(5) The elevator manufacturer and the architect shall cooperate in preparing plans to avoid discrepancy in design.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.05 Inspections.** (1) **INTERVAL.** All elevators, power dumbwaiters, or escalators operated in the state of Wisconsin shall be subjected to a regular inspection at least once every 12 months.

(2) **INSPECTION BY INSURANCE COMPANIES.** The industrial commission may accept inspections of elevators, power dumbwaiters, and escalators reported by certified inspectors, subject to the following conditions:

(a) Each installation shall be inspected once every 12 months.

(b) A detailed report of each unit inspected shall be filed with the commission within 14 days after inspection on a printed form approved by the commission. Such report shall show all respects in which the installation fails to comply with the code requirements. If

there are any special conditions which, in the inspector's opinion, would require modification of any general order, the facts shall be fully stated in the report, with the inspector's recommendation.

1. Where an insurance company inspects an elevator, power dumbwaiter or escalator within the city limits of Milwaukee, a detailed report of each unit inspected shall be filed with the Inspector of Buildings, City Hall, Milwaukee, within 14 days after inspection on a printed form approved by the commission. Such report shall show all respects in which the installation fails to comply with the code requirements. If there are any special conditions which, in the inspector's opinion, would require modification of any general order, the facts shall be fully stated in the report with the inspector's recommendation.

*Note:* Reports required to be submitted to the Inspector of Buildings, Milwaukee, need not be filed with the commission.

(c) A certificate of inspection on a form approved by the commission shall be posted by the insurance company in a conspicuous place in the elevator car, dumbwaiter cage, or escalator, as the case may be, and shall show the date of inspection, name of insurance company, name of inspector, safe carrying capacity. (See section Ind 4.52)

(d) The insurance company shall use all reasonable diligence to secure compliance with the commission's orders. If unsuccessful, it shall so report to the commission. If it then becomes necessary for the commission to make an inspection, the statutory fee for each unit inspected will be charged. (See section Ind 4.07)

(e) The competency of each elevator inspector shall be certified by each insurance company to the commission in writing prior to making inspections. Insurance company inspectors will be approved by the commission only after the receipt of acceptable evidence of competency and a satisfactory examination has been passed consisting of written, oral, and performance tests.

(f) Insurance companies that cover elevators, escalators, or power dumbwaiters which come within the scope of liabilities of workmen's compensation, public liability, or comprehensive coverage in any manner or degree shall report to the industrial commission on January 1 each year the identity, location, and ownership of each such risk.

1. Insurance companies employing inspectors holding valid certificates of competency, inspect all risks annually, and regularly file proper inspection reports shall not be required to file a list of such risks on January 1 of each year.

2. Insurance companies insuring risks in cities of the first class shall not be required to make the above report provided the risks are located within the corporate limits of such cities and provided that such cities have equivalent reporting requirements.

3. Elevators, escalators, or power dumbwaiters covered by insurance companies as in section Ind 4.05 (f) not employing inspectors holding valid certificates of competency shall be subject to inspection by the industrial commission. Fees for performing such inspection services shall be paid in accordance with the provisions of the applicable fee schedule.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

Table 12

Contract Speed—Feet per Minute	Total Weight of Counterweight Pounds
250.....	2000
200.....	3000
160.....	4000
125.....	5000

device, and shall be located where it cannot be struck by the car or counterweight in case of overtravel and where there is sufficient space for full movement of governor parts.

(11) Every type of car safety device hereafter installed not heretofore approved and having a rated capacity less than 20,000 pounds shall be subjected to a type drop test. Such tests shall be made at the risk and expense of the elevator manufacturer under the direction of the industrial commission. Complete plans and specifications for every car safety device and speed governor to be tested shall be submitted to the commission for approval, or the manufacturer may make such tests and submit to the industrial commission with complete plans and specifications, certified copies of the tests made on forms satisfactory to the commission, duly witnessed and sworn to by a person or persons satisfactory to the commission for which approval is desired.

(a) The test load shall equal the maximum load, including the weight of the safety, for which approval is requested. The free fall shall be such that the safety under test shall have attained the maximum governor tripping speed for which approval is requested, assuming 100% efficiency, before the safety actuating device starts to function, but in no case shall the required fall be greater than that needed to attain 300 feet per minute. The drop test may be made with the governor with which the safety will be used. If so tested, the governor shall actuate the safety. The governor shall be set for the maximum tripping speed for which approval is requested except that a tripping speed of more than 300 feet per minute shall not be required. The distance from the starting point to the final point of rest under the above test conditions shall not be more than 12 feet. The application of the car safety device shall not cause the car platform to become out of line in excess of 1/2 inch per foot measured in any direction. No car safety device, or combination of car safety device and speed governor, shall be used which has not been so tested and approved.

(12) Every type of car safety device, and every combination of car safety device and speed governor, shall be maintained in proper working condition and shall be subjected to running tests at intervals as outlined as follows:

(a) Every power elevator with a car safety device and speed governor combination shall by not later than January 1, 1949, be subjected to an actual running test with the load indicated by the capacity plate on the car and, by tripping the governor by hand at contract speed, stop and hold the car with the contract load. This test shall be made with all electric apparatus operative except for the cutout switch required by section Ind 4.64 (7). On such tests

car safeties of the sliding type shall stop the car within the limits specified in section Ind 4.64 (15) Table 13 except that the stopping distance shall be based on the car speed at which the governor is tripped. In the event the safety device and governor combination fails to function as required, the owner or agent shall renew or replace any part or parts of equipment and make a test or tests necessary to insure satisfactory operation of the safety device and governor.

(b) When a test is made and the safety device and governor combination prove satisfactory on either new or existing installations, a similar test shall be made at every three year period thereafter. Reports of tests of section Ind 4.64 (a) and (b) shall be submitted to the industrial commission on forms furnished by the commission.

(12) If the approved rated capacity of safeties hereafter installed is less than the weight of the car, the contract load and the cables suspended from the car, a new drop test shall be made and complete plans and specifications shall be submitted to the industrial commission for approval.

(13) A drop test made on a car safety device that is designed and constructed to trip by inertia, when set within the drop test requirements, shall be considered satisfactory. The governor in connection with the above safety device as a combination shall be tested separately by means of a weight test, and also to determine tripping speed.

*Note:* Test of car safety devices and other safety appliances by the United States Bureau of Standards will be recognized by the industrial commission.

(14) Tests of the car safety device and speed governor combination shall be made before the elevator is placed in regular service. Such tests shall be made with cables attached and all electric apparatus operative, except for the cutout switch required by section Ind 4.64 (7) and shall comply with the following:

(a) Where elevators having *type A safeties* are equipped with alternating current driven machine motors, a test of the safeties shall be made with the contract load in the car and shall be tested at contract speed in the down direction and by tripping the governor by hand.

(b) Where elevators having *type B and C safeties* are equipped with "generator field control", an overspeed test of the safeties shall be made with the contract load in the car, by gradually increasing the speed of the car until the governor causes application of the safety. The stopping distance for *type B safeties* and the governor tripping speed shall conform with requirements of section Ind 4.64 (15) Table 13.

(c) The stopping distance for *type C safeties* shall be equal to the stroke of the buffer located between the lower member of the car frame and auxiliary safety plank, and shall conform to the requirements of section Ind 4.19.

(d) For elevators, where the contract load is unable to bring about overspeed and for elevators without sufficient travel to permit overspeed, the governor shall be tripped by hand at maximum obtainable speed.

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(e) No test of the safeties with safe-lifting load in the car shall be made.

(f) No person shall be permitted to ride on the elevator car during an overspeed test or drop test.

(g) The governor tripping speed shall be checked for compliance with section Ind 4.64 (15) Table 13.

(h) The pull-out of the governor cable from its normal running position until the safety jaws begin to apply pressure to the guide rails shall not exceed 30 inches.

(i) Stopping distance is the actual slide as indicated by the marks on the rails.

(15) Car safety devices (safeties) are identified and classified on the basis of performance characteristics after the safety begins to apply pressure on the guide rails. On this basis, there are 3 types of safeties:

(a) *Type A safeties.* Safeties which develop a rapidly increasing pressure on the guide rails during the stopping interval, the stopping distance being very short due to the inherent design of the safety. The operating force is derived entirely from the mass and the motion of the car or the counterweight being stopped. These safeties apply pressure on the guide rails through eccentrics, rollers or similar devices, without any flexible medium purposely introduced to limit the retarding force and increase the stopping distance.

(b) *Type B safeties.* Safeties which apply limited pressure on the guide rails during the stopping interval, and which provide stopping distances that are related to the mass being stopped and the speed at which application of the safety is initiated. Retarding forces are reasonably uniform after the safety is fully applied. Continuous tension in the governor rope may or may not be required to operate the safety during the entire stopping interval. Minimum and maximum distances are specified on the basis of governor tripping speed.

Table 13. Maximum and Minimum Stopping Distances Type B Car Safeties with Rated Load, and of Type B Counterweight Safeties

Rated Speed in Ft. per Minute	Maximum Governor Trip Speed in Ft. per Minute	Stopping Distances in Feet-Inches **	
		Minimum	Maximum
0-125	175	0- 6	1- 3
150	210	0- 6	1- 4
175	250	0- 8	1- 7
200	280	0- 9	1-10
225	308	0-10	2- 0
250	337	0-11	2- 3
300	395	1- 1	2- 9
350	452	1- 3	3- 4
400	510	1- 6	4- 0
450	568	1- 9	4-10
600	625	2- 1	5- 8
600	740	2- 9	7- 7
700	855	3- 7	9-10
800	970	4- 6	12- 6
900	1085	5- 5	15- 3
1000	1200	6- 8	18- 6
1100	1320	7-11	22- 4
1200	1440	9- 4	26- 4
1300	1560	10-11	30-11
1400	1680	12- 7	35- 7
1500	1800	14- 5	40-10

(c) *Type C safeties (Type A with oil buffers)*. Safeties which develop retarding forces during the compression stroke of one or more oil buffers interposed between the lower members of the car frame and a governor-operated Type A auxiliary safety plank applied on the guide rails. The stopping distance is equal to the effective stroke of the buffers.

(16) Each safety shall be marked for identification by the manufacturer by a plate that may be placed in a conspicuous location on the plank. This plate shall show the range of weight and speed for which the safety is approved; said weight to include the complete car structure, the safety, the contract load in the car, and all moving equipment, the weight of which is borne by the safety and the name of the manufacturer.

Type -----  
 Load Range -----  
 Speed -----  
 Manufacturer -----

(17) The governor shall be marked for identification by a plate, which marking shall give the type, tripping speed, size and material of cable and the name of the manufacturer.

Type -----  
 Tripping Speed -----  
 Cable Size -----  
 Cable Material -----  
 Manufacturer -----

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.65 Brakes.** (1) Every direct connected electric elevator hereafter installed shall be equipped with an electrically released spring applied brake so designed, installed and maintained that it will not be released until the power has been applied to the motor. Under normal operating conditions, the action of the brake magnet in allowing the brake to set shall not be retarded by any motor field discharge or counter voltage, nor by any single ground or short circuit.

**Note:** See section Ind 4.63 (6) for traction elevators with mechanical brake.

(2) Every power elevator shall be equipped with a brake so designed, installed and maintained that it will be released whenever the control mechanism is shifted to the starting position, and so that the brake will be applied whenever the control device is moved to the stopping position.

(3) Every hand elevator shall be equipped with a brake that will operate effectively in either direction of motion of the elevator. Whenever such a brake has been applied it shall remain locked in position until released.

(4) The brake on every hand elevator hereafter installed shall be so arranged that it will operate automatically at the top landing.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.69 Warning chains;** new and existing installations. Warning chains shall be hung from the car platform within 2 inches of the edge of the entrance side or sides of every power freight elevator, except where hoistway landing doors with electric contacts or inter-



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## Chapter Ind 4

### ELEVATOR CODE

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Ind 4.001 Definitions. (1) ANNUNCIATOR, ELEVATOR CAR. An electrical device in the car which indicates visually the landing at which an elevator landing signal registering device has been actuated.

(2) APPROVED. Means approved by the Industrial Commission.

(3) BASEMENT. A basement is a story, the floor line of which is below the grade at any entrance or exit, and the ceiling of which is not more than 5 feet above such grade at any exit or entrance. The number of stories of a building includes all stories except the basement.

(4) BUFFER. A buffer is a device designed to absorb the impact of the car or counterweight at the extreme lower limits of travel.

*DM* (5) CAPACITY. See Contract Load.

(6) CAR, ELEVATOR. An elevator car is the load carrying unit including its platform, car frame, and enclosure.

(7) CAR DOOR OR GATE. A car door or gate is the door or gate in or on the elevator car ordinarily used for entrance and exit.

(8) CAR GATE, COLLAPSING. A collapsing gate is one that is distorted in opening and closing.

(9) CAR DOOR OR GATE ELECTRIC CONTACT. An electrical device, the function of which is to prevent operation of the driving machine by the normal operating device unless the car door or gate is in the closed position.

(10) CAR ENCLOSURE. The car enclosure or cab of an elevator is the enclosure consisting of walls and the top or cover built up on the platform.

(11) CAR FRAME (SLING). The supporting frame to which the car platform, upper and lower sets of guide shoes, car safety and the hoisting ropes or hoisting-rope sheaves, or the plunger of a direct plunger elevator are attached.

(a) *Car frame, overslung.* A car frame to which the hoisting-rope fastenings or hoisting-rope sheaves are attached to the crosshead or top member of the car frame.

(b) *Car frame, underslung.* A car frame to which the hoisting-rope fastenings or hoisting-rope sheaves are attached at or below the car frame.

(c) *Car frame, sub-post.* A car frame all of whose members are located below the car platform.

(12) **CAR PLATFORM.** The car platform is the structure, including the floor of the car, which directly supports the load.

(13) **CLEARANCE, BOTTOM CAR.** The clear vertical distance from the pit floor to the lowest structural or mechanical part, equipment or device installed beneath the car platform, except guide shoes or rollers, safety jaw assemblies and platform aprons or guards, when the car rests on its fully compressed buffers. (See *Overtravel, Bottom*)

(14) **CLEARANCE, TOP CAR.** The shortest vertical distance between the top of the car crosshead, or between the top of the car where no crosshead is provided, and the nearest part of the overhead structure or any other obstruction when the car floor is level with the top terminal landing. (See *Overtravel, Top*)

(a) *Clearance, top counterweight.* The shortest vertical distance between any part of the counterweight structure and the nearest part of the overhead structure or any other obstruction when the car floor is level with the bottom terminal landing.

(15) **COMPENSATING-ROPE SHEAVE SWITCH.** A device which automatically causes the electric power to be removed from the elevator driving-machine motor and brake when the compensating sheave approaches its upper or lower limit of travel.

*Ann* (16) **CONTRACT LOAD, CAPACITY.** Contract load is the approved safe live load specified in application and plans submitted for permit.

(17) **RATED SPEED.** The speed at which the elevator, dumbwaiter, escalator is designed to operate under the following conditions:

(a) *Elevator or dumbwaiter.* The speed in the up direction with rated load in the car.

