

## ARTICLE 14. ELEVATORS

### Sub-Article 1. Definitions of Terms in This Article

**(13.1.1). §C26-771.0 General.**-For the purposes of this article, the words and terms listed in section C26-772.0 through C26-843.0 shall have the meanings therein given.

**(13.1.1.1). §C26-772.0 Alteration.**-The term “alteration” of an elevator, dumbwaiter or escalator, shall mean a change in the use, classification, operation, control, motor, brake, character of power supply, capacity, dead weight of car or counter-car safeties or safety devices, for which application is filed in the department under the provisions of this article.

**(13.1.1.2). §C26-773.0 Amusement Device.**-The term “amusement device” shall mean a mechanically or power operated device, used to convey persons in any direction as a form of amusement.

**(13.1.1.3). §C26-774.0 Annunciator, Elevator Car.**-The term “elevator car annunciator” shall mean an electrical device in the car which indicates the landing at which hall buttons have been pressed.

**(13.1.1.4). §C26-775.0 Automatic Push Button or Self-Service Elevator, Electric.**-The term “electric automatic push button elevator” or “self-service elevator” shall mean an elevator which is operated by the passengers by means of momentary pressure of push buttons in the car and halls.

**(13.1.1.5). §C26-776.0 Auxiliary Power Elevator.**-The term “auxiliary power elevator” shall mean an elevator having a source of mechanical power, such as shafting, in common with other machinery.

**(13.1.1.6). §C26-777.0 Bi-Parting Door or Gate.**-The term “bi-parting door or gate” shall mean a vertical-slide, horizontal-slide or swing door or gate consisting of two or more sections so arranged that such sections, or pairs of sections, open away from each other, and are so interconnected that both sections operate simultaneously.

**(13.1.1.7). §C26-778.0 Bottom Clearance.**-The term “bottom clearance” of the elevator car shall mean the vertical distance between the highest point of any obstruction in the pit, exclusive of the compensating device, buffers and buffer supports, and the lowest point on the understructure of the elevator car exclusive of the safeties, car frame channels and guide shoes, when the car floor is level with the lower terminal landing.

**(13.1.1.8). §C26-779.0 Bottom Overtravel.**-

a. The term “bottom overtravel” of the elevator car shall mean the distance the car floor can travel between the level of the lower terminal landing and the point at which the fully loaded car rests on the buffers, and shall include the resulting buffer compression.

b. The term “bottom overtravel” of the counterweight shall mean the distance the counterweight can travel between its position when the car platform is level with the upper terminal landing, and the point at which the counterweight rests on the buffers, and shall include the resulting buffer compression.

**(13.1.1.9). §C26-780.0 Buffer.**-The term “buffer” shall mean a device designed to absorb the impact of the car or counterweight at the lower limits of travel.

**(13.1.1.10). §C26-781.0 Car or Counterweight Safety.**-The term “car safety” or “counterweight safety” shall mean 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.

**(13.1.1.11). §C26-782.0 Car Door or Gate.-**The term “car door or gate” shall mean the door or gate, in or on the elevator car, ordinarily used for entrance and exit.

**(13.1.1.12). §C26-783.0 Car Door or Gate Electric Contact.-**The term “car door or gate electric contact” shall mean a device which opens the control circuit, or an auxiliary circuit, when the car door or gate is open more than one and one-half inches from full closure, and thus prevents any operation of the elevator that moves the car away from the landing.

**(13.1.1.13). §C26-784.0 Car Enclosure or Cab.-**The term “car enclosure” or “cab” of an elevator shall mean the enclosure consisting of railings, doors or gates, walls, and the top or cover built upon the platform.

**(13.1.1.14). §C26-785.0 Car Frame.-**The term “car frame” or “sling” shall mean the supporting frame to which the car platform, the upper and lower sets or guide shoes, and the hoisting cables are usually attached.

**(13.1.1.15). §C26-786.0 Car-Leveling Device.-**The term “car-leveling device” shall mean any mechanism or control which will move the car within a limited zone toward, and stop the car at, such landing. A car-leveling device may also be used for emergency operation of the car throughout its entire travel and for safe-lifting purposes.

**(13.1.1.16). §C26-787.0 Car Platform.-**The term “car platform” shall mean that part of the car floor which directly supports the load.

**(13.1.1.17). §C26-788.0 Chain-Driven Elevator.-**The term “chain-driven elevator” shall mean an elevator machine connected by a chain to a reversible motor or engine.

**(13.1.1.18). §C26-789.0 Continuous Pressure Electric Elevator.-**The term “continuous pressure electric elevator” shall mean an elevator operated by means of push buttons in the car and at the landing, which elevator requires a button to be held manually in contact to keep the car in motion.

**(13.1.1.19). §C26-790.0 Contract Load.-**The term “contract load” shall mean the load specified in the contract for the purchase of the elevator, or the load specified in the application for the building permit.

**(13.1.1.20). §C26-791.0 Contract Speed.-**The term “contract speed” shall mean the upward speed specified in the purchase contract, or in the application for a building permit, to be attained by the elevator with contract load in the car.

**(13.1.1.21). §C26-792.0 Control.-**

a. The term “control” of an elevator shall mean the system of regulation by which the starting, stopping, direction, acceleration speed and retardation of the elevator are governed.

(13.1.1.21.1). b. Controller, Electric Elevator.-The term “electric elevator controller” shall mean a device, or a group of devices, which serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it connected.

(13.1.1.21.2). c. Generator-Field Control.-The term “generator-field control” shall mean a system in which control is primarily accomplished by the use of an individual generator for each elevator, and in which the voltage applied to the hoistway motor is adjusted by varying the strength of the generator held.

(13.1.1.21.3). d. Multi-Voltage Control-The term “multi-voltage control” shall mean a system in which control is accomplished primarily by impressing successive on the armature of the hoisting motor a number of substantially fixed voltages so as may be produced by multi-commutator generators common to a group of elevators.

(13.1.1.21.4). e. Rheostatic Control-The term “rheostatic control” shall mean system in which control is accomplished primarily by varying resistance and reactant in the armature and field circuit of the hoisting motor.

**(13.1.1.22). §C26-793.0 Conveyor.**-The term “conveyor” shall mean a device intended for the continuous movement of materials only, and operating without the services of an operator thereon.

**(13.1.1.23). §C26-794.0 Door Closer.**-The term “door closer” shall mean a device, operated by gravity or other means, which will automatically close a door when such device is released by the operator or by automatic means.

**(13.1.1.24). §C26-795.0 Door Operator, Electric Elevator.**-The term “elevator electric door operator” shall mean an electric device for operating the hoistway door car doors or both.

**(13.1.1.25). §C26-796.0 Double-Belted Elevator.**-The term “double-belted elevator” shall mean an auxiliary power elevator in which the direction of motion changed without reversal of the prime mover.

**(13.1.1.26). §C26-797.0 Dumbwaiter.**-The term “dumbwaiter” shall mean a hoisting and lowering mechanism, equipped with a car which moves in guides in substantially vertical direction, the maximum horizontal sectional area of which car nine square feet, the maximum compartment height of which, if provided with a fixed or removable bottom, is four feet, the maximum capacity of which is five hundred pounds, and which is used exclusively for carrying freight or materials.

**(13.1.1.27). §C26-798.0 Electric Dumbwaiter.**-The term “electric dumbwaiter” shall mean a dumbwaiter in which the motion of the car is produced by an electric motor directly applied to the dumbwaiter machinery.

**(13.1.1.28). §C26-799.0 Electric Elevator.**-The term “electric elevator” shall mean an elevator in which the motion of the car is produced by an electric motor directly applied to the elevator machinery.

**(13.1.1.30). §C26-800.0 Elevator Car.**-The term “elevator car” shall mean load-carrying unit, including the platform, car frame and enclosure, if any.

**(13.1.1.31). §C26-801.0 Elevator Landing.**-The term “elevator landing” shall mean that portion of a floor, balcony or platform immediately adjacent to the hoistway opening, and used to receive and discharge passengers, freight or materials.

**(13.1.1.32). §C26-802.0 Elevator Machine.-**

a. The term “elevator machine” shall mean the machinery and its equipment used in raising and lowering the elevator.

(13.1.1.32.1). b. Geared-Traction Machine.-The term "geared-traction machine" shall mean a traction machine which employs gearing between the electric motor and the traction sheave.

(13.1.1.32.2). c. Gearless-Traction Machine.-The term “gearless-traction machine” shall mean a traction machine in which the traction sheave and the brake are mounted directly on the electric motor shaft.

(13.1.1.32.3). d. Traction Machine.-The term “traction machine” shall mean an elevator machine in which the motion of the car and counterweight is produced by means of traction between the driving drum, sheave or sheaves and the connecting hoisting cables.

(13.1.1.32.4). e. Winding-Drum Machine.-The term “winding-drum machine” shall mean an elevator machine in which the cables are fastened to and wind on a drum.

(13.1.1.32.5). f. Direct-Drive Machine.-The term “direct-drive machine” shall mean a machine in which the power is transmitted directly to the driving sheave or sheaves without intermediate mechanism or gears.

(13.1.1.32.6). g. Worm-Geared Machine.-The term “worm-geared machine” shall mean a machine in which the power is transmitted to the driving sheaves or drum through worm gearing.

(13.1.1.32.7). h. Spur-Geared Machine.-The term “spur-geared machine” shall mean a machine in which the power is transmitted to the driving sheaves or drum through spur gearing.

**(13.1.1.33). §C26-803.0 Emergency Release.**-The term “emergency release” shall mean a device to make inoperative, in case of emergency, door or gate electric contacts or door interlocks.

**(13.1.1.34). §C26-804.0 Emergency Stop Switch.**-The term “emergency stop switch” or “safety switch” shall mean a device in the car used to cut off the power from the elevator machine independently of the operating devices.

**(13.1.1.35). §C26-805.0 Escalator.**-The term “escalator” shall mean a moving inclined continuous stairway or runway used for raising or lowering passengers.

**(13.1.1.36). §C26-806.0 Final Terminal Stopping Device.**-The term “final terminal stopping device” shall mean an automatic device for stopping the car and counterweight, when traveling at contract speed, within the top clearance and bottom overtravel, independently of the operation of the normal terminal stopping device, and the operating device.

**(13.1.1.37). §C26-807.0 Freight Elevator.**-The term “freight elevator” shall mean an elevator used for carrying freight or materials and on which only the operator and such persons as are necessary for handling the freight or materials are permitted to ride.

**(13.1.1.38). §C26-808.0 Gravity Elevator.**-The term “gravity elevator” shall mean an elevator in which gravity is the source of power.

**(13.1.1.39). §C26-809.0 Hand Power Elevator.**-The term “hand power elevator” shall mean an elevator driven by manual power.

**(13.1.1.40). §C26-810.0 Hoist.**-The term “hoist” shall mean all the machinery, apparatus and equipment, except cranes, used for raising or lowering freight by means of a sling or hook.