(b) *Escalators.* The rate of travel of the steps or carriage, measured along the angle of inclination, with rated load on the steps or carriage. In case of a reversible escalator the rated speed shall be the rate of travel of the steps in the up direction, measured along the angle of inclination, with rated load on the steps.

(18) **CONTROL.** The system governing the starting, stopping, direction of motion, acceleration, speed, and retardation of the moving member.

(a) *Generator-field control.* A system of control which is accomplished by the use of an individual generator for each elevator or dumbwaiter wherein the voltage applied to the driving-machine motor is adjusted by varying the strength and direction of the generator field.

(b) *Multi-voltage control.* A system of control which is accomplished by impressing successively on the armature of the driving-machine motor a number of substantially fixed voltages such as may be obtained from multi-commutator generators common to a group of elevators.

(c) *Rheostatic control.* A system of control which is accomplished by varying resistance and/or reactance in the armature and/or field circuit of the driving-machine motor.

(d) *Two-speed alternating current control.* A control for a 2-speed driving-machine induction motor which is arranged to run at 2 different synchronous speeds by connecting the motor windings so as to obtain a different number of poles.

(19) **CABLE LOCK.** A cable lock is a device installed and maintained so that the operating cable can be locked at any landing.

(20) **CENTERING ROPE.** A centering rope is used in connection with hand cable control which, when pulled, will throw the operating device to the stop position.

(21) **DOOR OR GATE DEVICE, POWER OPERATED.** A power operated door or gate device is a device or assemblage of devices, the purpose of which is to open and/or close the hoistway door and/or car door or gate by power other than by hand, gravity, springs, or the movement of the car.

**Doors:** See Hoistway Door or Gate, Section Ind 4.001 (Definition 36).

(22) **DUMBWAITER.** A dumbwaiter is a hoisting and lowering mechanism equipped with a car, which moves in guides in a substantially vertical direction, the floor area of which does not exceed 9 square feet, whose internal compartment height does not exceed 4 feet, the capacity of which does not exceed 500 pounds, and which is used exclusively for carrying freight.

(23) **DUMBWAITER, ELECTRIC.** An electric dumbwaiter is one in which the motion of the car is obtained through an electric motor directly applied to the dumbwaiter machinery.

(24) **ELEVATOR.** A hoisting and lowering mechanism equipped with a car or platform which moves in guides in a substantially vertical direction, and the travel exceeds 56 inches.

(a) *Passenger elevator.* An elevator used primarily to carry persons other than the operator and persons necessary for loading and unloading.

(b) *Freight elevator.* An elevator primarily used for carrying freight and on which only the operator and the persons necessary for unloading and loading the freight are permitted to ride.

(c) *Hand elevator.* An elevator utilizing manual energy to move the car.

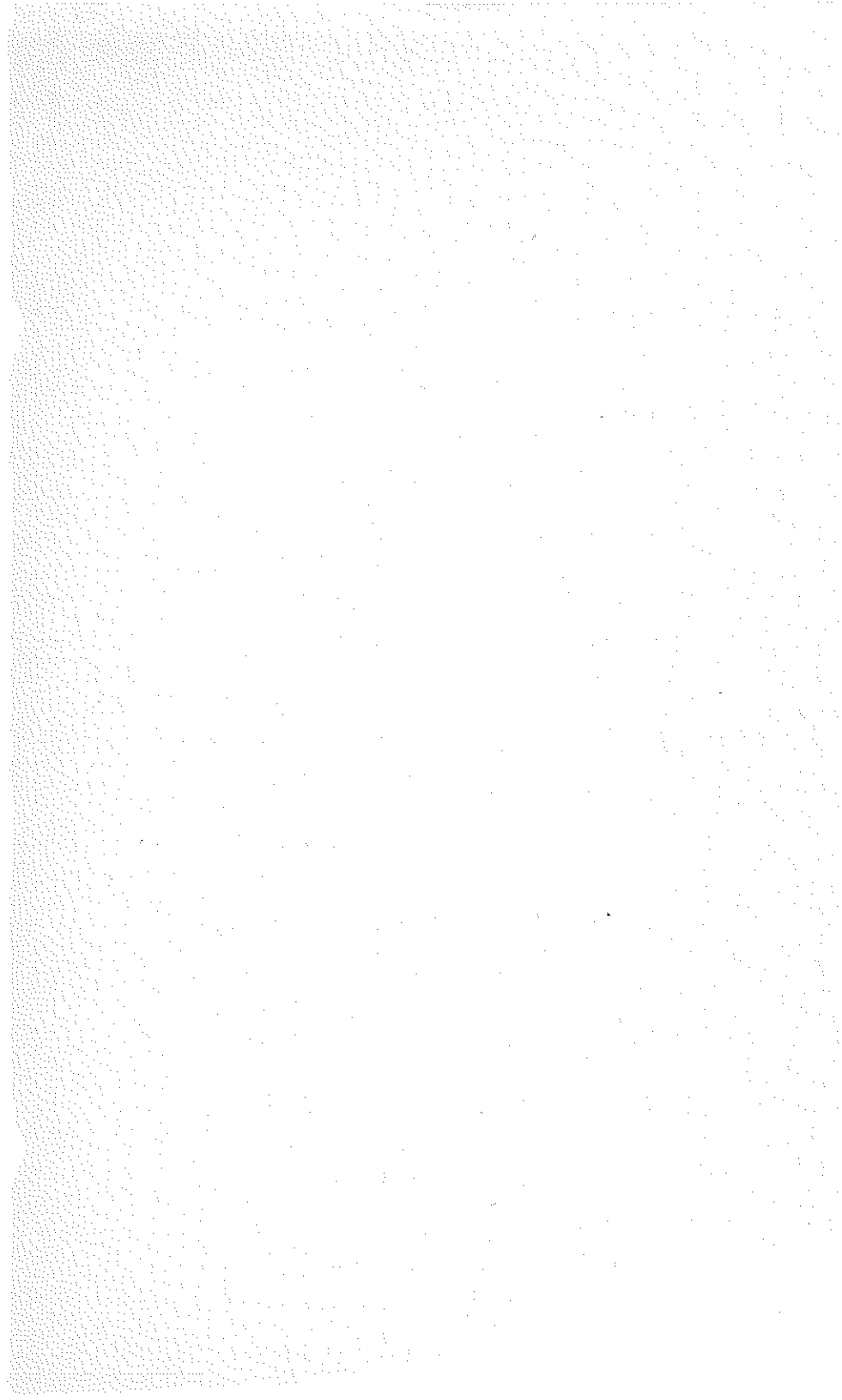
(d) *Power elevator.* An elevator utilizing energy other than gravitational or manual to move the car.

(e) *Electric elevator.* A power elevator where the energy is applied by means of an electric motor.

(f) *Electro-hydraulic elevator.* A direct-plunger elevator where liquid is pumped under pressure directly into the cylinder by a pump driven by an electric motor.

(g) *Carriage elevator.* An elevator which is supported by cables attached to the platform at four or more points in such a manner that the supporting cables are relied upon to maintain the platform substantially level.

(h) *Sidewalk elevator.* A freight elevator which operates between a sidewalk or other area exterior to the building and floor levels inside





(44) NON-SELECTIVE COLLECTIVE AUTOMATIC OPERATION. Non-selective collective automatic operation is automatic operation by means of one button in the car for each landing level served and one button at each landing, wherein all stops registered by the momentary pressure of landing or car buttons are made irrespective of the number of buttons pressed or of the sequence in which the buttons are pressed. With this type of operation the car stops at all landings for which buttons have been pressed, making the stops in the order in which the landings are reached after the buttons have been pressed but irrespective of its direction of travel.

(45) SELECTIVE COLLECTIVE AUTOMATIC OPERATION. Selective collective automatic operation is automatic operation by means of one button in the car for each landing level served and by "Up" and "Down" buttons at the landings, wherein all stops registered by the momentary pressure of the car buttons are made as defined under non-selective collective automatic operation, but wherein the stops registered by the momentary pressure of the landing buttons are made in the order in which the landings are reached in each direction of travel after the buttons have been pressed. With this type of operation, all "Up" landing calls are answered when the car is traveling in the "Up" direction and all "Down" landing calls are answered when the car is traveling in the "Down" direction, except in the case of the uppermost or lowermost calls, which are answered as soon as they are reached, irrespective of the direction of travel of the car.

(46) SINGLE AUTOMATIC OPERATION. Single automatic operation is automatic operation by means of one button in the car for each landing level served and one button at each landing, so arranged that if any car or landing button has been pressed the pressure of any other car or landing operating button will have no effect on the operation of the car until the response to the first button has been completed.

(47) CAR-SWITCH OPERATION. Car-switch operation is operation wherein the movement of the car is directly and solely under the control of the operator by means of a switch in the car.

(48) CAR-SWITCH AUTOMATIC FLOOR-STOP OPERATION. Car-switch automatic floor-stop operation is operation in which the stop is initiated by the operator from within the car with a definite reference to the landing at which it is desired to stop, after which the slowing down and stopping of the elevator is automatically effected.

(49) CONTINUOUS-PRESSURE OPERATION. Continuous-pressure operation is operation by means of push buttons or switches in the car and at landings, any one of which may be used to control the movement of the car so long as the button or switch is manually held in the operating position.

(50) DUAL OPERATION. Dual operation is a system of operation whereby the elevator controller is arranged for either automatic operation by means of landing and car buttons or switches, or for manual operation by an operator in the car, who may either use a car switch or the buttons provided in the car. When operated by an operator, upon the throwing of a suitable switch or switches, the car

can no longer be started by the landing buttons, which buttons may, however, be used to signal the operator that the car is desired at certain landings.

(51) **PRE-REGISTER OPERATION.** Pre-register operation is operation in which signals to stop are registered in advance by buttons in the car and at the landings. At the proper point in the car travel the operator in the car is notified by a signal, visual, audible, or otherwise, to initiate the stop, after which the landing stop is automatic.

(52) **SIGNAL OPERATION.** Signal operation is operation by means of single buttons or switches (or both) in the car, and up or down direction buttons (or both) at the landings, by which predetermined landing stops may be set up or registered for an elevator or for a group of elevators. The stops set up by the momentary pressure of the car buttons are made automatically in succession as the car reaches those landings, irrespective of its direction of travel or the sequence in which the buttons are pressed. The stops set up by the momentary pressure of the up and down buttons at the landing are made automatically by the first available car in the group approaching the landing in the corresponding direction, irrespective of the sequence in which the buttons are pressed. With this type of operation the car can be started only by means of a starting switch or button in the car.

(53) **POTENTIAL SWITCH, ELEVATOR.** An elevator potential switch is a switch which disconnects the power from the elevator apparatus when the supply voltage fails or decreases below a definite value and which is usually opened by various electrical safety devices. These switches are of the magnetic type.

(54) **SAFETY, CAR OR COUNTERWEIGHT.** A car or counterweight safety is a mechanical device attached to the car or counterweight frame to stop and hold the car or counterweight in case of predetermined overspeed, free fall, or slackening of the cables.

(55) **SLACK-CABLE SWITCH, ELEVATOR.** An elevator slack-cable switch is a device for automatically cutting off the power in case the hoisting cables become slack.

(56) **FACIA PLATE.** A metal plate not less than 1/16" in thickness, securely fastened, and extending flush from the top of the hoistway landing door frame to the landing sill above and run the full width of the door opening.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57; am. (5), (16) and cr. (56), Register, December, 1957, No. 24, eff. 1-1-58.

### Scope of the Elevator Code

**Ind 4.01 General scope.** The requirements of this code shall apply to all elevator, dumbwaiter and escalator installations in public buildings and places of employment as defined by the statutes. The requirements apply to both existing installations and those hereafter installed unless otherwise specified.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.02 Renewing of elevators, dumbwaiters and escalators.** Where the part or parts of equipment of an elevator, dumbwaiter or escalator are impaired through ordinary wear, damage or deterioration



by fire or other causes, to less than 50 per cent of the original condition, the equipment shall be repaired or rebuilt in conformance with the requirements for new installations.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.03 Exemptions.** This code does not apply to belt, bucket, scoop, roller, or similar inclined or vertical freight conveyors, portable tiering or piling machines when not passing through a floor unless serving more than the floor on which the portable tiering or piling machine is located, skip hoists, man hoists, mine hoists, lumber lifts, wharf ramps or apparatus in kindred classes, amusement devices, stage curtain hoists or lift bridges, nor to elevators used only for handling building material during the period of building construction and elevators with a travel less than 56 inches.

(1) For regulations relative to the use of elevators, hoists, derricks and similar equipment during the period of construction of a building or any other structure, see section Ind 35.28 to 35.31 inclusive of the general orders on Safety in Construction issued by the industrial commission.

(2) For man lift requirements, see general orders on Safety.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

### Plans

**Ind 4.04 Plans; new installations.** (1) Before starting work on any new installation of an elevator, power dumbwaiter or escalator, 3 copies of the plans shall be submitted to the industrial commission for approval, with 2 copies of application for each unit, properly filled out, on blank forms furnished by the commission.

(a) The form referred to under 4.04 (1) is SB-22 "Application For Construction, Erection And Remodeling Elevators" and may be obtained from the Industrial Commission, 1 West Wilson Street, Madison.

(2) A plan examination fee in the amount established under section 101.10 (13) (g), Wis. Stats., shall be paid for each installation requiring approval.

(3) Section Ind 4.04 (1) shall not apply in cities where elevator permits are issued by the city in a manner approved by the industrial commission. Every elevator manufacturer who furnishes an elevator, power dumbwaiter, or escalator to be installed by the owner, or an agent of the owner, shall submit plans and file an application in compliance with this order.

(4) Plans shall include: (a) Sectional plan of car and hoistway; (b) Sectional elevation of hoistway, machine room (showing machinery) and pit; (c) Plan of machine and supports showing details of materials, size of beams. If the hoistway has more than one entrance on any floor, all entrances shall be clearly shown.

(5) The elevator manufacturer and the architect shall cooperate in preparing plans to avoid discrepancy in design.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57; cr. (1) (a), Register, October, 1957, No. 22, eff. 11-1-57.

**Ind 4.05 Inspections.** (1) INTERVAL. All elevators, power dumbwaiters, or escalators operated in the state of Wisconsin shall be subjected to a regular inspection at least once every 12 months.

(2) **INSPECTION BY INSURANCE COMPANIES.** The industrial commission may accept inspections of elevators, power dumbwaiters, and escalators reported by certified inspectors, subject to the following conditions:

(a) Each installation shall be inspected once every 12 months.

(b) A detailed report of each unit inspected shall be filed with the commission within 14 days after inspection on a printed form approved by the commission. Such report shall show all respects in which the installation fails to comply with the code requirements. If there are any special conditions which, in the inspector's opinion, would require modification of any general order, the facts shall be fully stated in the report, with the inspector's recommendation.

1. Where an insurance company inspects an elevator, power dumbwaiter or escalator within the city limits of Milwaukee, a detailed report of each unit inspected shall be filed with the Inspector of Buildings, City Hall, Milwaukee, within 14 days after inspection on a printed form approved by the commission. Such report shall show all respects in which the installation fails to comply with the code requirements. If there are any special conditions which, in the inspector's opinion, would require modification of any general order, the facts shall be fully stated in the report with the inspector's recommendation.

*Note:* Reports required to be submitted to the Inspector of Buildings, Milwaukee, need not be filed with the commission.

(c) A certificate of inspection on a form approved by the commission shall be posted by the insurance company in a conspicuous place in the elevator car, dumbwaiter cage, or escalator, as the case may be, and shall show the date of inspection, name of insurance company, name of inspector, safe carrying capacity. (See section Ind 4.52)

1. The form referred to under 4.05 (2) (c) is SB-15A "Certificate Of Inspection" and is furnished to insurance companies by the Industrial Commission, 1 West Wilson Street, Madison.

(d) The insurance company shall use all reasonable diligence to secure compliance with the commission's orders. If unsuccessful, it shall so report to the commission. If it then becomes necessary for the commission to make an inspection, the statutory fee for each unit inspected will be charged. (See section Ind 4.07)

(e) The competency of each elevator inspector shall be certified by each insurance company to the commission in writing prior to making inspections. Insurance company inspectors will be approved by the commission only after the receipt of acceptable evidence of competency and a satisfactory examination has been passed consisting of oral and written tests.

1. The form referred to under 4.05 (2) (e) is SB-12 "Insurance Company Elevator Inspector" and is furnished by the Industrial Commission to insurance company inspectors after their competency has been examined and approved.

(f) Insurance companies that cover elevators, escalators, or power dumbwaiters which come within the scope of liabilities of workmen's compensation, public liability, or comprehensive coverage in any manner or degree shall report to the industrial commission on January 1 each year the identity, location, and ownership of each such risk.

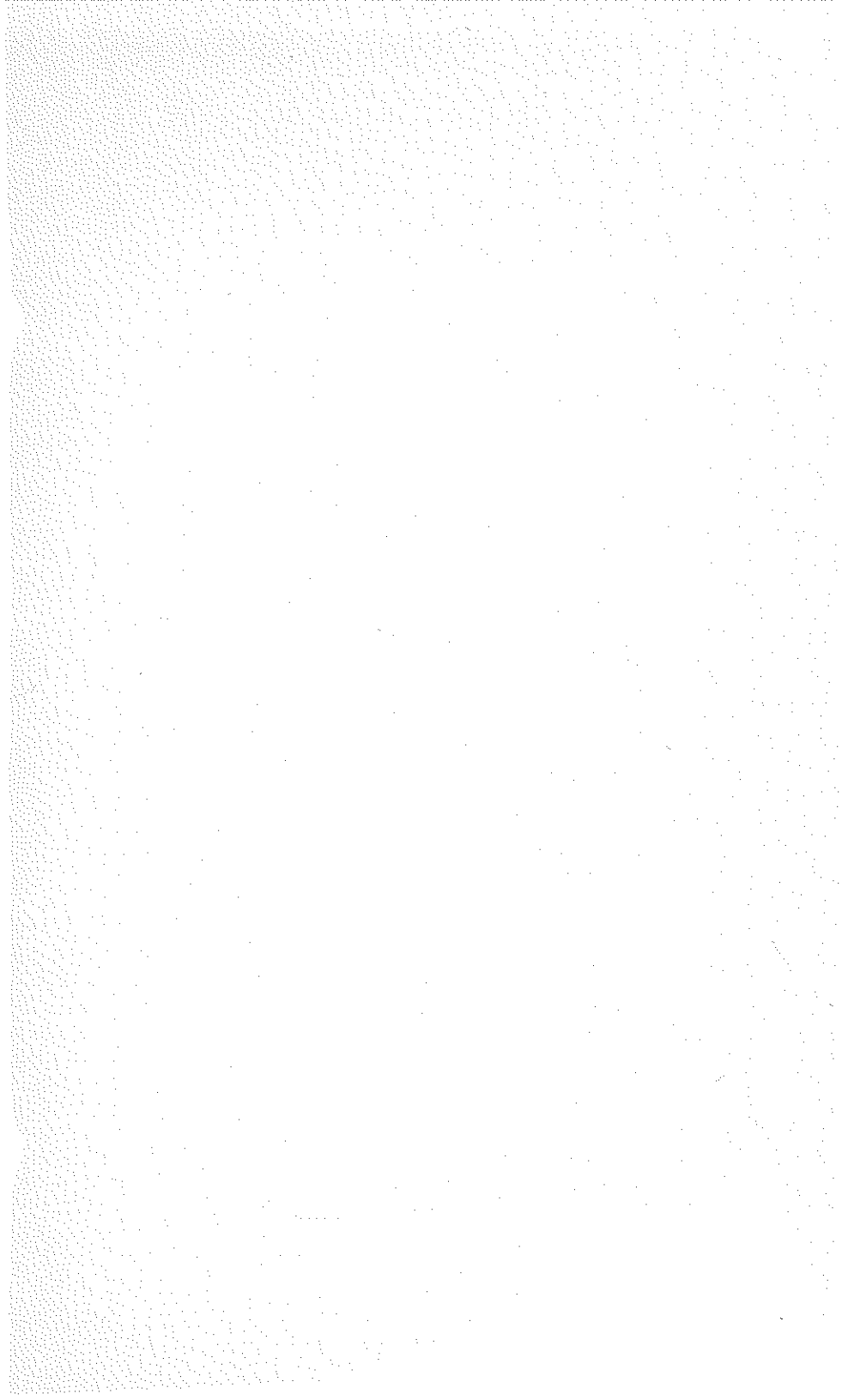
1. Insurance companies employing inspectors holding valid certificates of competency, inspect all risks annually, and regularly file proper inspection reports shall not be required to file a list of such risks on January 1 of each year.

2. Insurance companies insuring risks in cities of the first class shall not be required to make the above report provided the risks are located within the corporate limits of such cities and provided that such cities have equivalent reporting requirements.

3. Elevators, escalators, or power dumbwaiters covered by insurance companies as in section Ind 4.05 (f) not employing inspectors holding valid certificates of competency shall be subject to inspection by the industrial commission. Fees for performing such inspection services shall be paid in accordance with the provisions of the applicable fee schedule.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57; cr. (2) (c) (1) and (2) (e) (1), Register, October, 1957, No. 22, eff. 11-1-57; am. (2) (e), Register, December, 1957, No. 24, eff. 1-1-58.







(4) On every existing passenger elevator having a leveling device, the hoistway shall be equipped with a vertical toe-guard extending at least 2 inches beyond the leveling zone and beveled at the lower edge as required in section Ind 4.15 (1).

(5) Where a leveling device operates the car with the hoistway door open, the under side of the car platform shall be equipped with a vertical toe-guard at least 2 inches longer than the leveling zone.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.16 Car clearances.** (1) The clearance between the car entrance sill and any landing sill shall be not less than  $\frac{1}{2}$  inch where steel guide rails are used in side-post construction and not less than  $\frac{3}{4}$  inch where wood guide rails or corner-post construction is used.

(1) (a) The clearance between any point of the elevator hoistway wall and the elevator car shall not be less than  $\frac{3}{4}$  inch. Every rope, cable, sheave and other similar moving parts shall have a clearance of not less than  $\frac{3}{4}$  inch.

(b) The distance from the edge of the hoistway landing sill to the hoistway landing door or gate shall not be more than 4 inches.

(c) For automatic-operation elevators the distance between the hoistway side of the hoistway door opposite the car opening and hoistway edge of the landing threshold shall be not more than the following: for swinging doors  $\frac{1}{2}$  inch and for sliding doors  $2\frac{1}{4}$  inches. In no case shall the hoistway face of the hoistway door project into the hoistway beyond the edge of the landing sill.

1. For existing installations of automatic-operation elevators where the clearance exceeds  $1\frac{1}{2}$  inches for swinging doors or  $2\frac{1}{2}$  inches for sliding doors, the space between the hoistway side of the landing door and the hoistway edge of the landing threshold shall be filled in by suitable means.

2. If the hoistway door consists of 2 or more sections, the distance specified in section Ind 4.16 (1) and (1), (a), shall be measured from the section of the door nearest to the edge of the hoistway landing sill.

(d) The clearance between the car entrance sill and any landing sill shall not be more than  $1\frac{1}{2}$  inches.

(e) The clearance between the hoistway walls and the edge of any car entrance sill shall not be more than 7 inches at any point, except that where pass type vertical bi-parting counterbalanced hoistway doors are used, this clearance shall be not more than 8 inches. For existing installations this clearance at the secondary entrance may be increased, if approved in writing by the industrial commission.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.17 Depth of pit and overhead clearance including access to pits and stop switch in pits.** (1) **DEPTH AND CLEARANCE.** The depth of the pit and the overhead clearance for any power elevator hereafter installed, having a contract speed of 200 feet per minute or less, where spring buffers are required, shall be not less than the number of inches for a given speed and capacity shown in Table 2. See section Ind 4.19 (1).

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Table 2. Minimum Pit Depth and Overhead Clearance

Contract Speed Feet per Minute	Contract Load in Pounds		
	0—4000	5000—7000	8000 and over
0- 50	36 inches	42 inches	48 inches
100	42 inches	48 inches	54 inches
200	48 inches	54 inches	60 inches

(2) ACCESS TO PITS. Access to pits of elevators hereafter installed shall comply with the following:

(a) Access may be by means of the lowest hoistway door or by means of a separate pit access door.

(b) Access to pits extending more than 4 feet below the sill, shall be provided by means of fixed vertical ladders of incombustible material, located within reach of the access door. The ladder shall extend not less than 30 inches above the sill of the access door, or hand-grips shall be provided to the same height.

(c) Pits shall be accessible only to authorized persons.

(d) Where a separate pit access door is provided, it shall be self-closing and provided with a spring-type lock arranged to permit the door to be opened from inside the pit without a key. Such doors shall be kept locked.

(3) STOP SWITCH IN PITS. There shall be installed in the pit of every power elevator hereafter installed an enclosed stop switch of the approved type and shall be in addition to the directional and final limit switches. This switch shall be so located as to be accessible from the pit access door. Where access to the pits of elevators in a multiple hoistway is by means of a single access door, the stop switch for each elevator shall be located adjacent to the nearest point of access to its pit from the access door.

(4) PIT DEPTHS INCREASED. When vertically sliding bi-parting counterbalanced hoistway landing doors are used or required, the above minimum pit depths shall, in the case of shallow pits, be increased to not less than  $\frac{1}{2}$  the door height opening, plus 6 inches over the requirement of Table 2.

(a) Where spring buffers are used, the clearance between the bottom of the car platform and the pit floor shall be not less than 15 inches when the car is resting on the fully compressed buffers.

(5) The depth of the pit and the overhead clearance for any power elevator hereafter installed, having a contract speed in excess of 200 feet per minute, where oil or equivalent buffers are required, shall be not less than the number of inches for a given speed shown in Table 3. See section Ind 4.19 (1), (a).

(a) When excessively long oil buffers are provided and where practical, a pocket not over 30 inches deep may be provided below the normal pit floor to accommodate the lower portion of the car oil buffer, provided the pocket is of concrete and waterproofed and has a substantial removable cover or filled with sand to permit the buffer to be removed in case of repair. Such pocket shall be included in the pit depth.



at the edge of the higher level where such change in level occurs, and a stairway with handrails shall be provided for access between levels.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.25 Guards for counterweight runways.** Guards between adjacent pits, new and existing installations. (1) Where a counterweight runway is located in the elevator hoistway the outside (the side away from the elevator), if exposed to contact, shall be protected the full height with a solid guard and, if there is no other means provided for inspection of the counterweight stack, a removable panel at least 12 inches longer than the counterweight stack shall be provided at the bottom,

(2) The hoistway side of every counterweight runway shall be enclosed with a solid guard from a point not more than 18 inches above the bottom of the pit to a height of 90 inches, except for

(a) Hand elevators;

(b) Existing power elevators where there is not room for such guards;

(c) Elevators whose counterweights are equipped with compensating devices connected to the counterweights.

*Note:* Guards in hoistways should be made of metal of not less than 16 gauge.

(3) Where a counterweight runway is located outside the elevator hoistway, the runway shall be solidly enclosed on all sides but a removable panel 12 inches longer than the counterweight stack shall be provided on the outside at the bottom.

(4) (a) Where there is a difference in level between the floors of adjacent pits for elevators hereafter installed a rigid guard of unperforated metal, or a perforated metal guard having openings which will reject a ball 2 inches in diameter shall be installed for separating such pits. Guards shall extend not less than 6 feet above the level of the higher pit floor.

(b) Where the difference in level is 2 feet or less, a metal railing not less than 42 inches high measured from the level of the higher pit floor may be installed in lieu of the guard.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.26 Spreader brackets and counterweight stops.** (1) The counterweight guide rails of every power drum type elevator shall be strongly fastened together every 4 feet from the top of the guide rails, to a point opposite the bottom of the counterweight stack when it is at the upper limit of normal travel.

(2) In every power drum type elevator, there shall be an I-beam or other obstruction, and it shall be strongly secured at the upper limit of travel of the counterweights so that they cannot be drawn out of the runway. Such obstruction shall be so arranged that the counterweights will be stopped squarely, without distortion.

(3) In every hand elevator which does not have a limit stop at the top, a solid footing shall be provided on which the counterweight will rest when the car is not more than 6 inches above the highest landing.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

Ind 4.27 Construction of cars; new installations. (1) Every power freight elevator platform hereafter installed shall have a metal outside frame and shall be designed and constructed for one of the following classes of loading:

(a) *Class A. General freight loading.* Where the load is distributed, the weight of any single piece of freight or of any single hand truck and its load is not more than  $\frac{1}{4}$  the rated load of the elevator, and the load is handled on and off the car platform manually or by means of hand trucks. For this class of loading, the rated load shall be based on not less than 50 pounds per square foot of inside net platform area.

(b) *Class B. Motor-vehicle loading.* Where the elevator is used solely to carry automobile trucks or passenger automobiles up to the rated capacity of the elevator. For this class of loading, the rated load shall be based on not less than 30 pounds per square foot of inside net platform area.

(c) *Class C. Industrial truck loading.* Where the load is carried in transit by, or is handled on and off the car platform by means of industrial power trucks or by hand trucks having a loaded weight more than  $\frac{1}{4}$  the rated load of the elevator. For this class of loading the following requirements shall apply:

1. The rated load shall be based on not less than 50 pounds per square foot of inside net platform area.

2. The weight of the loaded industrial truck shall not exceed the rated load of the elevator.

3. The weight of the industrial truck plus any other material carried on the elevator shall not exceed the rated load when the industrial truck is also carried.

(d) *Loading and unloading.* During loading and unloading, the load on the elevator shall in no case exceed 150% of the rated load, and where this load exceeds the rated load, the capacity of the brake and the traction relation shall be adequate safely to sustain at least 150% of the rated load.

*Note:* When the entire rated load is placed on the elevator by the industrial truck in increments, the load imposed on the car platform while the last increment is being loaded or the first increment unloaded will exceed the rated load by the weight of the empty industrial truck.