**(13.1.1.41). §C26-811.0 Hoistway.**-The term “hoistway” shall mean any shaftway, hatchway, wellhole or other verticle opening or space designed for the operation of an elevator or dumbwaiter therein.

**(13.1.1.42). §C26-812.0 Blind Hoistway.**-The term “blind hoistway” shall mean a hoistway which does not have hoistway doors at every floor.

**(13.1.1.43). §C26-813.0 Hoistway Door or Gate.**-The term “hoistway door or gate” shall mean the hinged or sliding portion of the hoistway enclosure which gives access to the elevator at any landing.

**(13.1.1.44). §C26-814.0 Hoistway-Door or Gate Electric Contact.-**

a. The term “hoistway-door or gate electric contact” shall mean a device which opens the control circuit, or an auxiliary circuit, when the hoistway door or gate at which the car is standing is open more than one and one-half inches from full closure, and thus prevents operation of the elevator car away from the landing.

(13.1.1.44.1). b. Door Unit Contact System.-The term “door unit contact system” shall mean a contact system which meets the requirements of this section, but does not require all the hoistway doors to be closed.

(13.1.1.44.2). c. Hoistway Unit Contact System.-The term “hoistway unit contact system” shall mean a contact system which meets the requirements of subdivision “a” of this section, and also requires all hoistway doors to be closed.

**(13.1.1.45). §C26-815.0 Hoistway-Door Interlock.-**

a. The term “hoistway-door interlock” shall mean a device, the purpose of which is to prevent the operation of the elevator machine from moving the car away from a landing unless the hoistway door at that landing is locked in the closed position, and to prevent the opening of the hoistway door from the landing side, except by a 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.

(13.1.1.45.1). b. Door Unit Interlock System.-The term “door unit interlock system” shall mean an interlock system which meets the requirements of subdivision “a” of this section, but does not require all hoistway doors to be locked in the closed position.

(13.1.1.45.2). c. Hoistway Unit Interlock System.-The term “hoistway unit interlock system” shall mean an interlock system which, in addition to fulfilling the requirements of subdivision “a” of this section, will also prevent the operation of the car unless all hoistway doors are locked in the closed position.

**(13.1.1.46). §C26-816.0 Hoistway Enclosure.-**The term “hoistway enclosure” shall mean any structure which separates the hoistway, either wholly or in part, from the floors or landings through which such hoistway extends.

**(13.1.1.47). §C26-817.0 Hydraulic Elevator.-**

a. The term “hydraulic elevator” shall mean an elevator in which the motion of the car is produced by liquid under pressure.

(13.1.1.47.1). b. Plunger Elevator.-The term “plunger elevator” shall mean a hydraulic elevator having a ram or plunger directly attached to the under side of the car platform.

(13.1.1.47.2). c. Rope-Geared Hydraulic Elevator.-The term “rope-geared hydraulic elevator” shall mean an elevator in which the motion of the car is produced by multiplying the travel of a piston or ram by a system of sheaves over which the hoisting ropes operate.

**(13.1.1.48.1). §C26-818.0 Installations.-**

a. Existing Installation.-The term “existing installation” of an elevator, dumbwaiter or escalator shall mean an installation the application for which was filed with the department before January first, nineteen hundred thirty-eight.

(13.1.1.48.2). b. New Installation.-The term “new installation” of an elevator, dumbwaiter or escalator shall mean a complete elevator, dumbwaiter or escalator installation the application for which is filed with the department after January first, nineteen hundred thirty-eight.

**(13.1.1.49). §C26-819.0 Landing Zone.-**The term “landing zone” shall mean the space within eight inches above or below the landing.

**(13.1.1.50). §C26-820.0 Manually Operated Door or Gate.-**The term “manually operated door or gate” shall mean a door or gate which is opened and closed by hand.

**(13.1.1.51). §C26-821.0 Non-Stop Switch.-**The term “non-stop switch” shall mean a switch, which, when thrown, will prevent the elevator from making hall stops and will automatically transfer hall stop signals to the next car following.

**(13.1.1.52). §C26-822.0 Normal Terminal Stopping Device.-**The term “normal terminal stopping device” shall mean an automatic device for stopping the elevator car within the overtravel independently of the operating device.

**(13.1.1.53). §C26-823.0 Operating Device.**-The term “operating device” shall mean the car switch, push button, rope, wheel, lever, treadles, or similar devices by the use of which the operator can actuate the controller.

**(13.1.1.54). §C26-824.0 Operation.-**

a. The term “operation” shall mean the method of actuating the control.

(13.1.1.54.1). b. Automatic Operation.-The term “automatic operation” shall mean operation by means of buttons or switches both in the car and at the landings, the momentary pressing of which buttons or switches will cause the car to start and stop automatically at the floor which corresponds to the button pressed.

(13.1.1.54.1.1). 1. Single Automatic Operation-The term “single automatic operation” shall mean automatic operation by means of one button in the car for each 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 such button will be without effect on the operation of the car until the response to the first button has been completed.

(13.1.1.54.1.2). 2. Non-Selective Collective Automatic Operation.-The term “nonselective collective automatic operation” shall mean automatic operation by means of one button in the car for each landing level served and one button at each landing, so arranged that all stops registered by the momentary pressure of landing or car buttons are made in the order in which the landings are reached after the buttons have been pressed, irrespective of direction of travel, of the number of buttons pressed or of the sequence in which such buttons are pressed.

(13.1.1.54.1.3). 3. Selective Collective Automatic Operation.-The term “selective collective automatic operation” shall mean automatic operation by means of one button in the car for each landing level served and by “up” and “down” buttons at the landings, so arranged that all stops registered by the momentary pressure of the car buttons are made as provided in paragraph two of subdivision “b” of this section, but 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 such buttons have been pressed; all “up” landing calls are answered when the car is traveling upwards and all “down” landing calls are answered when the car is traveling downwards, except in the case of the uppermost or lowermost calls, which are answered as soon as reached, irrespective of the direction of the car.

(13.1.1.54.2). c. Car-Switch Automatic Floor-Stop Operation.-The term “car switch automatic floor-stop operation” shall mean 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.

(13.1.1.54.3). d. Car-Switch Operation.-The term “car-switch operation” shall mean operation in which movement of the car is directly and solely under the control of the operator by means of a switch or constant pressure push button or buttons in the car.

(13.1.1.54.4). e. Continuous-Pressure Operation.-The term “continuous-pressure operation” shall mean operation with “up” or “down” buttons or an up and down switch in the car and at each landing, except the terminal landings where one button or switch may suffice, any one of which buttons or switches may be used to control the movement of such car in the direction for which the button is pushed or the switch actuated, but only so long as such button or switch is manually held in the operation position.

(13.1.1.54.5). f. Dual Operation.-Dual operation is a system of operation whereby the control of an automatic operation elevator is arranged so that, on throwing of a transfer switch, the starting of the car is solely under the control of an operator in the car and the car cannot be started from the landing button. Landing stops may be either automatic or under the control of the operator.

(13.1.1.54.6). g. Pre-Register Signalling Operation.-The term “pre-register signalling operation” shall mean operation in which signals to stop are registered in advance by buttons in the car and at the landings; and in which the operator is notified, at the proper point in the car travel, by a signal, visual, audible, or otherwise to initiate the stop, after which the landing stop is automatic.

(13.1.1.54.7). h. Signal Operation.-The term “signal operation” shall mean operation by means of single button or switches in the car, and up or down direction buttons or switches at the landings by which predetermined landing stops may be set up or registered for an elevator or for a group of elevators; and by which stops set up by the momentary pressure of the car buttons are made automatically in succession as the car reaches those landings, irrespective of the direction of travel or the sequence in which such buttons are pressed; and by which stops set up by the momentary pressure of the “up” and “down” buttons at the landings are made automatically by the first car in the group approaching the landing in the corresponding direction, irrespective of the sequence in which such buttons are pressed; and by which type of operation the car can be started only by means of a starting switch or button in the car.

**(13.1.1.55). §C26-825.0 Overhead Structure.-**The term “overhead structure” shall mean all of the structure and platforms at the top of the hoistway supporting the elevator equipment.

**(13.1.1.56). §C26-826.0 Passenger Elevator.-**The term “passenger elevator” shall mean an elevator designed to carry persons.

**(13.1.1.57). §C26-827.0 Platform Elevator.-**The term “platform elevator” shall mean an elevator the platform of which is supported by ropes at two or more points at or below the platform level, and which elevator is without an underslung frame or sling having guide shoes so arranged as to prevent the tipping of the platform.

**(13.1.1.58). §C26-828.0 Pit.-**The term “pit” shall mean that portion of an elevator hoistway extending below the level of the bottom landing saddle to provide for bottom over-travel and clearance, and for parts which require space below the bottom limit of car travel.

**(13.1.1.59). §C26-829.0 Power Elevator.-**The term “power elevator” shall mean an elevator in which the motive power is produced otherwise than manually or by gravity.

**(13.1.1.60). §C26-830.0 Power-Operated Door or Gate.-**The term “power operated door or gate” shall mean a door or gate opened and closed by power other than hand-power, gravity, springs, or the movement of the car.

(13.1.1.60.1). 1. Power-Operated Door or Gate, Manually Controlled.-The term “power-operated door or gate, manually controlled” shall mean a door or gate which is opened and closed by power other than hand-power, gravity, springs, or the movement of the car, the movement of which is controlled by the elevator operator.

(13.1.1.60.2). 2. Power-Operated Door or Gate, Automatically Opened.-the term “power-operated door or gate, automatically opened” shall mean a door or gate which is opened by power other than hand-power, gravity, springs, or the movement of the car, the opening of which is 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.

(13.1.1.60.3). 3. Power-Opened, Self-Closing Door or Gate.-The term “power-opened, self-closing door gate” shall mean a door or gate which is opened by power other than hand-power, gravity, springs, or the movement of the car, and when released by the operator is closed by energy stored during the operation of opening.

(13.1.1.60.4). 4. Power-Closed Door or Gate.-The term “power-closed door or gate” shall mean a door or gate which is manually opened and is closed by power other than hand-power, gravity, springs, or the movement of the car.

**(13.1.1.61). §C26-831.0 Power-Operated Door or Gate Device.**-The term “power-operated door or gate device” shall mean a device or assemblage of devices to open and close the hoistway door and car door or gate by power other than hand-power, gravity, springs, or the movement of the car.

**(13.1.1.62). §C26-832.0 Self-Closing Door or Gate.**-The term “self-closing door or gate” shall mean a door or gate which is opened manually and closes automatically when released.

**(13.1.1.63). §C26-833.0 Sidewalk Elevator.**-The term “sidewalk elevator” shall mean a sidewalk type freight elevator which serves no floors above the sidewalk or ground level, and which opens outside the structure at its top limit of travel.

**(13.1.1.64). §C26-834.0 Sidewalk Type Elevator.**-The term “sidewalk type elevator” shall mean an elevator the platform of which is supported at two or more points at or below the platform level and which is provided with an underslung frame or sling and guide shoes so arranged as to prevent the tipping of the platform.

**(13.1.1.65). §C26-835.0 Single-Belted Elevator.**-The term “single-belted” elevator shall mean an elevator machine connected by a belt to a reversible motor or engine.

**(13.1.1.66). §C26-836.0 Slack Cable Switch.**-The term “elevator slack cable switch” shall mean a device for automatically cutting off the power in case the hoisting cables become slack.

**(13.1.1.67). §C26-837.0 Steam Elevator.**-The term “steam elevator” shall mean an elevator in which the motion of the car is produced by a steam engine directly applied to the elevator machinery.

**(13.1.1.68). §C26-838.0 Stop Button, Elevator Hall.**-The term “elevator hall stop button” shall mean a push button placed in the elevator hallway, which button when momentarily pressed, automatically causes the elevator to stop at that floor.

**(13.1.1.70). §C26-839.0 Terminal Slow Down Device, Elevator Emergency.**-The term “elevator emergency terminal slow down device” shall mean a device so arranged that when the elevator does not slow down properly when approaching the terminal landings, an emergency retarding force is applied.

**(13.1.1.71). §C26-840.0 Top Clearance.-**

a. The term “top clearance” as applied to an elevator car shall mean the distance the car floor can travel above the level of the upper terminal landing without any part of the car or devices attached thereto coming in contact with the overhead structure.

b. The term “top clearance” as applied to an elevator counterweight shall mean 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 lower terminal landing.

**(13.1.1.72). §C26-841.0 Top Overtravel.**-The term “top overtravel” as applied to an elevator car shall mean the distance the car floor can travel between the level of the upper terminal landing and the point at which the car is stopped by the normal terminal stopping device.



**(13.1.1.73). §C26-842.0 Travel (Rise).**-The term “travel” or “rise” as applied to an elevator or dumbwaiter shall mean the vertical distance between the bottom terminal landing and the top terminal landing.

**(13.1.1.74). §C26-843.0 Underslung Elevator.**-The term “underslung elevator” shall mean an elevator, the platform of which is supported at two or more points at or below the platform level so arranged as to prevent the tipping of the platform.

### **Sub-Article 2. Administrative Provisions for Elevators**

**(13.1.2.1). §C26-844.0 Application and Scope of This Article.-**

a. Application.-

1. The construction, maintenance, operation, inspections and tests of elevator, dumbwaiter, escalator or amusement device installations shall be as provided in this article and other applicable sections of this title and the rules of the board, except as otherwise provided in subdivision “c” of this section.

2. In the absence of provisions of this title or rules of the board, applicable to the construction, maintenance and operation of:

(a) amusement devices,

(b) devices inclined at an angle of forty-five degrees or less for carrying one or two persons,

(c) elevators used only for handling building materials and workmen during construction,

(d) elevators of capacity exceeding thirty thousand pounds and platform area exceeding three hundred square feet when suspended by cable near each corner of the hoistway and at additional positions, and

(e) stage and orchestra lifts installed after January first, nineteen hundred thirty-eight, such devices shall be permitted and maintained only when the design, materials, and method of operation are, with a view to safety, approved by the superintendent.

3. The provisions of this article cover the construction, inspection, maintenance and operation of elevators, dumbwaiters, escalators and their hoistways, except devices inclined at an angle of forty-five degrees or less for carrying one or two persons, belt, bucket, scoop, roller or similarly inclined or vertical freight conveyors, telescopic ash hoists, tiering or piling machines, skip hoists, wharf ramps, or apparatus in kindred classes, lift bridges and elevators used only for handling building materials and workmen during construction. The use of such excepted types of apparatus may be permitted in the discretion of the superintendent.

4. Amusement devices, stage and orchestra lifts, and elevators of capacity exceeding thirty thousand pounds and platform area exceeding three hundred square feet when suspended by cables near each corner of the hoistways and at additional positions may be used subject to the discretion of the superintendent.

(13.1.2.2). b. Purpose, Interpretation and Exceptions.-The purpose of this article is to provide reasonable safety. In case of practical difficulty or unnecessary hardship the board may grant exceptions from the literal requirements or permit the use of other devices or methods, but such exceptions may be granted only when it is clearly evident that reasonable safety is secured.

(13.1.2.3). c. Existing Installations.-

1. Existing elevators moved to new hoistways shall comply with the provisions of this article.
2. Equipment legally installed prior to January first, nineteen hundred thirty-eight may be used without being reconstructed. Such elevators shall be maintained by the owner in a safe operating condition.
3. Existing installations may be altered to receive the benefit of any of the provisions of this article, provided the safety requirements of such provisions are met. When an increase is made in the capacity or speed of an elevator or a change is made in the method of its operation, control or classification, the governor or car safety, or both, of such elevator may be continued in use, provided each such governor or car safety meets the requirements of sections C26-989.0 through C26-1004.0 and sections C26-1044.0 through C26-1053.0, except that it shall be unnecessary to meet the requirements of section C26-1009.0.
4. When such alteration consists solely of a change in the character of an electric power supply, the elevator shall be made to conform to additional requirements as follows:
  - (a) When the change of power supply is from direct current to alternating current, only such additional new parts as are necessitated by the change in the power supply shall be required, except that there shall be provided electrically operated brakes as provided in sections C26-1025.0 and C26-1026.0, and terminal stopping devices as provided in sections C26-1044.0 through C26-1053.0. If existing electric brakes are inadequate in the opinion of the superintendent, such brakes shall be replaced with approved electrically released brakes.
  - (b) When the change of power supply is from direct current to alternating current and the contract speed of the elevator exceeds one hundred ten feet per minute, there shall be provided a two-speed induction motor and terminal stopping and safety device as provided in sections C26-1044.0 through C26-1053.0, except that when the overhead car and counterweight clearances meet the requirements of sub-divisions b and c of section C26-867.0 and the speed of the elevator does not exceed two hundred feet per minute, a one-speed induction motor may be used.
  - (c) When there is a change in voltage, cycles, or number of phases of an alternating current supply, or a change from direct current to alternating current, or alternating current to direct current, or to a combination of direct current and alternating current of an elevator, only such electrical equipment or parts thereof of such elevator as are adjusted or altered in such manner as to operate safely and efficiently, may be retained.
5. Ordinary repairs or replacements on existing installations may be made with parts of equivalent material and at least the equivalent in strength and design to those replaced, without complying with the provisions of this article. Damaged or defective parts shall be wholly or partly replaced in the discretion of the superintendent, except that broken parts subject to bending, tension or torsional stresses and parts upon which the support of the car depends shall not be welded.

**(13.1.3). §C26-845.0 Certificates.**-It shall be unlawful for the owner or lessee to operate or permit the operation or use of any device mentioned in section C26-844.0 until a certificate has been obtained from the superintendent that such device has been inspected and found to be safe. Within a reasonable time after being requested to do so, the superintendent shall inspect any

device installed or constructed after January first, nineteen hundred thirty-eight. If such device is found to be safe and in conformity with the provisions of this article and the rules adopted hereunder, a certificate to that effect shall be issued. The superintendent may permit the temporary use of any such device for passenger service or for freight service during construction under authority of a temporary certificate issued by him for each class of service provided that a notice is conspicuously posted on or in connection With such elevator to the effect that such elevator has not been officially approved.

**(13.1.4, last sentence). C26-846.0 Posting of Certificates.-**The owner or lessee or agent of either of them shall cause the most recent certificate of inspection to be posted in the elevator car in the manner prescribed by the superintendent.

**(13.1.4). §C26-847.0 Record of Passenger Elevators and Escalators.-**Every elevator and escalator shall be given a serial number for purposes of identification. In the case of elevators installed after January first, nineteen hundred thirty-eight, such serial number shall be assigned when the first certificate is issued. A docket of all elevators and escalators shall be kept in each borough. Such docket shall give, under the corresponding serial number, a description of the location of any elevator or escalator sufficient for identification, together with information as type of construction, motive power, rise, rated speed, inspection and such other information as the superintendent may deem desirable. The owner or lessee or agent of either of them shall cause such number, together with the most recent certificate of inspection, to be posted in the elevator car in the manner prescribed by the superintendent.

**(13.1.5). §C26-848.0 Inspection.-**

a. The superintendent shall cause all passenger and freight elevators and escalators to be inspected quarterly in accordance with the provisions of this article and the rules of the board.

b. The superintendent shall cause amusement devices to be inspected at least twice a year.

c. Upon notice from the superintendent, any necessary repairs to elevators, escalators or amusement devices shall be made without delay by the owner or lessee. If defects are found which would make the continued use of such elevator, escalator or amusement device dangerous, it shall be unlawful to use such elevator or amusement device until the superintendent certifies that such elevator or amusement device has been made safe. The car safety devices of elevators installed after December twelfth nineteen hundred thirty-one, shall be tested at least once a year. It shall be unlawful to operate an elevator or escalator without a certificate issued by the superintendent certifying that such elevator or escalator has been inspected. Such certificates shall be issued annually.

**(13.1.5.1). §C26-848.1 Fees.-**The .department, in consideration of the issuance of the certificate mentioned in the preceding section, is hereby authorized to charge an annual fee of ten dollars. The provisions of this section shall not apply to and no fee shall be payable in the case of amusement devices, nor in the case of premises solely and exclusively devoted to charitable, religious or educational purposes.

**(13.1.6). §C26-849.0 Riding on Elevators Restricted.-**It shall be unlawful for any person other than the operator or those persons necessary to handle freight, to ride on any elevator other than a passenger elevator, and it shall be unlawful for the owner or lessee of any elevator knowingly to permit any person to ride on any elevator other than a passenger elevator. Every freight elevator shall have the following notice posted conspicuously thereon: "THIS IS NOT A PASSENGER ELEVATOR. IT IS UNLAWFUL FOR ANY PERSON OTHER THAN THE OPERATOR OR THOSE NECESSARY TO HANDLE FREIGHT, TO RIDE ON THIS ELEVATOR."

**(13.1.7). §C26-850.0 Operators.**-Every power driven passenger elevator and every power driven freight elevator with a rise of more than one story, except automatic operation and continuous pressure elevators and sidewalk elevators, shall be in charge of a designated competent operator eighteen years of age or more, of reliable and industrious habits, qualified in accordance with the rules of the board, except as specifically provided otherwise in any other law. Operators of amusement devices which require the services of a regular operator shall be at least twenty-one years of age and shall have secured a certificate of competency from the superintendent. If the superintendent finds that any person engaged in running an elevator or amusement device is incompetent or unqualified, the owner or lessee of such elevator or amusement device shall, upon notice from the superintendent, discontinue the operation of such elevator or amusement device by such operator. It shall be unlawful to employ or permit any person to operate any elevator or amusement device, except as provided in this section, who does not possess the qualifications prescribed therefor by law or the rules of the board.