(e) *Signs, general.* Signs, in addition to the capacity and data plates required in section Ind 4.53 (2), shall be provided inside the car located in a conspicuous position and permanently and securely fastened to the car enclosure. In every elevator the sign shall specify the type of loading for which the elevator is designed and installed, with one of the following markings:

1. "THIS ELEVATOR DESIGNED FOR GENERAL FREIGHT LOADING".

2. "THIS ELEVATOR DESIGNED FOR MOTOR VEHICLE LOADING".

3. "THIS ELEVATOR DESIGNED FOR INDUSTRIAL TRUCK LOADING".

(f) *Signs, material and marking.* The material and marking of all signs shall conform to the requirement of section Ind 4.53 (2).

(2) No cast iron shall be used in the construction of any member of the car frame or platform, subject to tension or bending except for

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compensating cable anchorages, releasing carriers and guide shoe stands.

(3) If there is a railroad track on an elevator car, the tops of the rails shall be flush with the car floor.

(4) The car frame members of every elevator car shall be securely welded, bolted and/or riveted and braced. Welding, where used, shall meet the requirements of the industrial commission.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.28 Passenger elevator. Car enclosure.** (1) (a) Every existing passenger elevator car shall be enclosed on all sides, excepting the entrance opening. This enclosure shall be solid from floor to car ceiling in front of the counterweight runway, and openings in other sections shall not be greater than  $1\frac{3}{4}$  inches square; or if greater than  $1\frac{3}{4}$  inches, not wider than 1 inch. If wire mesh is used, the wire shall be not less than No. 10 U. S. standard gauge, with mesh not greater than  $1\frac{3}{4}$  inches, measured along the wire from center to center of wires at points where they cross.

*Note:* On an existing elevator where the openings in the grille work are greater than specified in this order, a screen may be stretched around the outside of the car.

(2) The car enclosure of every passenger elevator hereafter installed shall be constructed of solid incombustible panels on an incombustible frame to the full height of the car, except that louvers may be used, and provided with open grille or bars which shall reject a ball  $\frac{1}{2}$  inch in diameter and placed within 6 inches of the floor or above the 6-foot level. If louvers are placed in front of the counterweight runway, a guard shall be provided to protect the full opening.

*Note:* For passenger elevator car entrances see section Ind 4.60 (1) (c).

(3) Wood or wood veneer panels may be used if covered on the outside with sheet metal of not less than No. 27 U. S. Gauge.

(4) The floor covering shall be constructed and maintained so that persons will not readily slip thereon.

(5) The roof of every passenger car shall be constructed of solid material.

(6) An emergency exit with a cover shall be provided in the top of all elevator cars and shall conform to the following requirements:

(a) The exit opening shall have an area of not less than 400 square inches, and shall measure not less than 16 inches on any one side.

(b) The exit shall be so located as to provide a clear passageway unobstructed by fixed elevator equipment located in or on top of the car.

(c) The exit cover shall open outward and shall be so hinged or otherwise attached to the car top that the cover can be opened from both inside and from on top of the car without the use of tools.

(7) Tops of car enclosures shall be so designed and installed as to be capable of sustaining a load of 300 pounds on any square area 2 feet on a side and 100 pounds applied at any point. Simultaneous application of these loads is not required.

(8) No passenger elevator car enclosure shall deflect more than 1 inch when subjected to a force of 75 pounds when applied horizontally at any point, nor with such deflection shall the actual running clearance be less than  $\frac{3}{4}$  inch as specified in section Ind 4.16 (1) (a).

*Note:* For car door or gate requirements, see section Ind 4.30.

*History:* Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.29 Passenger elevator. Car furnishings; new and existing installations.** (1) No glass shall be used in elevator cars except to cover certificates, lighting fixtures, and appliances necessary for the operation of the cars.

(a) No piece of glass, unless laminated, or otherwise shatterproof, shall exceed 1 square foot in area.

(b) Mirrors, other than hall view mirrors, will not be permitted.

(2) A metal handrail not less than 1 inch in diameter, or equivalent, and approximately  $3\frac{1}{2}$  feet above the floor, shall be placed on each side, except the entrance side, or sides, of every passenger car.

(3) No seats, except one for the operator, and except for elevators installed to carry invalids, shall be placed in any elevator.

(4) No signs or advertisements shall be posted in any elevator car, other than those required for the operation of the elevator and/or the certificate of inspection required in section Ind 4.05.

*History:* Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.30 Passenger elevator. Car door or gate.** (1) A car door or gate shall be provided at each entrance to power passenger elevator cars hereafter installed. This door or gate when closed shall guard the full opening and each door or gate shall be provided with a car door or gate electric contact.

(a) This requirement for a car door or gate electric contact shall also apply to existing installations that are required to have a car gate prior to the time this order becomes effective, and to all existing installations where new cars are installed, except that cable control hydraulic elevators are not required to have car gates contacted.

*Note:* The above requirement includes all elevators installed after August 12, 1926 where the speed is in excess of 150 feet per minute and the state registration number is 7,000 or over.

(2) Every existing automatic push button controlled elevator shall be provided with a car door or gate at each entrance, so arranged that the elevator cannot be operated unless the car door or gate is closed.

(3) Car gates used for passenger elevators shall be of such design that when fully expanded they will reject a ball 3 inches in diameter. Car gates of the scissors or pantograph type shall not be power-opened, except that in the event a power gate operator is used to operate the hoistway door retiring cam, a maximum of 10 inches of clear gate opening will be permitted.

(4) Sliding car doors for passenger elevators may be solid; may be equipped with glass vision panels, but in no case shall the panels exceed 80 square inches in area, or may be provided with open grille or bars which will reject a ball  $1\frac{1}{2}$  inches in diameter. Glass panels in excess of 80 square inches in area shall be laminated or otherwise shatterproof.

(5) A car door or gate shall be considered in the closed position when the clear open space between the edge of the door or gate and

the nearest face of the jamb does not exceed 2 inches; except that where the car door or gate is provided with a door closer and the requirements specified in section Ind 4.32 (6) are fully met, the electric contact on the car door or gate may permit the starting of the car when the clear open space does not exceed 4 inches.

(6) The functioning of a car door or gate electric contact on elevators hereafter installed to prevent the movement of the car shall not be dependent solely on the action of a spring or springs, nor solely upon gravity, nor shall it be dependent on the closing of an electric circuit.

(a) Car door or gate electric contacts hereafter installed shall be positively opened by a lever or other device attached to and operated by the door or gate.

(7) For automatic-operation passenger elevators having power-closed or automatically released, self-closing doors or gates and manually closed or self-closing hoistway doors, the closing of the car gate shall be prevented unless the hoistway door is in the closed position.

(8) For automatic-operation passenger elevators the car door or gate shall be so located that the distance from the face of the hoistway door to the face of the car door or gate shall be not more than the following:

(a) for swinging hoistway door if a car gate is used, 4 inches;  
(b) for swinging hoistway door if a car door is used, 5½ inches;  
(c) for sliding hoistway door and car door or gate, 5½ inches. Exception: The opening of the car door or gate electric contact shall not prevent the operation of the car when the emergency release is in temporary use or where the car is being moved by a car leveling device.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.31 Passenger elevator. Hoistway landing doors.** (1) In every passenger elevator the hoistway shall be equipped at each landing with a horizontally sliding door, or doors, which shall entirely fill the opening to the hoistway. Every such door shall be an approved fire-resistive door and shall be solid to a height of not less than 12 inches above the floor level. Upper sections of such doors may be solid metal, or of wired glass, provided the glass pane dimension complies with the requirement as outlined in section Ind 4.001 definition (30) (a). Every landing door shall be of sufficient strength to resist a lateral pressure of 250 pounds applied at the center. (See section Ind 4.10.) Exception: In cases where the doors in outside walls of elevator hoistway enclosures are not required by the Wisconsin Building Code to be fire-resistive, the phrase in section Ind 4.31 (1) reading "every such door shall be an approved fire-resistive door" does not apply.

(2) Vertically sliding or doors of the bi-parting type shall not be used to protect landing openings, except doors used exclusively for freight.

(3) Doors shall not swing on vertical axis except on automatic push button elevators and except where approved in writing by the industrial commission.

(4) Existing wood doors in an existing hoistway will be accepted, but if such doors contain grille work or screen, the openings shall be closed.

(5) On existing installations, solid metal or metal screen on substantial door framing will be accepted. The screen shall be the equivalent in strength, rigidity and protection of wire screen described in section Ind 4.28 (1).

(6) Every existing passenger elevator shall be provided with an emergency key which cannot easily be duplicated, which will, irrespective of the position of the car, open the lowest terminal landing door from the landing side. This key shall open no other hoistway landing door. This emergency key shall be placed in a receptacle having a transparent breakable cover clearly marked, "Elevator Door Key for Fire Department and Emergency Use Only", and shall be located at the lowest landing. Emergency keys shall be especially designed to prevent easy duplication.

*Note A:* Hoistway landing door interlocks that are the equivalent of those listed by the Underwriters' Laboratories and on the basis of engineering tests outlined by the Safety Code for Elevators approved by the American Standards Association will be approved by the industrial commission.

*Note B:* See section Ind 4.71.

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(7) A service key shall be provided to open the hoistway door from the landing side at the landing where the car is normally parked out of service, except for automatic operation elevators and elevators equipped with interlocks released by car retiring cams. This key shall open this door only when the car is within the landing zone and shall open no other hoistway door provided the pit depth does not exceed the requirements in section Ind 4.17.

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(8) Every passenger elevator hereafter installed equipped with hoistway landing doors shall be provided with a hoistway access switch at the top terminal landing. The car travel shall be limited to the full door opening to permit access to the top of the car, and at the bottom terminal landing to permit access to the pit, where the door at this landing is the only means of access to the pit, the car travel shall be limited to the full door opening. These switches shall be located immediately adjacent to the hoistway doorways at these landings and shall not be installed at any other landings or in the car.

(a) *Design and use of switch.* The hoistway access switch shall be of the continuous-pressure spring-return type and shall be operated by a cylinder type lock having not less than a 5 pin or 5 disk combination with the key removable only when the switch is in the "off" position. The lock shall not be operable by any key which will operate any other lock or device which is used for any other purpose in the building. The key shall be available to and used only by inspectors, maintenance men, and repairmen.

(b) *Operating requirements of switch.* The operation of the hoistway access switch at either terminal landing shall permit movement of the car with the hoistway door at this landing unlocked or open and with the car door or gate open, subject to the following:

1. The operation of the access switch shall not render ineffective the hoistway door interlock or electric contact at any other landing.

2. The car can be operated at a speed not greater than 100 feet per minute.

3. For automatic and continuous-pressure operation elevators:

a. Normal operation shall first be made inoperative by means other than the access switch.

b. Power operation of the hoistway door and/or car door or gate is inoperative.

4. Automatic operation by a car-leveling device is inoperative.

5. The operating device on top of the car as of section Ind 4.70 (5) is inoperative.

(9) Emergency hoistway doors hereafter installed shall be at least 30 inches wide, 6 feet 6 inches high (clear opening), and shall be easily accessible and free from fixed obstructions. Such doors shall be self-closing, self-locking and provided with door electric contacts or interlocks.

(10) Vision panels shall be provided in all hoistway landing doors of every automatic operated elevator hereafter installed, except at landings where a hall position indicator is provided or where car and landing doors are power-operated. All swing type hoistway doors shall be provided with vision panels. Where required or used, vision panels shall comply with the following requirements:

(a) The area of any single panel shall be not less than 25 square inches and the total area of one or more panels in any hoistway door shall be not more than 80 square inches.

(b) Each clear panel opening shall reject a ball 6 inches in diameter.

(c) Where mullions or division strips are used between panels, they shall be of fire-resistant material and of substantial construction.

(d) Panels shall be of clear wired glass.

(e) The center of a panel shall be not less than 54 inches nor more than 66 inches, above the elevator landing.

(f) The panel in swing type doors shall be located for convenient vision when opening the door from the car side.

(g) If used for power-operated hoistway doors, the wired glass panel shall be substantially flush with the surface of the landing side of the door.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.32 Passenger elevator, Hoistway landing door interlocks. (1) EXISTING INSTALLATIONS.** (a) Interlocks, either mechanical or electro-mechanical as outlined in section Ind 4.001 definition 37 shall be provided on the hoistway landing doors of every passenger elevator installation.

(b) No hoistway landing door interlock shall be constructed or installed so that its functioning is dependent upon the action of a spring (or springs) in tension, or upon the closure of an electric contact.

(c) Hoistway door contacts shall be designed so that they are positively opened by the locking bar or by a lever or other device attached to and operated by the door or gate.

(d) The functioning of a hoistway door contact to prevent the movement of the car shall not be dependent solely on the action of the spring or springs, nor solely upon gravity, nor shall it be dependent on the closing of an electric circuit.

(2) NEW INSTALLATIONS. (a) Interlocks shall be provided on hoistway landing doors hereafter installed and shall comply with one of the following: 1. The Door Unit System in which the interlock prevents the operation of the elevator machine by the operating device in a direction to move the car away from the landing unless the hoistway door at that landing at which the car is stopping, or is at rest, is locked in the closed position.

2. The Hoistway Unit System in which the interlock prevents the operation of the elevator machine in a direction to move the car away from the landing unless all hoistway doors are locked in the closed position. See section Ind 4.71 for automatic operated elevators. Exception: The interlock is not required to prevent the operation of the car with the hoistway door in the open position when the car is being moved by a car leveling device.

(3) INTERLOCK SYSTEM. In section Ind 4.32 (2) (a) 1. and 2. interlock systems, the interlock shall prevent the opening of the hoistway door from the landing side unless the car is at rest within the landing zone; or is coasting through the landing zone with its operating device in the "Stop" position.

(4) DOOR UNIT SYSTEM. The door unit interlock system may be used only where there is a regular operator in the car and where the elevator can be operated only from inside the car.

(5) AUTOMATIC OPERATION. For automatic operation elevators or for power driven elevators where the hoistway door is not equipped with a door closer, the hoistway door shall be considered in the closed position only when the door is within  $\frac{3}{8}$  inch of the nearest face of the door jamb, or in the case of bi-parting doors only when the doors are within  $\frac{3}{8}$  inch of contact with each other.

(6) WHERE DOOR CLOSER IS USED. Where the hoistway door of an elevator requiring the presence of an operator in the car is equipped with a door closer, the door shall be considered to be in the closed position and the car may be started when the door is within 4 inches of the nearest face of the jamb (or in the case of a bi-parting door when the sections are within 4 inches of contact with each other), if at this position and any other up to full closure, as defined in section Ind 4.32 (5), the door cannot be opened from the landing side more than 4 inches from the jamb (or the sections more than 4 inches from each other in case of a bi-parting door) provided that the door closer is of a type which will eventually close the door to the fully closed position as defined in section Ind 4.32 (5), and lock it in this position.

(7) INTERLOCK DESIGN. The interlock for all hoistway doors shall be so designed that the door is locked in the closed position as defined in section Ind 4.32 (5) and (6) before the car can be operated.