**(13.1.8). §C26-851.0 Accidents.**-The owner or lessee or person in charge of any of the devices mentioned in section C26-844.0, shall immediately notify the superintendent of every accident to any person or damage to apparatus on or about or in connection with such device, and shall afford the superintendent every facility for investigating such accident or damage. The superintendent shall make an investigation immediately thereafter, and shall file in the department a full and complete report of such investigation. Such report shall give in detail all material facts and information available and the cause or causes so far as they can be determined. Such report shall be open to public inspection at all reasonable hours. When an accident involves the failure or destruction of any part of the construction or operating mechanism of such a device, it shall be unlawful to use such device until it has been made safe, and the superintendent may, if he deem it necessary, order the discontinuance of such device until a certificate has been issued by him for its use. It shall be unlawful to remove any part of the damaged construction or operating mechanism from the premises until permission to do so has been granted by the superintendent.

### **Sub-Article 3. Hoistway Construction for Passenger, Freight and Sidewalk Type Power Elevators**

#### **GROUP 1 Hoistway Construction**

##### **SUB-GROUP 1 Hoistway Enclosures**

**(13.2.1.1.1). §C26-852.0 Hoistways to be Fire Resistive.**-Hoistway enclosures of all elevators, except sidewalk elevators the travel of which is one story or less, shall comply with sections C26-638.0 through C26-647.0, and sections C26-660.0 through C26-665.0, and, in factory buildings, shall also comply with sections two hundred sixty-one and two hundred seventy of the labor law.

**(13.2.1.1.2). §C26-853.0 Landing Openings to be Protected.**-Landing openings in a fire resistive hoistway enclosure shall be provided with fire resistive doors, panels or fronts which comply with sections C26-638.0 through C26-647.0, and sections C26-660.0 through C26-665.0, and, in factory buildings, with sections two hundred sixty-one and two hundred seventy of the labor law, except that such openings shall first comply with sections C26-896.0. For elevators

whose contract load is two thousand pounds or more, the aggregate clear width of the hoistway doors shall be at least thirty inches and the clear height shall be at least seventy-eight inches.

**(13.2.1.2.1). §C26-854.0 Use and Enclosure of Non-Fire Resistive Hoistway Enclosures.-**

a. Non-fire resistive hoistway enclosures shall be permitted only for sidewalk elevators the travel of which is one story or less. Where non-fire resistive construction is permitted, hoistways shall be enclosed in partitions of incombustible material to the full height of the hoistway.

b. The enclosure on the side or sides used for loading or unloading shall be at most five inches from the edge of the car platform. Doors of incombustible material shall be provided in the openings.

**(13.2.1.2.2). §C26-855.0 Materials for Enclosures.-**

a. Non-fire resistive hoistway enclosures shall be building walls, solid or latticed partitions, or of incombustible material, grille work, metal grating, expanded metal or fireproofed wood. Where wire grille work is used, such wire shall be at least 0.0915 inch in diameter (No. 13 steel wire gage), and the maximum size of mesh shall be two inches. Where expanded metal is used, its minimum thickness shall be 0.094 inch (No. 13 U.S. gage).

b. The maximum spacing between vertical bars shall be one inch, except where such bars are used as furring material in order to comply with section C26-854.0. In such case the maximum spacing between vertical bars shall be four inches.

**(13.2.1.2.3). §C26-856.0 Netting Required on Enclosures.-**When either of the following conditions exists, the openings in any non-fire resistive enclosures shall be covered with a netting of square mesh, one-half of an inch or less in size. Such mesh shall be made of wire at least 0.0348 inch in diameter (No. 20 steel wire gage):

1. The clearance between such enclosures and any part of the car, counterweight or any sliding landing door is less than one inch.

2. Such enclosure is grille or open work having openings which will pass a one-half inch diameter ball, and the openings in the enclosures are less than six feet above any landing, stairway, floor or platform.

**(13.2.1.2.4-13.2.1.1.3). §C26-857.0 Design and Construction of Projections.-**Projections and hoistway doors extending inward from the general surface from the hoistway enclosure, and which are opposite a car entrance of an elevator, shall be beveled on the under side or shall be guarded with metal plates, or by fireproofed wood or by wood faced with metal at least 0.125 inch thick (No. 11 U.S. gage). The angle of such bevels or guard plates shall be at least sixty degrees, and preferably seventy-five degrees, from the horizontal. If plates and guards are used, such plates or guards shall be smooth and shall be firmly and permanently fastened to the hoistway enclosure.

**(13.2.1.2.5-13.2.1.1.4). §C26-858.0 Recesses.-**

a. In fire resistive hoistway enclosures, recesses other than landing openings in the general surface of the hoistway enclosure which are opposite a car opening. shall be filled in flush with the general surface of the hoistway, except where the corresponding opening in the car enclosure is provided with solid panel car doors. In non-fire resistive hoistway enclosures, recesses other than landing openings in the general surface of the hoistway enclosure of a freight elevator. which are opposite a car opening, shall be filled in flush with the general surface of the hoistway to comply with section C26-855.0.

b. The soffit of a recess formed by or between vertical bars shall be beveled as specified for projections in section C26-857.0.

**(13.2.1.2.6-13.2.1.1.5). §C26-859.0 Strength of Hoistway Enclosure.**-The hoistway enclosure adjacent to a landing opening shall be of sufficient strength to support in true alignment the hoistway doors and gates with their operating mechanisms and interlocks.

## **SUB-GROUP 2**

### **Clearance Between Cars, Counterweights and Hoistway Enclosures of Elevators**

**(13.2.1.3.1). §C26-860.0 Clearance Between Cars, Enclosures and Counterweights.**-The hoistway of an elevator shall have a clearance of at least three-quarters of an inch between the sides of the car and the hoistway enclosure, and a clearance of at least one inch between the car and its counterweights.

**(13.2.1.3.2). §C26-861.0 Clearance Between Platforms and Landing Thresholds.**-The minimum clearance between the car platforms and the landing saddles shall be one-half of an inch for elevators using side-post construction, and three-quarters of an inch for elevators using corner-post construction. The maximum clearance in each case shall be one and one-half inches.

**(13.2.1.3.3). §C26-862.0 Clearance Between Hoistway Enclosure and Loading Side of Car Platform.**-The maximum clearance between a hoistway enclosure and a loading side of the car platform opposite a car entrance shall be five inches, except that when the doors are installed wholly within the hoistway, the maximum clearance shall be seven and one-half inches.

**(13.2.1.3.4). §C26-863.0 Furring.**-If furring out shall be necessary to comply with the foregoing requirements, such furring shall conform to section C26-855.0.

**(13.2.1.3.5). §C26-864.0 Clearance of Cars in Adjoining Hoistways.**-The clearance between cars operated in adjoining hoistways shall be at least two inches.

## **SUB-GROUP 3**

### **Pits, Overtravel and Clearances**

**(13.2.1.4.1). §C26-865.0 Pits.**-Pits shall be provided at the bottom of all elevator hoistways, except as provided in subdivision d of section C26-1097.0.

**(13.2.1.4.2). §C26-866.0 Pit Dimensions.**-

a. Every pit for sidewalk type or private residence elevators shall be at least two feet deep measured from the saddle of the lowest landing.

b. Every pit for elevators which have a contract speed of one hundred feet or less per minute, except for sidewalk type and private residence elevators, shall have, such a depth that the vertical clearance between the lowest projection under the car platform and any obstruction in the pit shall be at least twenty-four inches when the buffers are fully compressed.

c. Every pit for elevators which have a contract speed exceeding one hundred feet, but not exceeding two hundred fifty feet per minute, where spring buffers are permitted and used, shall be at least three and one-half feet deep measured from the saddle of the lowest landing to the floor of such pit.

d. The pit depth for elevators having a contract speed exceeding two hundred fifty feet per minute, where oil or equivalent buffers are required, shall be at least the sum of the following two distances measured from the saddle of the lowest landing:

1. The overall length of the fully extended buffer, having a buffer stroke as determined by section C26-944.0.

2. The distance between the upper surface of the car platform and the under surface of the buffer strike plate, plus three inches.

e. Additional pit depth shall be provided where necessary to allow clearance for compensating rope sheaves and any vertical movement thereof, and to comply with sections C26-1044.0 through C26-1053.0.

f. When the car rests on the fully compressed buffer, there shall be at least two feet clearance vertically between the lowest projection of the under side of the car platform, except guide shoes, car frame channels and safeties and aprons attached to the sill, and any obstruction in the pit, exclusive of compensating device, buffers and buffer supports. Sidewalk type elevators shall be exempted from the requirements of this division.

g. Ten percent of the total area of the platform may be used for junction boxes or other elevator equipment and such portion of the total area is exempted from the requirements of this section. When the area of the junction boxes or other elevator equipment exceeds ten percent of the total area of the platform, such clearance shall be measured from the under side of such boxes or equipment. The location of such projections shall be subject to the approval of the superintendent. Sidewalk type elevators shall be exempted from the requirements of this subdivision.

h. When practical difficulties make it essential, the pit depth required by this section may be reduced subject to the approval of the superintendent. If such reduction in pit depth involves precompression of either the car or counterweight buffer or both, the amount of precompression so allowed shall not reduce the extension of the buffer plunger to less than fifty percent of the buffer stroke as determined by section C26-944.0, or to less than eighteen inches, whichever is greater, and such amount shall not permit precompression of buffers having a stroke of eighteen inches or less.

i. In no case shall the depth of any depression or trench in the pit be included in the pit depth or clearance.

j. The walls of the pit shall be substantially vertical. The horizontal sectional area of the pit shall include the continuation of the horizontal clearance about the car platform, required to permit the passage of the counterweight and its guide rails, the car guide rails and any cables, ropes or tapes extending below the lower terminal landing saddle.

k. The floor of the pit shall be approximately level. This requirement may be waived if old foundation footings are encountered in a new installation and it is inadvisable to remove such footing, but the maximum encroachment shall be fifteen percent of the cubical contents of the pit. Precautions shall be taken to minimize the hazards of an uneven pit.

**(13.2.1.4.3). §C26-867.0 Top Clearances.-**

a. The top clearances for passenger and freight power elevators, except sidewalk type elevators shall be as prescribed in subdivisions b and c of section C26-867.0.

(13.2.1.4.3.1). b. Car clearance.-

1. When the car is at its top landing, the clear distance between the top of the crosshead of such car and the corresponding point of any obstruction in the hoistway vertically above such crosshead, shall be at least the sum of the following four items:

(a) The clearance between the bottom of the counterweight buffer and its striking block, which shall be at least six inches.

(b) The stroke of the counterweight buffer used.

(c) Two feet, or the distance which any sheave or any other equipment mounted on or on the car crosshead projects above the top of the crosshead, whichever is greater.

(d) One-half the counterweight buffer stroke corresponding to the required governor tripping speed of the car as determined by section C26-944.0.

2. Item 'd' may be omitted if provision is made to eliminate the jump of the car at counterweight buffer engagement.
3. It shall be unlawful to permit any equipment mounted on the car to strike any part of the overhead structure and also it shall be unlawful to permit any equipment on the car to strike any equipment or material located in the hoistway when the car crosshead is a distance equal to Item 'c' of subdivision 1 of this section from the nearest obstruction above it.
4. For private-residence elevators the clearance shall be as specified in this section, except that the two foot dimension in item 'c' may be reduced to one foot and Item 'd' eliminated, provided that an emergency stop switch is mounted to an accessible location on top of the car.

(13.2.1.4.3.2). c. Counterweight Clearance.-

1. When the car is level with the bottom landing, the clear distance between the top of the counterweight and the corresponding point of any obstruction in the hoistway vertically above it, shall be at least the sum of the following four items:
  - (a) The clearance between the top of the car buffer and its striking block, which shall be at least three inches.
  - (b) The stroke of the car buffer used.
  - (c) Six inches.
  - (d) One-half the car buffer stroke corresponding to governor tripping speed of the car as determined by section C26-944.0.
2. Item (d) may be omitted if provision is made to eliminate the jump of the counterweight at car buffer engagement.
3. When the pit depth has been reduced as provided for to section C26-866.0, the top clearances may be modified to conform therewith subject to the approval of the superintendent.

**(13.2.1.4.4). §C26-868.0 Overtravel for Sidewalk Type Elevators.-**An overtravel of at least six inches at the top and at least three inches at the bottom shall be provided for sidewalk type elevators, except as required by section C26-973.0.

#### **SUB-GROUP 4**

##### **Hoistway Windows, Bulkheads and Machine Rooms**

**(13.2.1.5.1). §C26-869.0 Window Entrances to Freight Elevators.-**Windows in the hoistway enclosure walls toward which the car of a freight elevator has an entrance, shall, except in the case of elevators having car gates equipped with electric contacts, be provided with vertical bars or gratings having clearances as specified in sections C26-860.0 through C26-864.0. The soffit of the recess formed by or between the vertical bars shall be beveled as specified for projections in section C26-857.0.

**(13.2.1.5.2). §C26-870.0 Protection of Hoistway Windows.-**Where windows in the hoistway enclosure are less than seven floors above the sidewalk level and less than three floors above the roof of an adjacent structure, such windows shall be fitted with vertical metal bars which are at least five-eighths of an inch in diameter. The maximum spacing between such bars shall be ten inches.

**(13.2.1.5.3). §C26-871.0 Access to Machine Rooms, Pits and Overhead Machinery Spaces.-**

- a. Safe and convenient access shall be provided to the machine rooms, pits and overhead machinery and elevator equipment spaces. Where the entrance to machine rooms and



overhead machinery spaces is more than five feet above the adjacent floor or roof surface, access shall be provided by means of a metal ladder or stairs. Such ladder or stairs shall have a maximum angle of incline of sixty degrees from the horizontal. Where the difference in level is five feet or less, vertical ladders may be used. Such ladder or stairs shall be fitted with a metal hand-rail above the outside stringers. When the entrance door opens outwards, a platform shall be provided within eight inches below the door sill. Such platform shall be at least two feet wide and shall project at least two feet beyond the lock jamb of the door. A guard rail shall be provided at the edge of such platform, except where the ladder or stairs join such platform.

b. Access to pits over five feet deep may be provided by means of fixed vertical metal ladders. Where the buffer cylinder is over five feet high, a fixed inclined metal ladder shall be provided.

c. It shall be unlawful to use elevator machine rooms and overhead machinery spaces as public thoroughfares. Doors to elevator machine rooms and overhead machinery spaces shall be fitted with locks which will permit the door to be opened from the inside without a key.

d. Where it is impractical to provide access to overhead sheaves and governors from outside the hoistway, access may be provided from within the hoistway, if an emergency switch, suitably marked, is placed inside the hoistway which switch, when opened, will prevent operation of the elevator during the inspection of the overhead machinery.

**(13.2.1.5.4). §C26-872.0 Lighting of Elevator Machinery.-**

a. Permanent provision for adequate artificial light shall be made in all elevator equipment spaces, machine rooms, pits and spaces for overhead machinery of elevators. Where electric light is available, the extent of illumination shall be based on the use of at least one-half watt per square foot of floor area.

b. The machine room lighting switch, if electric light is used, or the lamp, if electricity is unavailable, shall be within easy reach of the entrance of the machine room.

c. Wherever practical, the elevator service switch and the lighting switch shall be located on the lock jamb side of the machine room entrance door. Both such switches shall be of the enclosed type.

**(13.2.1.5.5). §C26-873.0 Head Room in Bulkheads.-**Bulkheads of elevators shall be constructed with a minimum head room of six feet above any platform required in sections C26-876.0 through C26-880.0.

**(13.2.1.5.6). §C26-874.0 Enclosure of and Access to Elevator Machines.-**

a. Elevator machines shall be surrounded by substantial grille work or by some other enclosure unless such machines are located in machine, engine or pump rooms where an attendant is in charge, or unless such machines are otherwise secured against unauthorized access.

b. All machine enclosures shall provide at least twelve inches horizontal clearance on at least three sides and so such vertical clearance as is necessary to give access to such parts of the machinery as require maintenance and inspection.

**(13.2.1.5.7). §C26-875.0 Guarding of Exposed Moving Machine Parts.-**Exposed gears, sprockets, tape sheaves, and ropes and tapes passing through the secondary levels shall be guarded in accordance with the standards prescribed in section C26-892.0.

**SUB-GROUP 5**

**Machine Supports, Loads on Supports and Factors of Safety**

**(13.2.1.6.1). §C26-876.0 Machine Supports.**-Machinery and sheaves shall be supported and held so effectually to prevent any part from becoming displaced. The supporting beams shall be of steel or reinforced concrete. It shall be unnecessary to have beams under machinery supported on an independent foundation or on the floor of the machine room, if such foundation or floor is properly constructed to support the loads.

**(13.2.1.6.2). §C26-877.0 Loads on Supports.**-Loads on overhead beams and their supports shall be computed as follows:

1. The total load on overhead beams shall be assumed to be equal to the weight of all apparatus resting on such beams plus twice the maximum load suspended from such beams.
2. The load resting on such beams shall include the complete weights of machine, sheaves, controller, and similar equipment. The load suspended from such beams shall include the sum of the tensions of all cables suspended from such beams.

**(13.2.1.6.3). §C26-878.0 Hanging of Machinery Underneath Supporting Beams.**-It shall be unlawful to hang elevator machinery underneath the supporting beams at the top of the hoistway except for idler or deflecting sheaves with their guards and frames, devices for limiting or retarding the car speed and their accessories, and overhead sheaves for private residence elevators.

**(13.2.1.6.4). §C26-879.0 Factors of Safety.**-The factor of safety for overhead beams and their immediate supporting beams, based on the ultimate strength of the material, which, if of steel, shall conform to the standard specifications of the A.S.T.M., D., A7-29, the loads being assumed as in section C26-877.0, shall be at least the following:

1. For Steel.....4
2. For Reinforced Concrete.....7

**(13.2.1.6.5). §C26-880.0 Allowable Deflections.**-The allowable deflections of overhead beams and their immediate supports shall be as follows:

1. For overhead machine beams of all alternating current installations, and for direct current installations where the car speed is over one hundred fifty feet per minute, the deflection under static load shall be 1/2,000 of the span or less.
2. The overhead machine beams of direct current installations where the car speed is one hundred fifty feet or less per minute, the deflection under static load shall be 1/1,666 of the span or less.
3. For overhead sheave beams the deflection under static load shall be 1/1,333 of the span or less.
4. For overhead beams immediately supporting the machine beams the deflection under static load shall be 1/1,666 of the span or less.

**SUB-GROUP 6**

**Platforms Under Machinery**

**(13.2.1.7.1). §C26-881.0 Materials and Strength of Platforms.**-

- a. A flooring of iron, steel, or reinforced concrete, which flooring is capable of sustaining a concentrated load of three hundred pounds on any four square inches of the structure, shall be provided at the top of the hoistway, either immediately below the sheaves or at the level of the top of the machine beams. Sidewalk type elevators, or elevators without sheaves directly over the elevator car shall be exempted from this requirement. It shall be unnecessary for the

platform or its supports to be capable of supporting three hundred pounds on every four square inches of its area simultaneously. When a floor of solid construction is used and the shaft extends through the roof, two hundred eighty-eight square inches of ventilation shall be provided. Such openings shall be adequately protected with steel gratings. Hoop and rail holes may be considered part of the required area.

b. If the floor consists of a metal bar grating, the mesh or opening between the bars shall reject a ball one and one-half inches in diameter.

**(13.2.1.7.2). §C26-882.0 Extent of Grating or Flooring.**-The grating or flooring shall fill the entire hoist way when the cross-sectional area is fifty square feet or less; otherwise the platform shall extend at least two feet beyond the general contour of the sheaves or machines, and shall extend to the entrance to the hoistway at or above the level of the platform.

**(13.2.1.7.3). §C26-883.0 Hand-Rails and Toeboards Required.**-If the platform does not entirely cover the hoistway, the open or exposed sides of such hoistway shall be provided either with a standard hand-rail and toeboard or with a screen and railing at least forty-two inches high.

**(13.2.1.7.4). §C26-884.0 Deflecting Sheave Cradles.**-Where no slab or grating complying with section C26-881.0, is provided over the entire area of the hoistway below the deflecting or secondary sheaves which extend below the machine level, such sheaves shall be provided with cradles which comply with the requirements for guards prescribed in section C26-892.0. Sidewalk type elevators shall be exempted from the requirements of this section.

#### **SUB-GROUP 7**

##### **Stops for Counterweights**

**(13.2.1.8). §C26-885.0 Stops for Counterweights.**-

a. Where winding drum machines are used, a permanent beam or bar shall be provided at the top of the counterweight guides and beneath the counterweight sheaves to prevent the counterweights from being drawn into the sheaves. Such beam or bar shall be of such strength that the cables will be pulled out of the sockets before there is any undue deflection of such beam or bar.

b. Such beams or bars shall be so located that the center of resistance is in line with the center of gravity of the counterweight or, if more than one stop is used, such beams or bars shall be located symmetrically with respect to the counterweight.

#### **SUB-GROUP 8**

##### **Pipes and Wiring**

**(13.2.1.9.1). §C26-886.0 Electrical Conductors.**-The electrical conductors, installed in or under any elevator or counterweight hoistway, except the flexible cables connecting the car with the fixed wiring, and except the conductors installed under exceptions provided in section C26-887.0, shall be encased in metal conduits or such conductors shall be made of armored cable.

**(13.2.1.9.2). §C26-887.0 Electrical Conduits or Cables to be Continuous.**-

a. It shall be unlawful to install in elevator hoistways any electrical conductors or conduits for furnishing power to elevator hoisting machines or for the control of such hoisting machines, or any other electrical conductors or conduits, except as provided in section C26-886.0, and except in the following cases:

1. Where an existing hoistway is being used;
2. When conductors are used to furnish or control power, light, heat, communication, or signals, for hoistways, for hoistway doors, for car doors, or for cars;

3. When the superintendent approves the installation of other conduits in existing hoistways where space conditions permit.

b. Junction splice boxes or cable support boxes in main elevator feeder runs and other permitted runs shall open outside of the hoistway.

c. Pipes and conduits and armored cables shall be securely fastened to the hoistway construction.