*Note 1:* Attention is called to the fact that devices employing locks and contacts of a type in which the interlocking contact is made when the door is closed and the locking of the door takes place subsequently, are not interlocks and are not permitted where interlocks are required under this code.



*Note 2:* Hoistway landing door interlocks that are the equivalent of those listed by the Underwriters' Laboratories and on the basis of engineering tests outlined by the Safety Code for Elevators approved by the American Standards Association will be approved by the industrial commission.

*Note 3:* See section Ind 4.71.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.33 Passenger elevator landings.** The landing threshold shall be constructed and maintained so that persons will not readily slip thereon.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.34 Freight elevator. Car enclosure.** (1) Every freight elevator car shall be solidly enclosed on all sides, except the entrance side. The height of every such enclosure shall be at least 6 feet, except as follows:

(a) On every freight elevator the enclosure shall be at least 7 feet in height in front of the counterweight runway, and shall extend from floor to cover on every car where a cover is required or provided.

(b) On every hand carriage type elevator traveling not more than two stories the enclosure shall be at least 3½ feet in height, except in front of the counterweight runway, where it shall be 7 feet high.

(c) On the side of the operating cable, sufficient open space to operate the cable shall be allowed, but in no case shall the opening be more than 15 inches wide.

(d) On hand elevators, the enclosure may be arranged on the pull rope side so as to permit free operation of the pull rope.

(2) Every freight elevator shall be equipped with a solid or openwork top cover. Openwork top covers shall reject a ball 1½ inches in diameter and if made of wire mesh, shall be made of wire not less than No. 10 steel wire gauge (0.135 inches diameter) or its equivalent.

(a) The car top or cover shall be sufficiently strong to sustain a load of 300 pounds applied on any square area 2 feet on a side and 150 pounds applied at any point, except the hinged sections next to the car entrance.

(3) Exceptions: (a) On an existing power freight elevator traveling one story no cover is required if the hoistway above the lowest story is enclosed to a height of 6 feet and the bottom rail of each gate at the top landing extends to the floor.

(b) On an existing power freight elevator car 10 feet or more in length, open at one end only (except at the lowest landing), and traveling not more than two stories, but not to exceed 30 feet, a cover is required over only that half of the car next to the open end.

(c) No cover is required on a sidewalk elevator where the travel is not over one story.

*Note:* See section Ind 4.80.

(d) No cover is required over an existing hand elevator car where the bottom rail of every landing gate above the lowest landing rests on the floor.

(e) Where a hand elevator is not provided with a cover, a floor or screen shall be provided under the overhead machinery as specified in section Ind 4.23 (2).

(4) On any hand elevator operating outside of a building, except sidewalk elevators, the cover shall be solid and form a part of the car enclosure or cab.

(5) Where any entrance opening in an elevator hoistway is not equipped with a hoistway door, provided with a hoistway door interlock or electric contact, or where the entrance side of the car is not equipped with an approved car gate, the cover of the car shall be equipped with a hinged section facing each entrance, unless such entrance occurs only at the lowest landing. This hinged section shall be at least 12 inches wide, shall extend the full width of the entrance to within 5 inches of the landing sill, and shall be constructed so it will rise easily if it meets an obstruction as the car descends.

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*Reg Doc*  
*1957 eff*  
*1-1-58*

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.35 Freight elevator. Car entrances; new and existing installations.** There shall be not more than 2 entrances to any freight elevator car except when approved in writing by the industrial commission.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.36 Freight elevator. Car doors or gates.** (1) Every power elevator hereafter installed, where the contract speed is not in excess of 50 feet per minute, the secondary entrance shall be protected by an approved car door or gate, not less than 6 feet in height, completely filling the width of the opening and equipped with electric contact. Exception: This requirement shall not apply to an elevator having but one entrance at the lower landing and the secondary entrance at the upper limit of travel only, provided that the distance between the edge of the car and the hoistway enclosure on the side of the secondary entrance is not more than 1½ inches and there are no projections in the hoistway on the side of the secondary entrance.

(2) Every power elevator hereafter installed, where the contract speed is in excess of 50 feet per minute, shall have each car entrance protected by an approved car door or gate, not less than 6 feet in height, completely filling the width of opening and equipped with electric contact.

*Note:* See section Ind 4.001 Definition 9.

(3) On an existing power freight elevator having more than one entrance and having a difference in the landing floor levels at such entrances in excess of 30 inches, a car gate shall be installed on the secondary entrance. A car gate shall also be provided if the distance between the edge of the car and the hoistway enclosure on the side of the secondary entrance is more than 7 inches at any point, or the hoistway enclosure on that side shall be altered so that it will come within the specified limit.

(4) Every automatic push button controlled elevator shall be provided with car doors or gates at each entrance, so arranged that the elevator cannot be operated unless all car doors or gates are closed; when horizontally sliding gates are used, when closed, shall reject a ball 3 inches in diameter.

(5) Every existing constant pressure controlled elevator having a secondary entrance shall be provided with a secondary car door or gate, so arranged that the elevator cannot be operated unless the car door or gate is closed. See section Ind 4.36 (1) for Exception.

(6) Exception. The opening of the car door or gate electric contact shall not prevent the operation of the car when the car is being moved by a car leveling device.

(7) The functioning of a car door or gate electric contact on elevators hereafter installed to prevent the movement of the car, shall not be dependent solely on the action of a spring, or springs, nor solely upon gravity, nor shall it be dependent on the closing of an electric circuit.

(8) Every car gate shall run in guides, the legs shall extend to the floor, the gate shall be at least 6 feet high and, in the case of a vertically sliding gate, shall contain no openings greater than 3 inches measured in a horizontal direction and the bottom rail shall not be more than 1 inch off the floor when the gate is closed.

(9) Every manually operated vertically sliding car gate hereafter installed shall be counterbalanced from two sides.

(10) An electric contacted car gate shall be provided to protect each car entrance of every power elevator hereafter installed, operating in a hoistway outside of a building and which is enclosed only at the ground floor. (See section Ind 4.12 (4)).

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.37 Freight elevator hoistway landing doors or gates.** (1) All openings in the hoistway enclosure of every freight elevator shall be protected at landings in one of the following ways:

(a) For elevators installed prior to August 12, 1926, doors may be used only where previously installed and where the doors are equipped with self-acting locks which cannot be opened from the outside and that a regular operator is stationed on the car. (See section Ind 4.00 Definition (37) (1)).

(b) For elevators installed since August 12, 1926, all doors shall be equipped with either mechanical interlocks, electro-mechanical interlocks or electric contacts with approved door locks. (See section Ind 4.001 Definition (37) (1)).

(2) Doors shall be provided on all freight elevators hereafter installed where the contract speed exceeds 100 feet per minute and shall comply with section Ind 4.32 (2). See section Ind 4.001 Definition (37) and section Ind 4.71 (2) (b) 3.

(3) Where doors are provided on freight elevators hereafter installed where the contract speed does not exceed 100 feet per minute doors shall be equipped with electric contacts and approved locks or interlocks. (See section Ind 4.10)

(4) Hoistway landing doors hereafter installed shall be of sufficient strength to resist a lateral pressure of 250 pounds applied at the center.

(5) If electric contacts are provided on a hoistway door and are not part of an interlock system, the lock or latch and contact shall be so arranged as to insure the door being in a position to be locked or latched when or before the contact is closed.

(6) Every existing freight elevator shall be provided with an emergency key which cannot easily be duplicated, which will, irrespective of the position of the car, open the lowest terminal landing door from the landing side. This key shall open no other hoistway landing door. This emergency key shall be placed in a receptacle

having a transparent breakable cover, clearly marked, "Elevator Door Key for Fire Department and Emergency Use Only", and shall be located at the lowest landing of each elevator group. Emergency keys shall be especially designed to prevent easy duplication.

R (7) Where horizontally sliding doors are used a service key shall be provided to open the hoistway door from the landing side at the landing where the car is normally parked out of service, except for automatic operation elevators, and elevators equipped with interlocks released by car retiring cams. This key shall open this door only when the car is within the landing zone and shall open no other hoistway door, provided the pit depth does not exceed the requirement in section Ind 4.17.

Cham (8) Every freight elevator hereafter installed equipped with hoistway landing doors shall be provided with a hoistway access switch at the top terminal landing. The car travel shall be limited to the full door opening to permit access to the top of the car, and at the bottom terminal landing to permit access to the pit, where the door at this landing is the only means of access to the pit, the car travel shall be limited to the full door opening. These switches shall be located immediately adjacent to the hoistway doorways at these landings and shall not be installed at any other landing or in the car.

(a) *Design and use of switch.* The hoistway access switch shall be of the continuous-pressure, spring-return type, and shall be operated by a cylinder-type lock having not less than a five pin or five disk combination with the key removable only when the switch is in the "OFF" position. The lock shall not be operable by any key which will operate any other lock or device which is used for any other purpose in the building. The key shall be available to and used only by inspectors, maintenance men, and repairmen.

(b) *Operating requirements of switch.* The operation of the hoistway access switch at either terminal landing shall permit movement of the car with the hoistway door at this landing unlocked or open, and with the car door or gate open, subject to the following:

1. The operation of the access switch shall not render ineffective the hoistway-door interlock or electric contact at any other landing.  
2. The car can be operated at a speed not greater than 100 feet per minute.

3. For automatic and continuous-pressure operation elevators:

a. Normal operation shall first be made inoperative by means other than the access switch.

b. Power operation of the hoistway door and/or car door or gate is inoperative.

4. Automatic operation by a car-level device is inoperative.

5. The operating device on top of the car as of section Ind 4.70 (5) is inoperative.

(9) Vision panels shall be provided on all hoistway landing doors hereafter installed, except where car position indicators are installed at each floor, or where car and landing doors are power-operated. Where required or used, vision panels shall conform to the following requirements:

(a) The area of any single panel shall be not less than 25 square inches and the total area of one or more panels in any hoistway door shall be not more than 80 square inches.

(b) Each clear panel opening shall reject a ball 6 inches in diameter.

(c) Where mullions or division strips are used between panels, they shall be of fire-resistant material and of substantial construction.

(d) Panels shall be of clear wired glass.

(e) The center of a panel shall be not less than 54 inches nor more than 66 inches, above the elevator landing.

(f) The panel in swing type doors shall be located for convenient vision when opening the door from the car side.

(g) If used for power-operated hoistway doors, the wired glass panel shall be substantially flush with the surface of the landing side of the door.

(10) On every existing hand elevator traveling not more than 30 feet, or serving not more than 2 floors and basement, or three floors without basement where hoistway landing doors are used, the doors shall be equipped with self-locking devices designed to prevent opening the doors from the outside except by means of a key, which key shall be placed in the care of a responsible person, or so arranged that the doors can be opened only when the car is at, or within 3 inches of the floor level.

*Note:* Where possible, vertically rising gates should be installed in preference to doors.

(11) Where required and used, hoistway landing gates shall comply with the requirements as outlined in section Ind 4.37 Table 4.

(a) On freight elevators hereafter installed, hoistway landing gates shall not be used or installed where the contract speed exceeds 100 feet per minute. (See section Ind 4.10 (2) and Table 1 and Ind 4.37 (3)).

Table 4

Car Speed Ft. per Min.	Height of Gate		Operation of Gate	
	Hoistway		Hoistway	
	Existing	New**	Existing	New**
(1) Less than 50.....	3½ ft. or 5½ ft.	3½ ft. or 5½ ft.	Semi-automatic at each landing or semi-automatic at each intermediate landing and full automatic at terminal landings or balanced gate with electric* contact and lock.	Balanced gate with electric contact and lock
(2) 50 to 75.....	3½ ft. or 5½ ft.	5½ ft.	Same as above	Same as above
(3) Over 75.....	5½ ft.	5½ ft.	Semi-automatic at each landing or Balanced gate with electric contact and lock.*	Same as above

\* *Note:* Balanced gates with electric contacts are not permitted on elevators with mechanical brake. (See section Ind 4.60 (1) (e)).

\*\* *Note:* See section Ind 4.10.

(12) For elevators installed prior to August 12, 1926 balanced gates may be used only where previously installed and where gates are equipped with self-acting locks which cannot be opened from the outside and that a regular operator is stationed on the car. (See section Ind 4.001 Definition (37)).

(13) Hoistway landing gate contacts hereafter installed shall be designed so that they are positively opened by the locking bar or by a lever or other device attached to and operated by the gate.

(14) The functioning of a hoistway gate electric contact hereafter installed to prevent the movement of the car by the operating device shall not be dependent solely on the action of a spring or springs, nor solely upon gravity, nor shall it be dependent on the closing of an electric circuit.

(15) If electric contacts are provided on a hoistway gate and are not part of an interlock system, the lock or latch and contact shall be so arranged as to insure the gate being in a position to be locked or latched when or before the contact is closed.

(16) Hoistway landing gates on existing continuous pressure operation freight elevators shall be equipped with gate electric contacts and gate locks or interlocks.

(17) On existing installations, except in the case of continuous pressure operation elevators, gates over 8 feet wide may be full automatic, provided the car speed is not over 50 feet per minute and an operator is stationed on the car, or where means is provided for stopping the elevator without reaching over, through, or under the gates.

(18) Every full automatic gate shall be so arranged that it will be fully closed when the car has traveled a distance of not more than 8 feet from the landing.

(19) The bottom rail of each landing gate at an opening in an outside wall shall not be more than 1 inch above the sill. On new installations, the outside landing gate shall not be less than 5½ feet high.

(20) The bottom bar of each landing gate except at basement landings shall extend to within 12 inches of the sill when closed. On existing installations, when conditions require more space to secure sufficient headroom for safety, a clearance of not more than 20 inches between the lower bar of a closed gate and the floor will be permitted.

(21) A bar gate not less than 12 inches in total depth may be used on elevators hereafter installed at basement landings where conditions will not permit a standard gate, except that the distance from the floor to the bottom of such a bar gate when closed shall not be more than 30 inches, and the speed shall not exceed 50 feet per minute. Existing installations equipped with bar gates at the basement landings will be accepted if the gates are self-closing, or balanced gate with an electric contact and approved lock.

(22) No collapsible gate shall hereafter be installed at any hoistway landing.

(23) Hoistway landing gates for hand operated elevators shall be semi-automatic at each landing or semi-automatic at each intermediate landing and full automatic at terminal landings.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

locks are provided. Such chains shall extend at least 5 feet below the bottom of the platform, shall be spaced not more than 5 inches apart, and shall be made of not less than No. 10 U. S. Standard Gauge wire with long links.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.70 Control mechanism.** (1) There shall not be installed or used any control system which depends upon the completion or maintenance of an electric circuit for the interruption of the power and for the application of electro-mechanical brakes at the terminals, for the operation of car safety devices, or for the closing of a contactor by an emergency switch or stop button, except that the requirements in this paragraph do not apply to dynamic braking and speed control devices.

(2) The car switch or hand lever on every power elevator which requires such mechanism shall be so arranged that the movement of the switch handle or lever toward the opening (which operator usually faces) will cause the car to descend and the movement of the switch handle or lever away from the opening will cause the car to ascend. Except on hydraulic elevators and existing electric lever control elevators, the switch handle or lever shall return to the neutral position when released, and shall automatically latch in this neutral position.