**(13.2.1.9.3). §C26-888.0 Pipe Installations.-**It shall be unlawful to install soil waste or vent pipes and pipes conveying gases or liquids which, if discharged into the hoistway would endanger life, in or under any elevator or counterweight hoistway. Low pressure steam or hot water pipes used only for heating the elevator hoistways may be installed in such hoistways.

**(13.2.1.9.4). §C26-889.0 Voltage of Car Control Systems.-**It shall be unlawful to use any part of any electric circuit having a rated system or circuit voltage in excess of seven hundred fifty volts direct current, or five hundred fifty volts alternation current, for any control or operating circuit. Circuits of a higher rated system or circuit voltage may be used in machine rooms or bulkheads for the operation of motors, provided that all operating and signal wiring is thoroughly insulated from such power circuits, and provided that all machine frames and hand ropes are permanently grounded.

**(13.2.1.9.5). §C26-890.0 Electric Wiring.-**Live parts of electrical apparatus in elevator hoistways shall be suitably enclosed to prevent accidental contact. Metal coverings shall be permanently grounded. Wiring shall comply with the requirements of the department of water supply, gas and electricity.

## **SUB-GROUP 9**

### **Thoroughfares and Occupied Spaces**

**(13.2.1.10.1). §C26-891.0 Thoroughfares and Occupied Spaces Under Elevator Hoistways or Counterweights.-**It shall be unlawful to have thoroughfares or occupied spaces under elevator hoistways or counterweights unless:

1. Buffers are provided conforming to the requirements of sections C26-944.0 through C26-951.0;

2. The car and counterweights are provided with safety devices conforming to the requirements of sections C26-989.0 through C26-1004.0;

3. A structure is provided under the hoistway, which structure is sufficiently strong to withstand without failure the impact of the car with contract load or the impact of the counterweight when either the car or counterweight is descending at contract speed, or at governor tripping speed where a governor-operated safety is used.

## **GROUP 2**

### **Hoistway Guards and Screens**

**(13.2.2.1) §C26-892.0 Standard Guards.-**

a. The standard railings mentioned in this title shall be made of metal and shall be between forty and forty-six inches high and shall have an intermediate rail midway between the top rail and the floor. The uprights and hand-rail, shall be made of angles measuring at least two by two inches or the equivalent and the midrail of angles measuring at least one by two inches.

b. The toeboards mentioned in this title shall be made of metal at least as thick as No. 16 U.S. gage, at least six inches high, or such toeboards shall be made of fireproofed wood having dimensions of at least one by six inches.

c. All guards for cables and machinery mentioned in this title shall conform to the safety code for mechanical power-transmission apparatus of the American Standards Association, dated nineteen hundred twenty-seven.

**(13.2.2.2). §C26-893.0 Hatch Covers for Sidewalk Elevators.-**

a. Where the top hatch opening of sidewalk elevators is wholly or partially outside the building wall, the hatch covers shall be of the hinged type or the vertically lifting type and shall be capable of sustaining a live load of three hundred pounds per square foot. The maximum dimensions of sidewalk openings, except by permission of the superintendent, shall be five feet at right angles to and six feet parallel to the building line. The side of the opening nearest the building shall be four inches or less from the building wall, except that where conditions make this impractical such distance may be increased subject to the approval of the superintendent.

b. Where hinged type covers are used, the line of the hinges shall be at right angles to the building line. Where the covers open toward any obstruction, the space between the fully opened cover and such obstruction shall be at least eighteen inches. Where vertically lifting covers are used, there shall be a clearance of at least two feet between the cover and any obstruction above it when the elevator is at the top of its overtravel.

c. Hatch covers shall be self-closing. It shall be unlawful to fasten or to hold open such covers when the car is away from the top landing, except where the hatch opening is in an area inaccessible to the public.

d. Where the top hatch opening of sidewalk elevators is wholly inside the building wall, hinged or vertically lifting type covers may be used, or doors may be provided complying with sections C26-925.0 through C26-932.0, If such doors are provided with interlocks complying with sections C26-907.0 through C26-913.0.

**(13.2.2.3.1). §C26-894.0 Counterweight Runway Enclosures.-**

a. Counterweight Runways Outside of the Hoistway.-Where runways for counterweights are located outside of the elevator hoistway, such runways shall be solidly enclosed throughout their height, except that when the runway is located outside of the structure, such runway shall be enclosed to a height of at least seven feet from the ground.

(13.2.2.3.2). b. Counterweight runways inside of the hoistway.-Each counterweight runway located in the elevator hoist way shall be enclosed from a point twelve inches above the floor of the pit to a point at least seven feet above the floor of its own pit and any other pit adjacent to such counterweight runway, except where compensating chains or cables which practically compensate for the weight of the hoisting cables are attached to the counterweight. In such case, counterweight enclosures may be omitted on the side facing the elevator. Such enclosures shall be made of metal at least as thick as No. 16 U.S. gage.

(13.2.2.3.3). c. Access to Counterweight Runways.-Access shall be provided for inspection, maintenance and repair of all counterweights and cables. Doors to counterweight runway enclosures shall be self-closing. If the counterweight is located in the same hoistway as the car and can be inspected at midtravel from the car, hinged sections shall be unnecessary in the counterweight screen.

**(13.2.2.4). §C26-895.0 Cable Enclosures.-**Where cables pass through floors outside the hoistway enclosures, such cables shall be guarded to a height of at least six feet from each floor

with a standard power-transmission guard. It shall be unlawful to have floor openings greater than is necessary for the free passage of the cables.

### **GROUP 3 Landings**

#### **SUB-GROUP 1**

##### **Hoistway Doors for Passenger Elevators**

**(13.2.3.1.1). §C26-896.0 Automatic Fire Doors Functioning by Heat.**-It shall be unlawful for any automatic fire door, the functioning of which is dependent on the action of heat, to lock any landing opening in the hoistway enclosure of any passenger elevator or to lock any exit leading from any hoistway landing door to the outside of the structure.

**(13.2.3.1.2). §C26-897.0 Protection of Landing Openings.-**

a. Landing openings in passenger elevator hoistway enclosures shall be protected by doors sliding horizontally or vertically, or combination sliding and swinging doors, or swinging doors, or by counterbalanced doors.

b. Where vertically sliding or counterbalanced doors are used, the car gate or door and the hoistway doors shall be so interlocked that the car gate or door cannot be opened more than eighteen inches until the landing door is locked in its fully opened position and so that such landing door cannot start to close until the car gate or door is closed to within eighteen inches of full closure. Doors used exclusively for loading or unloading of freight shall be exempted from this requirement.

**(13.2.3.1.3). §C26-898.0 Clearances of Hoistway Doors.-**

a. The maximum distance between the hoist way side of the hoistway door opposite the car opening and the hoistway edge of the landing saddle, shall be four inches.

b. For automatic-operation elevators, the maximum distance between the hoistway side of the hoistway door opposite the car opening and the hoistway edge of the landing shall be one inch for swinging doors and two and one-quarter inches for sliding doors.

c. For existing installation of automatic-operation elevators accessible to the general public, where the clearance exceeds one and one-half inches for swinging doors or two and one-quarter inches for sliding doors, the hoistway door shall be relocated in the hoistway so as to bring the entire hoistway side of the hoistway door within the above required clearance.

Whenever this is not possible the hoistway doors and their bucks shall be replaced with doors that meet the requirements of this title.

d. If the door slides in two or more sections, the specified dimension requirement shall apply to that section which closes against the lock jamb.

e. It shall be unlawful for any hardware, except hardware required for interlocking, indicator and signal devices, to project into the hoistway beyond the line of the landing saddle.

**(13.2.3.1.4). §C26-899.0 Hoistway Door Interlocks.**-All hoistway door interlocks used on the hoistway doors of passenger elevators shall conform to sections C26-907.0 through C26-913.0. The hoistway doors of hydraulic passenger elevators shall also be provided with a door-closer or with a device which will compensate for such creeping away of the car from the landing as is caused by leakage in the valve or in the cylinder.

**(13.2.3.1.5). §C26-900.0 Emergency Releases Required for Hoistway Doors for Passenger Elevators.**-Provision shall be made to render the car operative independent of the position of the hoistway doors in case of fire, panic or other emergencies, by means of an emergency release

conforming to sections C26-921.0 through C26-924.0, except that elevators which can be started from a landing shall not be provided with an emergency release unless such elevators are equipped for dual operation, in which case an emergency release shall be installed when a car switch is provided for use by an operator and maybe provided on dual operation elevators for use when operation is from the car only by means of buttons and the car cannot be started from the landing buttons but such emergency release shall be so arranged than when such elevator operates as an automatic-operation elevator such emergency release shall be inoperative.

**(13.2.3.1.6). §C26-901.0 Hand Opening of Hoistway Doors.-**

- a. Hoistway doors shall be arranged to be opened by hand from the hoistway side, except when locked “out of service”. It shall be unlawful to lock the main exit doors or the doors at the lower terminal landing “out of service” while the elevator is in operation.
- b. Hoistway doors for passenger elevators shall be so arranged that it shall be unnecessary to reach back of any panel, jamb or sash to operate such doors.
- c. Horizontally swinging type hoistway doors of automatic operation elevators shall have no hand operated latches or other hand operated door fastening devices. Such doors shall have no knobs or handles on the hoistway side. Key locks may be provided for locking the doors “out of service” subject to the requirements of paragraph a of this section. Such doors shall be equipped with door closers.
- d. For existing installations of automatic operation elevators, hand operated latches or other hand operated door fastenings on horizontally swinging type hoistway doors, and knobs or handles on the hoist way side of such doors, shall be removed. Such doors shall be equipped with interlocks and door closers. Key locks may be retained on elevator hoist way doors serving a single tenant exclusively.

**(13.2.3.1.7). §C26-902.0 Opening of Hoistway Doors.-**If the entire control of a passenger elevator is located on the car, the hoistway doors shall be so arranged that such hoistway doors cannot be opened from the landing side, except as provided in section C26-903.0. If the control is not located entirely on the car, such hoistway doors shall be so arranged that, unless the car is within nine inches of the landing, such doors shall be incapable of being opened from the landing side.