(3) An externally operated circuit-breaker or disconnecting fused switch opening all lines shall be installed separately in the supply circuit. This switch shall be of the enclosed type and shall be a horse-power rated motor circuit switch, and shall not be made to close from any other part of the building, and shall be located to be visible from the elevator machine in the machine room at the lock-jamb side of the entrance door.

(4) On existing elevators, dumbwaiters and escalators where a proper type of disconnecting device has not been installed in the machine room or visible from the machine, and in the opinion of the industrial commission is not reasonably safe, the device shall be relocated or a new device of the proper type and design shall be installed, and shall be located in the machine room at the lock-jamb side of the entrance door.

(5) Inspection switches shall be provided on all new elevators hereafter installed to operate the elevator from on top of the car during adjustment, inspection, maintenance and repair, and shall conform with the following:

- (a) They shall be of the continuous-pressure type.
- (b) They shall operate the car at a speed not exceeding 100 feet per minute.
- (c) They shall operate the car only when the car door or gate is in the closed position and when all hoistway doors are in the closed position, and, when all hoistway doors are in the closed position, and, where required by this code, locked.
- (d) They shall be permanently mounted vertically on the car cross-head.
- (e) The operating switches shall be of the enclosed type, externally operable, and so arranged and connected that when operative, the movement of the car shall be solely under the control of this device, except as provided in section Ind 4.70 (5) (g), and any power-door

operating devices shall be inoperative. The means for accomplishing this function shall be located between the car crosshead and that side of the car which is nearest to the hoistway door used for access.

(f) They shall be used only for the purpose of adjustment, inspection, maintenance and repair of the elevator or hoistway equipment.

(g) Separate additional means, of the continuous-pressure type, may also be provided to make power-door operating devices and automatic car-leveling devices operative from the top of the car for testing purposes. Exception: Elevators that travel 14 feet or less.

(6) Every elevator equipped with hand cable control shall be provided with adjustable stop balls, to center the control mechanism and stop the car at each terminal landing.

(7) Every hand cable controlled elevator, except hydraulic elevators, shall be equipped with a properly adjusted centering rope so arranged that it can be easily and safely used at any point in the car travel.

(8) In every hand cable controlled elevator, the sheaves which lead the hand cable from the hoistway to the machine shall be guarded to prevent injury to an operator and so that the cable cannot run off. Every idler sheave under which is led an operating cable shall be provided with a guard that will keep the cable on the sheave.

(9) The handrope for operating of an elevator shall be accessible from the car at any point in the car travel.

(10) When necessary to renew a section of the hand cable, each splice shall be made with standard shackles.

(11) The overhead tension weight for the hand cable of any elevator equipped with lever control apparatus shall be secured by a chain attached to the weight and to a suitable anchorage.

(12) The car of every power freight elevator with hand cable control shall be equipped with a cable lock so designed, installed and maintained that the hand cable can be locked at any landing to prevent the operation of the car by persons on other floors. Exception:

(a) Sidewalk Elevators.

(b) Elevators equipped with safety switches or electric contacted gates, provided requirement of section Ind 4.70 (6) is complied with.

*Note:* See section Ind 4.72 (5).

(13) The car of every electrically driven elevator equipped with an electric brake shall be provided with an emergency stop switch which will cut off the source of power. This switch shall be adjacent to the operating device.

(a) Exception: This requirement need not apply to existing elevators controlled by hand cable, installed prior to August 12, 1926.

(14) If the stop button of an automatic operated elevator is marked "STOP" it may be used as the emergency stop switch and shall be suitably identified and of a distinctive color.

(15) Contacts of emergency stop switches or buttons shall be directly opened mechanically and shall not be solely dependent upon springs for opening the contacts. A self-restoring type of switch or



button may be used only on elevators having single-automatic operation and manually operated or self-closing hoistway doors. Exception: (a) This requirement need not apply to existing elevators controlled by hand cables.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.71 Automatic and continuous pressure operation elevators. New and existing installations. (1) EXISTING INSTALLATIONS.** Existing installations of automatic and continuous pressure operation elevators shall conform to the following requirements:

(a) The breaking of a circuit to stop an automatic or continuous pressure operated elevator at the terminal shall not depend on the operation of a spring or springs in tension nor upon the completion of an electric circuit.

(b) Where hoistway landing door locking system is renewed or replaced, the equipment used shall comply with the requirements of new elevator installations as outlined in sections Ind 4.32 and Ind 4.37.

**(2) NEW INSTALLATIONS.** (a) Neither the operation of a spring or springs in tension nor the completion of another electric circuit shall be depended upon to break the circuit to stop an automatic operation elevator at the terminals. If springs are used they shall be in compression. The interruption of the electric circuit shall prevent the movement of the car.

(b) Automatic operation elevators shall conform to the following requirements:

1. If the car has started for a given landing, no impulse can be given from any landing to send the car in the reverse direction until the car has reached the destination corresponding to the first impulse. It is permissible, however, to stop the car at any intermediate landing to take on or discharge passengers going in the original direction.

2. If the car has been stopped to take on or discharge passengers and is to continue in the direction determined by the first impulse, it is permissible to start the car by the closing of the car gate.

3. The car cannot be started under normal operation unless every hoistway door is closed and locked in the closed position (Hoistway Unit System). See section Ind 4.32 (2).

4. Exception to section Ind 4.71 (2) (b) 3. are outlined as follows:  
a. On landings where no landing operating device is provided, the interlocks on such landings may be of a type which can only be unlocked manually from the car side.

b. Freight elevators with a contract speed not to exceed 100 feet per minute. (See section Ind 4.37 (1) (3) and (10)).

**(3) ELECTRIC OIL-HYDRAULIC PASSENGER ELEVATORS.** In addition to hoistway landing door interlocks, a device shall be provided which shall compensate for the creeping of the car away from the landing by leakage in the valve or in the cylinder.

*Note:* Attention is called to the fact that devices employing locks and contacts of a type in which the interlocking contact is made when the door is closed and the locking of the door takes place subsequently, are not interlocks and are not permitted under this code where interlocks are required.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.72 Electrical protection.** (1) Every elevator driven by a polyphase alternating current motor shall be protected against damage due to phase reversal by either:

(a) Limit switches as specified in section Ind 4.63 arranged to cut all wires, or all except one, which shall be the ground conductor on grounded systems, and so connected that after the car overtravels it cannot be moved until the phase reversal is corrected, or

(b) A reverse phase relay, or other protective device, which will prevent starting the motor if the phase rotation is in the wrong direction. This requirement shall also apply to existing elevators installed since August 12, 1926.

*Note:* This does not apply to alternating current motors used in motor generator sets.

(2) The proper functioning of a reverse phase relay shall not be dependent upon the closure of an electric circuit to open the motor circuit in case of failure or reversal of phase.

(3) If an overload circuit breaker is used for a direct-current electric elevator, the wiring shall be arranged so that the circuit of the brake-magnet coil is opened at the same time that the line circuit is opened.

(4) Every electrically driven elevator except electro-hydraulic, hereafter installed shall be provided with an elevator potential switch which will cause and maintain interruption of power to the main circuit during excessive reduction or failure of supply voltage. This protection may be a part of the control equipment.

(5) Every electrically driven elevator with an emergency stop switch or electric contacted gates, which is controlled by a hand cable, lever or wheel, shall be equipped with a sequence device requiring the centering of the operating device after the power has been cut off the motor before the car can again be started. This may be accomplished by the addition of a relay interlocked with the control apparatus.

(6) Every elevator which is hereafter changed from hand cable control to car switch or automatic or continuous pressure operated shall comply with new installation requirements outlined as follows:

(a) Enclosed type circuit breaker or disconnect switch. See section Ind 4.70 (3).

(b) Electric brake. See section Ind 4.65 (1).

(c) Hoistway limit switches. See section Ind 4.63 (1) and (2).

(d) Electric contacted hoistway landing doors or gates. See section Ind 4.37.

(e) Electric contacted car door or gate. See section Ind. 4.36.

(f) Emergency switch on the car. See section Ind 4.70 (14).

(g) A cutout switch in connection with the car safety device. See section Ind 4.64 (7).

(h) All wiring to comply with section Ind 4.73.

(7) When any material change in electrical equipment is hereafter made on any power elevator or dumbwaiter, the wiring and equipment which is an integral part of that which is being replaced or renewed must comply with the requirements of new installations.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.73 Switches and wiring.** (1) In every elevator hereafter installed in garages, the hoistway limit switches and other spark-

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ELEVATOR CODE

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Ind 4.001 Definitions. (1) ANNUNCIATOR, ELEVATOR CAR. An electrical device in the car which indicates visually the landing at which an elevator landing signal registering device has been actuated.

(2) APPROVED. Means approved by the Industrial Commission.

(3) BASEMENT. A basement is a story, the floor line of which is below the grade at any entrance or exit, and the ceiling of which is not more than 5 feet above such grade at any exit or entrance. The number of stories of a building includes all stories except the basement.

(4) BUFFER. A buffer is a device designed to absorb the impact of the car or counterweight at the extreme lower limits of travel.

(5) CAPACITY. See Contract Load, or Rated Load.

(6) CAR, ELEVATOR. An elevator car is the load carrying unit including its platform, car frame, and enclosure.

(7) CAR DOOR OR GATE. A car door or gate is the door or gate in or on the elevator car ordinarily used for entrance and exit.

(8) CAR GATE, COLLAPSING. A collapsing gate is one that is distorted in opening and closing.

(9) CAR DOOR OR GATE ELECTRIC CONTACT. An electrical device, the function of which is to prevent operation of the driving machine by the normal operating device unless the car door or gate is in the closed position.

(10) CAR ENCLOSURE. The car enclosure or cab of an elevator is the enclosure consisting of walls and the top or cover built up on the platform.

(11) CAR FRAME (SLING). The supporting frame to which the car platform, upper and lower sets of guide shoes, car safety and the hoisting ropes or hoisting-rope sheaves, or the plunger of a direct plunger elevator are attached.

(a) *Car frame, overslung.* A car frame to which the hoisting-rope fastenings or hoisting-rope sheaves are attached to the crosshead or top member of the car frame.

(b) *Car frame, underslung.* A car frame to which the hoisting-rope fastenings or hoisting-rope sheaves are attached at or below the car frame.

(c) *Car frame, sub-post.* A car frame all of whose members are located below the car platform.

(12) **CAR PLATFORM.** The car platform is the structure, including the floor of the car, which directly supports the load.

(13) **CLEARANCE, BOTTOM CAR.** The clear vertical distance from the pit floor to the lowest structural or mechanical part, equipment or device installed beneath the car platform, except guide shoes or rollers, safety jaw assemblies and platform aprons or guards, when the car rests on its fully compressed buffers. (See *Overtravel, Bottom*)

(14) **CLEARANCE, TOP CAR.** The shortest vertical distance between the top of the car crosshead, or between the top of the car where no crosshead is provided, and the nearest part of the overhead structure or any other obstruction when the car floor is level with the top terminal landing. (See *Overtravel, Top*)

(a) *Clearance, top counterweight.* The shortest vertical distance between any part of the counterweight structure and the nearest part of the overhead structure or any other obstruction when the car floor is level with the bottom terminal landing.

(15) **COMPENSATING-ROPE SHEAVE SWITCH.** A device which automatically causes the electric power to be removed from the elevator driving-machine motor and brake when the compensating sheave approaches its upper or lower limit of travel.

(16) **CONTRACT LOAD, OR RATED LOAD, (CAPACITY).** Contract load, or rated load, is the approved safe live load specified in application and plans submitted for permit.

(17) **RATED SPEED.** The speed at which the elevator, dumbwaiter, escalator is designed to operate under the following conditions:

(a) *Elevator or dumbwaiter.* The speed in the up direction with rated load in the car.

(b) *Escalators.* The rate of travel of the steps or carriage, measured along the angle of inclination, with rated load on the steps or carriage. In case of a reversible escalator the rated speed shall be the rate of travel of the steps in the up direction, measured along the angle of inclination, with rated load on the steps.

(18) **CONTROL.** The system governing the starting, stopping, direction of motion, acceleration, speed, and retardation of the moving member.

(a) *Generator-field control.* A system of control which is accomplished by the use of an individual generator for each elevator or dumbwaiter wherein the voltage applied to the driving-machine motor is adjusted by varying the strength and direction of the generator field.

(b) *Multi-voltage control.* A system of control which is accomplished by impressing successively on the armature of the driving-machine motor a number of substantially fixed voltages such as may be obtained from multi-commutator generators common to a group of elevators.

(c) *Rheostatic control.* A system of control which is accomplished by varying resistance and/or reactance in the armature and/or field circuit of the driving-machine motor.

(d) *Two-speed alternating current control.* A control for a 2-speed driving-machine induction motor which is arranged to run at 2 different synchronous speeds by connecting the motor windings so as to obtain a different number of poles.

(19) **CABLE LOCK.** A cable lock is a device installed and maintained so that the operating cable can be locked at any landing.

(20) **CENTERING ROPE.** A centering rope is used in connection with hand cable control which, when pulled, will throw the operating device to the stop position.

(21) **DOOR OR GATE DEVICE, POWER OPERATED.** A power operated door or gate device is a device or assemblage of devices, the purpose of which is to open and/or close the hoistway door and/or car door or gate by power other than by hand, gravity, springs, or the movement of the car.

**Doors:** See Hoistway Door or Gate, Section Ind 4.001 (Definition 36).

(22) **DUMBWAITER.** A dumbwaiter is a hoisting and lowering mechanism equipped with a car, which moves in guides in a substantially vertical direction, the floor area of which does not exceed 9 square feet, whose internal compartment height does not exceed 4 feet, the capacity of which does not exceed 500 pounds, and which is used exclusively for carrying freight.

(23) **DUMBWAITER, ELECTRIC.** An electric dumbwaiter is one in which the motion of the car is obtained through an electric motor directly applied to the dumbwaiter machinery.

(24) **ELEVATOR.** A hoisting and lowering mechanism equipped with a car or platform which moves in guides in a substantially vertical direction, and the travel exceeds 56 inches.

(a) *Passenger elevator.* An elevator used primarily to carry persons other than the operator and persons necessary for loading and unloading.

(b) *Freight elevator.* An elevator primarily used for carrying freight and on which only the operator and the persons necessary for unloading and loading the freight are permitted to ride.

(c) *Hand elevator.* An elevator utilizing manual energy to move the car.

(d) *Power elevator.* An elevator utilizing energy other than gravitational or manual to move the car.

(e) *Electric elevator.* A power elevator where the energy is applied by means of an electric motor.

(f) *Electro-hydraulic elevator.* A direct-plunger elevator where liquid is pumped under pressure directly into the cylinder by a pump driven by an electric motor.

(g) *Carriage elevator.* An elevator which is supported by cables attached to the platform at four or more points in such a manner that the supporting cables are relied upon to maintain the platform substantially level.

(h) *Sidewalk elevator.* A freight elevator which operates between a sidewalk or other area exterior to the building and floor levels inside

the building below such area, which has no landing opening into the building at its upper limit of travel and which is not used to carry automobiles.

(i) *Hydraulic elevator*. A power elevator where the energy is applied, by means of a liquid under pressure, in a cylinder equipped with a plunger or piston.

(j) *Direct-plunger elevator*. A hydraulic elevator having a plunger or piston directly attached to the car frame or platform.

(25) **ELEVATOR, EXISTING INSTALLATIONS**. Existing installations include all those elevators or parts of elevators installed before the effective date of this code.

(26) **ELEVATOR, DUMBWAITER, NEW INSTALLATIONS**. By new installations or elevator or dumbwaiter hereafter installed, is meant:

(a) Every elevator or dumbwaiter for which the contract was let after the effective date of this code.

(b) Every elevator or dumbwaiter which, after the effective date of this code, is moved to a new location.

(c) Any complete part of an existing installation which is materially altered or replaced with new after the effective date of this code.

(d) Every elevator that is changed from freight to passenger service, or from passenger to freight service, or from hand to power and every hand dumbwaiter changed to power, after the effective date of this code.

(e) Every elevator hoistway which is enlarged or the travel extended.

*Note*: Ordinary repairs necessary to maintain elevators in safe condition are not considered material alterations.

(27) **ESCALATOR**. A power-driven, inclined, continuous stairway used for raising and lowering passengers.

(28) **EMERGENCY DOOR RELEASE**. An emergency release is a device, the purpose of which is to make inoperative door or gate electric contacts or door interlocks in case of emergency.

(29) **EMERGENCY STOP SWITCH**. An emergency stop switch (safety switch) is a device in the car used to cut off the power from the elevator machine independently of the operating devices.

(30) **FIRE-RESISTIVE WALL CONSTRUCTION**. (a) Refer to Wisconsin Building Code, section Ind 51.05.

(b) Other materials, assemblies and thicknesses of necessary strength and durability for the use intended, and which have successfully performed under tests made by a recognized laboratory in accordance with the requirements of the "Standard Specifications for Fire Tests of Building Construction and Materials" (C19-33) of the American Society for Testing Materials, shall be accepted for specific ratings in addition to those prescribed in section Ind 51.05 of the Wisconsin Building Code.

(c) The wired glass in any hoistway enclosure shall have no pane less than  $\frac{1}{4}$  inch thick nor greater than 720 square inches and not more than 54 inches vertical and 48 inches horizontal dimension.

(31) **FIRE DOORS** See Hoistway doors: See Wisconsin Building Code, section Ind 51.09 for class B and C type doors.

*Note:* The Underwriters' Laboratories' List of Inspected Materials is obtainable from the Fire Insurance Rating Bureau and Fire Insurance Companies.

(32) **FULL-AUTOMATIC DOOR OR GATE.** A full-automatic door or gate is a vertically-moving door or gate which is opened directly by the motion of the elevator car approaching any landing and closed by gravity as the car leaves any landing.

(33) **HOISTWAY, ELEVATOR OR DUMBWAITER.** A shaftway for the travel of one or more elevators or dumbwaiters. It includes the pit and terminates at the underside of the overhead machinery space floor or grating, or at the underside of the roof where the hoistway does not penetrate the roof.

(34) **HOISTWAY ENCLOSURE.** The fixed structure, consisting of vertical walls or partitions, which isolates the hoistway from all other parts of the building or from an adjacent hoistway and in which the hoistway doors and door assemblies are installed.

(35) **HOISTWAY ACCESS SWITCH.** A switch, located at a landing, the function of which is to permit operation of the car with the hoistway door at this landing and the car door or gate open, in order to permit access to the top of the car or to the pit.

(36) **HOISTWAY DOOR OR GATE.**

(a) *Door.* A hoistway landing door is one which completely fills the door opening giving access to the elevator car at any landing and is of solid construction, with or without vision panels, regardless of design or method of operation.

(b) *Gate.* A hoistway landing gate is one which gives access to the elevator car at any landing and consists of slats, bars, spindles, wire screen or expanded metal regardless of the method of operation. See section Ind 4.37 and 4.38.

(c) *Hoistway door or gate electric contact.* A hoistway door or gate electric contact is a device, the purpose of which is to open the control circuit or an auxiliary circuit, unless the hoistway door or gate at which the car is standing is in the closed position, and thus prevent operation of the elevator in a direction to move the car away from the landing.

1. Door Unit System is a contact system which meets the requirements of the contact definition above, but does not require all the hoistway doors to be closed.

2. Hoistway Unit System is a contact system which meets the requirements of the contact definition above, and also requires that all hoistway doors are closed.

(d) *Hoistway bi-parting door or gate.* A bi-parting door or gate is a vertical slide, horizontal slide, or swing door or gate consisting of 2 or more sections so arranged that the sections, or pairs of sections, open away from each other, and so interconnected that both sections operate simultaneously.

(e) *Hoistway full automatic door or gate.* A full automatic door or gate is a vertically moving door or gate which is opened directly



by the motion of the elevator car approaching any landing and closed by gravity as the car leaves any landing.

(f) *Hoistway semi-automatic door or gate.* A semi-automatic door or gate is a door or gate which is opened manually, and which closes automatically as the car leaves the landing.

(g) *Hoistway manually operated door or gate.* A manually operated door or gate is a door or gate which is opened and closed by hand.

(h) *Hoistway power operated door or gate.* A power operated door or gate is one which is opened and closed by power other than by hand, gravity, springs, or the movement of the car.

(i) *Hoistway power-operated self-closing door or gate.* A power-operated, self-closing door or gate is a door or gate which is opened by power other than by hand, gravity, springs, or the movement of the car, and when released by the operator is closed by energy stored during the opening operation.

(j) *Hoistway power operated door or gate, automatically opened.* A power operated door or gate, automatically opened, is a door or gate which is opened by power other than by hand, gravity, springs, or the movement of the car, the opening of the door being initiated by the arrival of the car at or near the landing. The closing of such door or gate may be under the control of the elevator operator or may be automatic.

(k) *Hoistway power operated door or gate, manually controlled.* A power operated door or gate, manually controlled, is a door or gate which is opened and closed by power other than by hand, gravity, springs, or the movement of the car, the door movement in each direction being controlled by the elevator operator.

(l) *Hoistway, telescoping gate.* A telescoping door or gate is a door or gate in which the sections slip together without distortion of the section.

(m) *Hoistway door, fire-resistive.* See Wisconsin Building Code, section Ind 51.09.

(37) HOISTWAY DOOR OR GATE INTERLOCK, PASSENGER AND FREIGHT ELEVATORS. (a), *Existing Installations.*

1. Mechanical interlock. A mechanical interlock for a hoistway landing door or gate is a device, the purposes of which are:

a. To prevent the normal operation of the elevator machine unless the hoistway landing door or gate opposite which the car is standing is latched within 4 inches of the fully closed position, and

b. To prevent the opening of a hoistway landing door or gate from the landing side, except by special apparatus unless the car is at the landing.

2. Electro-mechanical interlock. An electro-mechanical interlock for a hoistway landing door or gate is a combination of electrical and mechanical devices, the purposes of which are:

a. To prevent the operation of the elevator machine by the operating device in a direction to move the car away from the landing unless all hoistway landing doors or gates are latched within 4 inches of the fully closed position; and

b. To prevent the opening of a hoistway landing door or gate from the landing side except by means of a key or other special apparatus.

(b) *New Installations.*

1. Hoistway door interlock. A hoistway door interlock is a device, the purposes of which are:

a. To prevent the operation of the elevator machine by the operating device in a direction to move the car away from the landing unless the hoistway door at that landing at which the car is stopping or is at rest is locked in the closed position.

b. To prevent the opening of the hoistway door from the landing side except by special key, unless the car is at rest within the landing zone, or is coasting through the landing zone, with its operating device in the stop position.

2. Door unit system. A door unit system is an interlock system which meets the requirements of the interlock definition above, but does not require all the hoistway doors to be locked in the closed position.

3. Hoistway unit system. A hoistway unit system is an interlock system which, in addition to fulfilling the requirements given under the definition of interlock, will also prevent the operation of the car by the operating device unless all hoistway doors are locked in the closed position.

*Note:* The "closed position" for hoistway landing doors or gates for various types of elevators is specified in section Ind 4.32 and 4.37.

(38) LANDING ZONE. The car is considered within the meaning of this code, as being within the landing zone when the car floor is not more than 18 inches above or below the landing.

(39) LEVELING DEVICE, CAR. A car leveling device is any mechanism or control which will move the car within a limited zone toward, and stop the car at, the landing.

(40) OPERATING DEVICE. The operating device is the car switch, push button, rope, wheel, lever, treadles, etc., employed to enable the operator to actuate the controller.

(41) OVERTRAVEL, BOTTOM.

(a) Bottom overtravel of the elevator car is the distance the car floor can travel below the level of the lower terminal landing until the weight of the fully loaded car rests on the buffers, and includes the resulting buffer compression.

(b) Bottom overtravel of the counterweight is the distance the counterweight can travel below its position when the car platform is level with the upper terminal landing until the full weight of the counterweight rests on the buffers, and includes the resulting buffer compression.

(42) OVERTRAVEL, TOP. Top overtravel of the elevator car is the distance provided for the car floor to travel above the level of the upper terminal landing until the car is stopped by the normal terminal stopping device.

(43) AUTOMATIC OPERATION. Automatic operation is operation by means of buttons or switches at the landings, with or without buttons or switches in the car, the momentary pressing of which will cause the car to start and automatically stop at the landing corresponding to the button pressed.

(44) **NON-SELECTIVE COLLECTIVE AUTOMATIC OPERATION.** Non-selective collective automatic operation is automatic operation by means of one button in the car for each landing level served and one button at each landing, wherein all stops registered by the momentary pressure of landing or car buttons are made irrespective of the number of buttons pressed or of the sequence in which the buttons are pressed. With this type of operation the car stops at all landings for which buttons have been pressed, making the stops in the order in which the landings are reached after the buttons have been pressed but irrespective of its direction of travel.

(45) **SELECTIVE COLLECTIVE AUTOMATIC OPERATION.** Selective collective automatic operation is automatic operation by means of one button in the car for each landing level served and by "Up" and "Down" buttons at the landings, wherein all stops registered by the momentary pressure of the car buttons are made as defined under non-selective collective automatic operation, but wherein the stops registered by the momentary pressure of the landing buttons are made in the order in which the landings are reached in each direction of travel after the buttons have been pressed. With this type of operation, all "Up" landing calls are answered when the car is traveling in the "Up" direction and all "Down" landing calls are answered when the car is traveling in the "Down" direction, except in the case of the uppermost or lowermost calls, which are answered as soon as they are reached, irrespective of the direction of travel of the car.

(46) **SINGLE AUTOMATIC OPERATION.** Single automatic operation is automatic operation by means of one button in the car for each landing level served and one button at each landing, so arranged that if any car or landing button has been pressed the pressure of any other car or landing operating button will have no effect on the operation of the car until the response to the first button has been completed.

(47) **CAR-SWITCH OPERATION.** Car-switch operation is operation wherein the movement of the car is directly and solely under the control of the operator by means of a switch in the car.

(48) **CAR-SWITCH AUTOMATIC FLOOR-STOP OPERATION.** Car-switch automatic floor-stop operation is operation in which the stop is initiated by the operator from within the car with a definite reference to the landing at which it is desired to stop, after which the slowing down and stopping of the elevator is automatically effected.

(49) **CONTINUOUS-PRESSURE OPERATION.** Continuous-pressure operation is operation by means of push buttons or switches in the car and at landings, any one of which may be used to control the movement of the car so long as the button or switch is manually held in the operating position.

(50) **DUAL OPERATION.** Dual operation is a system of operation whereby the elevator controller is arranged for either automatic operation by means of landing and car buttons or switches, or for manual operation by an operator in the car, who may either use a car switch or the buttons provided in the car. When operated by an operator, upon the throwing of a suitable switch or switches, the car

can no longer be started by the landing buttons, which buttons may, however, be used to signal the operator that the car is desired at certain landings.

(51) **PRE-REGISTER OPERATION.** Pre-register operation is operation in which signals to stop are registered in advance by buttons in the car and at the landings. At the proper point in the car travel the operator in the car is notified by a signal, visual, audible, or otherwise, to initiate the stop, after which the landing stop is automatic.

(52) **SIGNAL OPERATION.** Signal operation is operation by means of single buttons or switches (or both) in the car, and up or down direction buttons (or both) at the landings, by which predetermined landing stops may be set up or registered for an elevator or for a group of elevators. The stops set up by the momentary pressure of the car buttons are made automatically in succession as the car reaches those landings, irrespective of its direction of travel or the sequence in which the buttons are pressed. The stops set up by the momentary pressure of the up and down buttons at the landing are made automatically by the first available car in the group approaching the landing in the corresponding direction, irrespective of the sequence in which the buttons are pressed. With this type of operation the car can be started only by means of a starting switch or button in the car.

(53) **POTENTIAL SWITCH, ELEVATOR.** An elevator potential switch is a switch which disconnects the power from the elevator apparatus when the supply voltage fails or decreases below a definite value and which is usually opened by various electrical safety devices. These switches are of the magnetic type.

(54) **SAFETY, CAR OR COUNTERWEIGHT.** A car or counterweight safety is a mechanical device attached to the car or counterweight frame to stop and hold the car or counterweight in case of predetermined overspeed, free fall, or slackening of the cables.

(55) **SLACK-CABLE SWITCH, ELEVATOR.** An elevator slack-cable switch is a device for automatically cutting off the power in case the hoisting cables become slack.

(56) **FACIA PLATE.** A metal plate not less than 1/16" in thickness, securely fastened, and extending flush from the top of the hoistway landing door frame to the landing sill above and run the full width of the door opening.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57; am. (5), (16) and cr. (56), Register, December, 1957, No. 24, eff. 1-1-58.

### Scope of the Elevator Code

**Ind 4.01 General scope.** The requirements of this code shall apply to all elevator, dumbwaiter and escalator installations in public buildings and places of employment as defined by the statutes. The requirements apply to both existing installations and those hereafter installed unless otherwise specified.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.02 Renewing of elevators, dumbwaiters and escalators.** Where the part or parts of equipment of an elevator, dumbwaiter or escalator are impaired through ordinary wear, damage or deterioration

by fire or other causes, to less than 50 per cent of the original condition, the equipment shall be repaired or rebuilt in conformance with the requirements for new installations.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.03 Exemptions.** This code does not apply to belt, bucket, scoop, roller, or similar inclined or vertical freight conveyors, portable tiering or piling machines when not passing through a floor unless serving more than the floor on which the portable tiering or piling machine is located, skip hoists, man hoists, mine hoists, lumber lifts, wharf ramps or apparatus in kindred classes, amusement devices, stage curtain hoists or lift bridges, nor to elevators used only for handling building material during the period of building construction and elevators with a travel less than 56 inches.