**(13.2.3.1.8). §C26-903.0 Emergency Landing Openings and Keys.-**

- a. A service key shall be provided to permit the unlocking and opening of the hoist way door from the landing side provided the car is within the landing zone of that landing. The service key shall be provided for the hoistway door at the landing of each elevator nearest the main entrance to the structure and may be provided at other landings. The service key is not required for elevators having hoistway door interlocks which are automatically unlocked and where the doors are openable from the landing side when the car is within the landing zone.
- b. Emergency unlocking devices shall not be provided which will unlock or release from the landing side any hoistway door interlock at any landing when the car is outside the landing zone of that landing, except that for elevators which can be started from a landing, an emergency unlocking device shall be provided to unlock or release from the landing side, irrespective of the position of the car, the hoistway door interlock at the following landings:
  1. The first landing above the bottom landing.
  2. The bottom landing where the door at this landing is the only means of access to the pit.
- c. Keys for unlocking emergency unlocking devices shall be of special shape and of a design which will prevent unlocking or releasing the hoistway door interlock from the landing side

by the use of screwdrivers or other common tools or instruments. Where a door escutcheon plate is used to prevent the use of keys other than the specially shaped keys required by this rule, they shall be so designed, installed and secured in place as to prevent their removal from the landing side and so as to reduce to a minimum the possibility of their deformation.

d. Where any elevator is installed in a single blind hoistway there shall be installed at every third floor in the blind portion of the hoistway an emergency door. Such doors shall not be more than thirty-six feet apart. Emergency doors shall conform to the following:

1. They shall be not less than thirty inches wide and six feet six inches high, clear opening.
2. They shall be easily accessible and free from obstruction.
3. They shall be provided with hoistway door interlocks.

e. The person responsible for the maintenance and operation of the elevator (see section C26-1171.0) shall maintain on the premises a key for unlocking the emergency unlocking device. The key shall be kept in a location where it is readily available to authorized persons, but not available to the general public.

**(13.2.3.1.9). §C26-904.0 Hangers for Power Operated Hoistway Doors.-**Hangers for power operated hoistway doors shall be so designed as to withstand a downward thrust of five times the weight of the door and an upward thrust of four times the weight of the door.

**(13.2.3.1.10). §C26-905.0 Hanger Stops and Guards.-**Means shall be provided to prevent hangers for all sliding hoistway doors from jumping the tracks. Stops shall also be provided to prevent the hanger carriage from leaving the ends of the track, or suitable stops may be provided on the door only.

**(13.2.3.1.11). §C26-906.0 Vision Panels.-**

a. All manually opened hoistway doors and car doors of elevators which can be operated from outside the hoistway, and all hoistway swing doors, and car doors of elevators in hoistways equipped with swing doors, shall each be provided with a vision panel.

b. Such vision panel in an elevator hoistway door shall be of clear wired plate glass with an area of between eighty and thirty-six square inches. The width of each such panel shall be six inches or more.

c. Each vision panel in an elevator car door shall be of clear wired plate glass or not-shatterable safety glass of a type approved by the superintendent, or shall be a heavy wire mesh or a grille of a type approved by the superintendent. Every wired glass or safety glass vision panel in an elevator car door shall have an area of between eighty and thirty-six square inches. The width of each such panel shall be six inches or more.

d. The height above floor landings of vision panels in hoistway doors shall be as prescribed by the board. Each car door vision panel shall be so located as to provide unobstructed clear vision through both hoistway door and car door vision panels when the car is leveled at the landing.

e. The dimensions and distance above floor landings of all required vision panels, in the hoistway doors of any hoistway, shall be the same throughout the full height of the hoistway.

## **SUB-GROUP 2**

### **Hoistway Door Interlocks**

**(13.2.3.2.1). §C26-907.0 Door Unit and Hoistway Unit Systems of Door Interlocks.-**

- a. One of the two following systems of door interlocks shall be used:



1. The door unit system, in which the interlock prevents the operation of the elevator machine from moving 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 interlocks prevent the operation of the elevator machine from moving the car away from the landing unless all its hoistway doors are locked in the closed position.

b. All interlocks shall permit the operation of the car when the emergency release is in temporary use, or when the car is being moved by a car levelling device.

c. All interlocks shall prevent the opening of the hoistway door from the landing side, except by a 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.

**(13.2.3.2.2). §C26-908.0 Use of the 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.

**(13.2.3.2.3). §C26-909.0 Closed Position of Hoistway Doors.**-

a. For elevators not requiring the presence of an operator in the car, the hoistway door shall be considered in the closed position only when the door is within three-eighths of an inch of contact with the door jamb, or in the case of bi-parting doors, only when such doors are within three-eighths of an inch of contact with each other.

b. For elevators where the hoistway door is not equipped with a door closer, such door shall be considered in the closed position only when the door is within three-eighths of an inch of contact with the door jamb, or in the case of bi-parting doors, only when such doors are within three-eighths of an inch of contact with each other.

c. Where the hoistway door of an elevator requiring the presence of an operator in the car is equipped with a door closer, such door shall be considered to be in the closed position, and the car may be started, when such door is within four inches of being fully closed against the jamb, or in the case of bi-parting doors, when such doors are within four inches of contact with each other, provided that at this position and any other position up to full closure as defined in this section, such door cannot be opened from the landing side more than four inches from the jamb, or the sections of bi-parting doors more than four inches from each other, and provided further that the door closer is of a type which will eventually close the door to the fully closed position as defined in this section, and lock such door in such position.

**(13.2.3.2.4 ). §C26-910.0 Design of Interlocks.**-Interlocks for all hoistway doors shall be so designed that such doors are locked in the closed position as defined in section C26-909.0, before the car can be operated. It shall be unlawful to use as interlocks devices employing locks and contacts of a type where the contact is made when the door is closed and the locking of such door takes place subsequently and all existing self-service elevators shall comply with the provisions of this section.

**(13.2.3.2.5). §C26-911.0 Use of Springs and Electric Circuits in Interlocks.**-The functioning of door interlocks to prevent the movement of the car shall be independent of the action of a spring or springs in tension, or of the closing of an electric Circuit. If springs are used, such springs shall be in compression. If an electric circuit is used, the interruption of such circuit shall prevent the movement of the car.

**(13.2.3.2.6). §C26-912.0 Tests and Approvals of Interlocks.**-Each type and make of door interlock shall be approved by the superintendent on the basis of the engineering tests listed in

sections C26-1179.0 and C26-1180.0. Such tests shall be made by or under the supervision of the board or by or under the supervision of a competent laboratory designated by the board. Minor changes in design may be made without retesting, subject to the approval of the board.

**(13.2.3.2.7). §C26-913.0 Identification of Interlocks.-**Approved interlocks shall be suitably and plainly marked for identification. The marking shall be permanent and so placed as to be readily visible when such interlocks are mounted in position. Auxiliary appliances forming a part of, or used in conjunction with, an interlock, shall be similarly marked. Such marking shall include the following:

1. Date of official approval and number or designation, if any, of such official approval.
2. Manufacturer's name or trade-mark.
3. Type or style letter or number.
4. Rated voltage.

### **SUB-GROUP 3**

#### **Hoistway Door Electric Contacts**

**(13.2.3.3.1). §C26-914.0 Door Unit and Hoistway Unit Systems of Contacts.-**

a. One of the two following systems of door electric contacts shall be used:

1. The door unit system in which the contact prevents the normal operation of the car unless the hoistway door at which the car is standing is in the closed position.
2. The hoistway unit system in which the contact prevents the normal operation of the car unless all its hoistway doors are in the closed position.

b. The contact shall permit the operation of the car when the emergency release is in temporary use, or when the car is being moved by a car-leveling device.

**(13.2.3.3.2). §C26-915.0 Use of Door Unit System.-**The door unit system may be used only on elevators where there is a regular operator in the car and where such elevators can be operated only from inside the car.

**(13.2.3.3.3). §C26-916.0 Closed Position of Electric Contacts.-**Where the hoistway door contacts are not a part of an interlock system, the door shall be considered in the closed position when such door is within two inches of full closure against the jamb.

**(13.2.3.3.4). §C26-917.0 Design of Electric Contacts.-**Hoistway door contacts shall be so designed that they shall be positively opened by a lever or other device attached to and operated by the door.

**(13.2.3.3.5). §C26-918.0 Use of Springs or Electric Circuits in Contacts.-**The functioning of hoistway door Electric Contacts to prevent the movement of the car shall be independent of the action of a spring or springs in tension, or of the closing of an electric circuit. If springs are used, such springs shall be in compression. If an electric circuit is used, the interruption of such electric circuit shall prevent the movement of the car.

**(13.2.3.3.6) §C26-919.0 Tests and Approvals of Electric Contacts.-**

a. Each type and make of hoistway door electric contact shall be approved by the superintendent on the basis of the following engineering tests. Such tests shall be made by the board or by or under the supervision of a competent laboratory designated by the board:

1. Endurance test.
2. Current-interrupting test.
3. Test in moist atmosphere.
4. Misalignment test.
5. Insulation test.

b. Such tests shall be made according to the procedure outlined in sections C26-1179.0 and C26-1180.0. Minor changes in design may be made without retesting, subject to the approval of the board.

**(13.2.3.3.7). §C26-920.0 Identification of Approved Contacts.**-Approved contacts shall be suitably marked for identification as prescribed in section C26-913.0.

#### **SUB-GROUP 4**

##### **Emergency Releases**

**(13.2.3.4.1). §C26-921.0 Location of Emergency Switch.**-The emergency release switch shall be in the car.

**(13.2.3.4.2). §C26-922.0 Design, Construction and Operation of Release Switch.-**

a. The switch shall be key operated by means of a tumbler lock of at least the 5 pin type which shall not be master keyed with nor operated by a key which will operate any device or lock other than the switch required by this section except that the same design key may be used to operate the emergency release switches of all elevators.

b. The switch shall be of the continuous pressure type requiring the key to be manually held in the operating position to permit operation of the car with the door unlocked or open and designed to automatically return to the off position when the key is released.

c. The switch shall be so designed as to render the car operative only at its slowest operating speed.

d. The key shall be removable only when the switch is in the off position.

**(13.2.3.4.3). §C26-923.0 Location of Key.**-The person responsible for the maintenance and operation of the elevator as listed in section C26-1171.0 shall maintain on the premises a key for operating the switch specified in this section in a location readily available only to authorized persons but where it is unavoidable to the general public or to any other persons except maintenance men, repair men or inspectors.

**(13.2.3.4.4). §C26-924.0 Tests and Approvals of Emergency Releases.**-Each make and type of emergency release shall be tested and approved by the board as to compliance with section C26-922.0, and as to meeting the requirements of section C26-1185.0. Minor changes in design may be made without retesting, subject to the approval of the board.

#### **SUB-GROUP 5**

##### **Hoistway Doors for Freight Elevators**

**(13.2.3.5.1). §C26-925.0 Doors Required.-**

a. Each landing opening in every freight elevator hoistway enclosure shall be equipped with a door which, if not within the hoistway, shall be set within four inches of the face of the landing saddle. The upper landing of one-story sidewalk elevators is exempted from this requirement.

b. Such doors shall comply with the fire resistive requirements for doors in such enclosures. Landing doors may be of the horizontally or vertically sliding, counterbalanced vertically sliding, combination sliding and swinging, or swinging type.

**(13.2.3.5.2). §C26-926.0 Strength of Hoistway Doors.**-Every hoistway door in a freight elevator shall be capable of withstanding a force of seventy-five pounds applied perpendicularly to such door at any point without such door being sprung from its guides.