(1) For regulations relative to the use of elevators, hoists, derricks and similar equipment during the period of construction of a building or any other structure, see section Ind 35.28<sup>1</sup> to 35.31 inclusive of the general orders on Safety in Construction issued by the industrial commission.

(2) For man lift requirements, see general orders on Safety.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

### Plans

**Ind 4.04 Plans; new installations.** (1) Before starting work on any new installation of an elevator, power dumbwaiter or escalator, 3 copies of the plans shall be submitted to the industrial commission for approval, with 2 copies of application for each unit, properly filled out, on blank forms furnished by the commission.

(a) The form referred to under 4.04 (1) is SB-22 "Application For Construction, Erection And Remodeling Elevators" and may be obtained from the Industrial Commission, 1 West Wilson Street, Madison.

(2) A plan examination fee in the amount established under section 101.10 (13) (g), Wis. Stats., shall be paid for each installation requiring approval.

(3) Section Ind 4.04 (1) shall not apply in cities where elevator permits are issued by the city in a manner approved by the industrial commission. Every elevator manufacturer who furnishes an elevator, power dumbwaiter, or escalator to be installed by the owner, or an agent of the owner, shall submit plans and file an application in compliance with this order.

(4) Plans shall include: (a) Sectional plan of car and hoistway; (b) Sectional elevation of hoistway, machine room (showing machinery) and pit; (c) Plan of machine and supports showing details of materials, size of beams. If the hoistway has more than one entrance on any floor, all entrances shall be clearly shown.

(5) The elevator manufacturer and the architect shall cooperate in preparing plans to avoid discrepancy in design.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57; cr. (1) (a), Register, October, 1957, No. 22, eff. 11-1-57.

**Ind 4.05 Inspections.** (1) INTERVAL. All elevators, power dumbwaiters, or escalators operated in the state of Wisconsin shall be subjected to a regular inspection at least once every 12 months.

(2) **INSPECTION BY INSURANCE COMPANIES.** The industrial commission may accept inspections of elevators, power dumbwaiters, and escalators reported by certified inspectors, subject to the following conditions:

(a) Each installation shall be inspected once every 12 months.

(b) A detailed report of each unit inspected shall be filed with the commission within 14 days after inspection on a printed form approved by the commission. Such report shall show all respects in which the installation fails to comply with the code requirements. If there are any special conditions which, in the inspector's opinion, would require modification of any general order, the facts shall be fully stated in the report, with the inspector's recommendation.

1. Where an insurance company inspects an elevator, power dumbwaiter or escalator within the city limits of Milwaukee, a detailed report of each unit inspected shall be filed with the Inspector of Buildings, City Hall, Milwaukee, within 14 days after inspection on a printed form approved by the commission. Such report shall show all respects in which the installation fails to comply with the code requirements. If there are any special conditions which, in the inspector's opinion, would require modification of any general order, the facts shall be fully stated in the report with the inspector's recommendation.

*Note:* Reports required to be submitted to the Inspector of Buildings, Milwaukee, need not be filed with the commission.

(c) A certificate of inspection on a form approved by the commission shall be posted by the insurance company in a conspicuous place in the elevator car, dumbwaiter cage, or escalator, as the case may be, and shall show the date of inspection, name of insurance company, name of inspector, safe carrying capacity. (See section Ind 4.52)

1. The form referred to under 4.05 (2) (c) is SB-15A "Certificate Of Inspection" and is furnished to insurance companies by the Industrial Commission, 1 West Wilson Street, Madison.

(d) The insurance company shall use all reasonable diligence to secure compliance with the commission's orders. If unsuccessful, it shall so report to the commission. If it then becomes necessary for the commission to make an inspection, the statutory fee for each unit inspected will be charged. (See section Ind 4.07)

(e) The competency of each elevator inspector shall be certified by each insurance company to the commission in writing prior to making inspections. Insurance company inspectors will be approved by the commission only after the receipt of acceptable evidence of competency and a satisfactory examination has been passed consisting of oral and written tests.

1. The form referred to under 4.05 (2) (e) is SB-12 "Insurance Company Elevator Inspector" and is furnished by the Industrial Commission to insurance company inspectors after their competency has been examined and approved.

(f) Insurance companies that cover elevators, escalators, or power dumbwaiters which come within the scope of liabilities of workmen's compensation, public liability, or comprehensive coverage in any manner or degree shall report to the industrial commission on January 1 each year the identity, location, and ownership of each such risk.

1. Insurance companies employing inspectors holding valid certificates of competency, inspect all risks annually, and regularly file proper inspection reports shall not be required to file a list of such risks on January 1 of each year.

2. Insurance companies insuring risks in cities of the first class shall not be required to make the above report provided the risks are located within the corporate limits of such cities and provided that such cities have equivalent reporting requirements.

3. Elevators, escalators, or power dumbwaiters covered by insurance companies as in section Ind 4.05<sup>(f)</sup> not employing inspectors holding valid certificates of competency shall be subject to inspection by the industrial commission. Fees for performing such inspection services shall be paid in accordance with the provisions of the applicable fee schedule.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57; cr. (2) (c) (1) and (2) (e) (1), Register, October, 1957, No. 22, eff. 11-1-57; am. (2) (e), Register, December, 1957, No. 24, eff. 1-1-58.





**Ind 4.60 Prohibited installations.** (1) **NEW AND EXISTING INSTALLATION.** (a) No belt or chain driven machine shall be used in any passenger elevator installation.

(b) No friction gearing or clutch mechanism shall be used for connecting the drums or sheaves to the main driving gear of any elevator.

(c) No passenger car shall have more than 2 entrances except in existing installations when approved in writing by the industrial commission.

(d) No passenger elevator shall be installed having continuous pressure button operation.

(e) A drum type freight elevator installation equipped with a mechanical brake shall not have hoistway limit switches, car door or gate electric contacts, hoistway landing door or gate electric contacts, or any combination thereof, except when approved in writing by the industrial commission. See section Ind 4.63 (6).

(f) No emergency release shall be installed on an elevator car which can be started from a landing.

(2) **NEW INSTALLATIONS.** (a) Chains shall not be used for hoisting in connection with a power elevator. Exception: See section Ind 4.82, special requirements.

(b) Sidewalk elevators and sidewalk type elevator installations are prohibited, from the effective date of this code.

(c) Winding drum machines are prohibited except as indicated in section Ind 4.81.

(d) Belt driven freight elevators shall be limited to a travel of not more than 50 feet in any case and to a speed of not more than 50 feet per minute.

(e) No power elevator which consists of the platform or carriage type of car supported by cables attached at 4 or more points shall hereafter be installed.

(f) Cast iron worm gears shall not be used in the hoisting mechanism of any elevator hereafter installed.

(g) No power elevator hereafter installed shall be controlled or operated by a hand cable.

(h) No elevator of any type shall have more than one compartment, nor shall elevator cars counterbalance each other.

(i) No power freight elevator shall have a contract speed in excess of 100 feet per minute except automatic operation and elevators controlled by regular operators. Exception: When controlled by a 2 speed motor, and all requirements complied with, outlined as follows:

1. Speed not to exceed 150 feet per minute.
2. Equipped with automatic floor leveling.
3. Each car entrance to be equipped with an approved car gate and electric contact.

(j) Sheaves or idlers shall not be suspended in cast iron stirrups from the under side of the supporting beam.

(k) Cast iron guide rails shall not be used.

(l) No hand elevator hereafter installed shall exceed 1,500 pounds capacity.

(m) The travel of any hand elevator hereafter installed shall not exceed 30 feet.

**History:** Cp. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.61 Power attachments to hand elevators.** New and existing installations. No power attachment, such as worm reduction units, rope clutch or rope grip devices, belts to improvised rope wheels, or any similar device, shall be installed on any hand elevator unless all requirements for power elevators are complied with. Exception: See section Ind 4.82, special requirements.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.62 Slack cable devices.** (1) A slack cable device which will automatically shut off the power and stop the machine if the cables loosen or break shall be provided on every drum type power elevator, except on existing belt driven freight elevators where the machines are in good condition and such devices cannot be provided without rebuilding the machines.

(2) Every slack cable switch on elevators shall be so constructed, installed and maintained that it will not automatically reset when the slack in the cable is removed.

(3) Every ceiling drum type elevator machine shall be so located with respect to height that the slack cable device will operate with not more than 6 feet of slack cable. Recommendation: A ceiling type machine should be located not higher than the first story ceiling as this will permit proper lead to the cable and will result in longer service of each cable.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.63 Limit stops.** New and existing installations. (1) Every elevator which is provided with an electric brake shall be equipped with final terminal stopping devices that will automatically interrupt the power circuit and stop the car in case of over-travel at each terminal of travel, except on electric oil hydraulic elevators.

(2) If multi-phase alternating current is used to operate the motor of any elevator hereafter installed, the terminal stopping devices shall be so arranged and connected that if phase reversal occurs and the car over-travels at either terminal the motor cannot be again started until the phase reversal is corrected, except where the requirements of section Ind 4.72 (1) are met.

(3) Final terminal stopping device for elevators hereafter installed shall consist of limit switches mounted in the hoistway and directly operated by a cam attached to the car.

(4) Every electric elevator hereafter installed shall be equipped with normal stopping device at each terminal of travel. Such device shall consist of stopping switches mounted on the car or in the hoistway and directly operated by the movement of the car.

(5) Every drum type elevator machine shall be equipped with an approved machine automatic terminal stopping device which will automatically stop the machine if the car over-travels either of the terminal landings.

(a) On alternating current drum type elevator machines hereafter installed, the terminal stopping device as outlined in section Ind 4.63 (5) shall also directly open the electric circuit to the motor and brake. This device shall be in addition to the device required by section Ind 4.63 (1).

(6) Every traction type elevator machine with a mechanical brake shall be equipped with an electric brake and limit switches.

case exceed 5 feet at right angles to the curb and 7 feet parallel to the curb. The surface of the covers shall be rough and no part of them shall project above the sidewalk when closed.

(b) Hinged hatch covers may be used on sidewalk elevators hereafter installed only if the elevator car has a clear platform area of not more than 35 square feet. Hinges of hatch covers shall be of sufficient strength and be securely fastened to withstand the service of normal operation.

(c) Every power sidewalk elevator shall be provided with one of the following requirements:

1. A device to prevent its operation until the hatch covers over the top of the hoistway are open, or

2. Flat metal tops or arched bows of sufficient strength to open the hatch covers.

(d) When hatch covers are left open, a full guard not less than 30 inches in height shall be provided in each side of the sidewalk opening not fully protected by the hatch covers. This guard shall be so fastened that it cannot be pushed into the sidewalk opening.

(e) Beveled toe-guards shall be provided under the edges of the sidewalk and under other projections, if any, as required by section Ind 4.15.

1. If the platform of an existing sidewalk elevator rises above the sidewalk, similar toe-guards shall be provided under the platform on all exposed sides.

2. If the platform of a sidewalk elevator rises above the sidewalk, aprons shall be attached to the under side of the platform fully protecting all exposed sides (see section Ind 4.87 (7)).

(f) Every existing power sidewalk elevator traveling not more than 15 feet, or more than one story, shall comply with sections Ind 4.02, 4.05, 4.06, 4.07, 4.12 (1), 4.15, 4.18 (1), 4.36 (3), and sections Ind 4.37 and 4.38 (as applied to the lower landing), 4.73 (5), (6) (b), (7), (8), (11), (12), (13), 4.74, 4.76 (2), 4.78 (1).

(g) Every existing power sidewalk elevator traveling more than 15 feet shall, in addition to section Ind 4.80 (f) comply with section Ind 4.65 (1).

(h) Hydraulic sidewalk elevators shall be subject to sections Ind 4.85, 4.86, 4.87, and 4.88 as may reasonably be applicable to sidewalk elevators.

(i) Every hand chain hoist elevator shall comply with sections Ind 4.12 (1), 4.37 and 4.38 (as applied to lower landing) 4.78 (1) 4.80 (1) and 4.80 (5).

(j) Every hand or existing power sidewalk elevator car platform shall be enclosed to a height of one foot on the sides not used for entrance.

(2) SIDEWALK ELEVATORS INSTALLED BETWEEN SEPTEMBER 7, 1944 and JANUARY 1, 1957. (a) The contract speed of every power sidewalk elevator shall not exceed 20 feet per minute.

(b) Electric sidewalk elevators having a winding-drum machine shall have normal terminal stopping devices on the machine.

(c) The car enclosure on every power sidewalk elevator installed after 1944 shall comply with section Ind 4.34 (1).

(d) A sidewalk elevator having a travel of 30 feet or more shall comply with the requirements of power freight elevators.

(e) A hatch cover of the hinged type may be arranged to open against the building or may be used as a thoroughfare only when there is a space of at least 18 inches between the fully opened covers and any obstruction in the direction of opening.

(f) Guide shoes for sidewalk elevators (except plunger elevators) shall be at least 24 inches long unless 2 sets of shoes are used, spaced 18 inches between center.

1. If vertical lift covers are used (except plunger elevators), the spacing of guide shoes or the length of a single guide shoe remaining on the guide rail when the car platform is level with the sidewalk, shall be at least  $\frac{1}{2}$  of the height of the hatch cover stanchions.

2. If single guide shoes not less than 24 inches long are used, 6 inches of the shoe may be off the rail when the platform is level with the top landing.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

**Ind 4.81 Special type freight elevators. WINDING DRUM MACHINES.** Winding drum machines may be used for freight elevators only; shall not have counterweights, and shall be limited to a capacity not to exceed 2500 pounds. The speed shall not exceed 50 feet per minute and the travel not to exceed 35 feet.

**History:** Cr. Register, April, 1957, No. 16, eff. 5-1-57.

#### Power Chain or Cable Hoist

**Ind 4.82 Special requirements.** (1) Every power chain or cable hoist used in connection with an elevator shall comply with the following:

(a) Capacity shall not exceed 800 pounds.

(b) Speed shall not exceed 25 feet per minute.

(c) Travel shall not exceed 15 feet or more than one story, and a broken rope safety shall be provided when the travel exceeds 10 feet.

(d) The elevator shall be operated from the landings only and shall be constant pressure push button operation.

(2) In addition, the following sections or parts of sections with changes as noted shall also apply:

(a) Section Ind 4.10 (1) Hoistway enclosure.

(b) Section Ind 4.16 (1) (b) and (d).

(c) Section Ind 4.17 Pit depth shall be not less than 12 inches.

(d) Section Ind 4.23 The overhead supports shall be designed and constructed to carry the total load plus twice the load for impact.

(e) Section Ind 4.34 (1) and (2) Car enclosure.

(f) Section Ind 4.37 (11) Operation and height of gate.

(g) Section Ind 4.38 Gate construction.

(h) Section Ind 4.41 Safety factor.

(i) Section Ind 4.53 (2) Capacity plate.

(j) Section Ind 4.62 (2) (a) Slack cable.

(k) Section Ind 4.63 (4) Limit stops.

(l) Section Ind 4.65 (1) Brake.

(m) Section Ind 4.70 (3) Service switch.

(n) Section Ind 4.73 Wiring.

(o) Section Ind 4.74 Grounding.

(p) Section Ind 4.76 (1) Car light.