**(13.2.3.5.3). §C26-927.0 Size of Hoistway Doors.**-When hoistway doors for freight elevators are closed, such doors shall guard the full width of the landing openings and such doors shall extend the full height from the landing saddle to the top of the landing opening.

**(13.2.3.5.4). §C26-928.0 Interlocks and Electric Contacts.**-

a. Hoistway doors for power freight elevators shall be equipped with hoistway door interlocks conforming to sections C26-907.0 through C26-913.0 except that mechanical locks and electric contacts conforming to sections C26-914.0 through C26-920.0, may be used for manually opened vertical sliding counterweighted or vertical sliding bi-parting counterbalanced hoistway doors subject to following conditions:

1. On elevators having a travel of fifteen feet or less on the top and bottom hoistway doors and on the intermediate hoistway doors, if any, of adjacent or reverse landings, the door sills of which are located within four feet of the sill of the top or bottom hoistway doors.

2. On elevators having a travel of more than fifteen feet, for the hoistway door at an adjacent or reverse landing the door sill of which is located not over four feet above the sill of the bottom hoistway door.

b. Mechanical locks and contacts on interlocks shall be used on the bottom hoistway door of sidewalk elevators.

c. Hoistway door electric contacts which are not part of an interlock system shall have the lock or latch and contact arranged so that the door will be in a position to be locked or latched when or before such contact is closed.

d. Hoistway door electric contacts and door locks or latches shall be so located as normally to be inaccessible from the landing side.

**(13.2.3.5.5). §C26-929.0 Emergency Releases Required for Hoistway Doors for Freight Elevators.**-Provision shall be made to render the car operative independent of the position of the hoistway doors in case of fire, panic or other emergencies, by means of an emergency release conforming to sections C26-921.0 through C26-924.0, except that elevators which can be started from a landing shall not be provided with an emergency release unless such elevators are equipped for dual operation, in which case an emergency release shall be installed when a car switch is provided for use by an operator and may be provided on dual operation elevators for use when operation is from the car only by means of buttons but such emergency release shall be so arranged that when such elevator is operated as an automatic-operation elevator, such emergency release shall be inoperative. Sidewalk elevators shall be exempted from this requirement.

**(13.2.3.5.6). §C26-930.0 Vision Panels.**-For freight elevators which can be operated from outside of the hoistway, hoistway doors may be provided with a vision panel. Such panels shall be of clear wired glass with a maximum area of eighty square inches.

**(13.2.3.5.7). §C26-931.0 Opening of Hoistway Doors.**-If the entire control of a freight elevator is located on the car, the hoistway doors shall be so arranged that such hoist way doors cannot be opened from the landing side, except as provided in section C26-932.0. If the control is not located entirely on the car, hoistway doors shall be so arranged that, unless the car is within the landing zone, such doors cannot be opened from the landing side.

**(13.2.3.5.8). §C26-932.0 Emergency Landing Openings and Keys.**-Emergency landing openings and keys for freight elevators shall be provided in the same manner as required for passenger elevators by section C26-903.0.

## **SUB-GROUP 6**

### **Door Counterweight Enclosures**

**(13.2.3.6). §C26-933.0 Door Counterweight Enclosures.**-Door counterweights shall run in metal guides from which they cannot become dislodged, or shall be boxed in. The bottoms of such guides or boxes shall be so constructed as to retain such counterweight if the counterweight rope breaks.

## **SUB-GROUP 7**

### **Landings for Passenger and Freight Elevators**

**(13.2.3.7.1). §C26-934.0 Landing Saddle.**-The landing saddle shall be constructed and maintained in such a manner as to prevent persons from readily slipping thereon.

**(13.2.3.7.2). §C26-935.0 Railroad Tracks.**-Where there is a railroad track upon any elevator landing, the tops of the rails shall be flush with the floor for a distance of six feet from the threshold.

## **SUB-GROUP 8**

### **Lighting at Landings**

**(13.2.3.8). §C26-936.0 Lighting at Landings.**-When the car of an elevator is in service at the landing, the landing edges of the saddle and car platform shall be plainly visible. The illumination on the landing saddle shall be at least one foot candle.

## **Sub-Article 4. Passenger, Freight and Sidewalk Type Power Elevators**

### **GROUP 1**

#### **Limitations for Platform and Sidewalk Type Elevators**

**(13.3.1.1). §C26-937.0 Platform Elevators Unlawful.**-It shall be unlawful to use platform elevators.

**(13.3.1.2). §C26-938.0 Sidewalk Type Elevators.**-

- a. All sidewalk type elevators shall comply with the requirements of sections C26-937.0 through C26-1096.0, unless specifically exempted.
- b. Every sidewalk type elevator shall have a maximum contract speed of thirty-five feet per minute and a maximum platform area of fifty square feet.

### **GROUP 2**

#### **Guides, Buffers and Counterweights for Passenger, Freight and Sidewalk Type Elevators**

### **SUB-GROUP 1**

#### **Guide Rails**

**(13.3.2.1.1). §C26-939.0 Material.**-It shall be unlawful to use car or counterweight guide rails made of any material other than steel.

**(13.3.2.1.2). §C26-940.0 Fastenings and Joints.**-

- a. All guide rails shall be securely fastened with iron or steel brackets, or their equivalents. Such brackets shall be of such strength, design and spacing that the deflection of guide rails and their fastenings shall be one-quarter of an inch or less under normal operation.
- b. When rail brackets used in connection with freight elevators or sidewalk type elevators are so located that such rail brackets receive the full thrust of the guide shoes when the car

platform is level with the landing, special attention shall be given to the attachment of the brackets in such cases. Where the distance between rail supports is greater than fourteen feet, the rails shall be suitably backed or bracketed to secure sufficient rigidity for satisfactory operation.

c. Joints of guide rails, except for sidewalk elevators the travel of which is fifteen feet or less, shall be accurately machined with tongue and groove through the webs at right angles to the base and through the flanges parallel to the base, and such joints shall be fitted with fishplates each secured with at least four substantial bolts through each rail; or such joints shall be accurately machined with tongue and groove through the webs and with the backs of the flanges, where the fishplates bear, accurately machined at right angles to the tongue and groove and shall be fitted with finished fishplates each secured with at least four substantial bolts through each rail.

d. Guide rails shall withstand the application of the safety when the safety is stopping a fully loaded car or the counterweight.

**(13.3.2.1.3). §C26-941.0 Size of Guide Rail Fastenings and Bottoming of Guide Rails.-**

a. Guide rails and their fastenings shall be secured in position by clips or through bolts of at least the sizes given in the following table:

<b>Weight of Rails in Pounds per Foot.</b>	<b>Diameter of Bolts in Inches.</b>
6 1/2 – 7 1/2	1/2
14	5/8
22 1/2	3/4
30	3/4

b. The maximum diameter of bolt holes in steel beams for bracket bolts shall be equal to the diameter of the bolt plus one-sixteenth of an inch. Such holes for bolts shall be either drilled, punched or cut with a torch. If cut with a torch, such bolt holes shall be cut of small diameter and drifted to the required diameter.

c. The guide rails shall be extended at the top and bottom to prevent the car and counterweight guide shoes from running off the rails within the limits of the bottom over-travel and the top clearance.

**(13.3.2.1.5). §C26-942.0 Weight of Steel Guide Rails.-**

a. The weights of steel guide rails, except for sidewalk elevators the travel of which is fifteen feet or less, shall be at least those given in the following table.

<b>Maximum Permissible Total Weight of Car and Load, or Total Weight of Counterweights per Pair of Rails (Pounds).</b>	<b>Minimum Weight of Each Car Guide Rail (Pounds per Foot).</b>	<b>Minimum Weight of Each Counterweight Guide Rail (Pounds per Foot).</b>		
		<b>With Guide Rail Safeties.</b>	<b>Without Guide Rail Safeties</b>	
			<b>1 to 1 Roping.</b>	<b>2 to 1 Roping.</b>
4,000	7 1/2	7 1/2	6 1/2	6 1/2
15,000	14	14	7 1/2	7 1/2
27,500	22 1/2	22 1/2	7 1/2	14
40,000	30	30	7 1/2	14

b. Where seven and one-half pound rails are effectively bracketed or tied at intervals of six feet or less, the load permitted under the preceding table may be doubled for counterweights with guide rail safeties. Where seven and one-half pound rails are effectively bracketed or tied at intervals of seven and one-half feet or less, the load permitted under the preceding table may be increased to five thousand pounds for cars with guide rail safeties. Where seven and one-half pound rails are effectively bracketed or tied at intervals of ten feet or less the load permitted under the preceding table may be increased to four thousand five hundred pounds for cars with guide rail safeties.

c. The maximum weights of car and load as given in the preceding table for each pair of guide rails shall apply when only one safety device gripping both rails in a horizontal plane is used. When two such safety devices are used on the same guide rail and such devices are so arranged that both will be applied at practically the same time and with substantially equal retarding force, the total weight may exceed the weight shown in the table but such weight shall in any case be within the maximum weight given in the table multiplied by the following factors based on distance between safeties:

<b>Distance Between Safeties in Feet.</b>	<b>Multiply Maximum Load Given in the Preceding Table by</b>
<b>Car Duplex Safeties.</b>	
18 (or over)	2.0
15	1.83
12	1.67
9	1.50
6	1.33
<b>Counterweight Duplex Safeties.</b>	
15 (or over)	2.0
10	1.67
5	1.33

**(13.3.2.1.6). §C26-943.0 Use of Single Pair of Car Guide Rails.-**Whenever practicable a single pair of car guide rails shall be used for passenger elevators.

## **SUB-GROUP 2**

### **Car and Counterweight Buffers**

**(13.3.2.2.1). §C26-944.0 Required Types of Buffers.-**

a. Buffers of the spring, oil or equivalent type shall be installed under the cars of all elevators, except sidewalk elevators having a travel of fifteen feet or less.

b. Spring buffers or their equivalent may be used with elevators having a contract speed of two hundred feet or less per minute.

c. Oil buffers or their equivalent shall be used with elevators having a contract speed greater than two hundred feet per minute. The minimum stroke of oil buffer shall be based on an average retardation of thirty-two and one-fifth feet per second based on governor-tripping speed.

d. Where speed retarding devices independent of normal and final stop switches are provided for retarding the car or counter weight or both to a definite limiting speed before the buffer is engaged, the required corresponding buffer stroke need be based only on retardation from such speed rather than from governor tripping speed. Such speed retarding devices shall be so designed that the retarding force shall be quickly but gradually applied, substantially

constant, and so that the retarding distance shall be at least the sliding distance specified in sections C26-1005.0 through C26-1010.0, for under-car safeties. For contract car speeds in excess of five hundred feet per minute, the corresponding reduced buffer stroke shall be at least eighteen inches.

**(13.3.2.2.2). §C26-945.0 Oil Gages Required.**-Oil buffers shall be provided with means for gaging the amount of oil in them.

**(13.3.2.2.3). §C26-946.0 Location of Car Buffers.**-Buffers shall be located symmetrically with reference to the center of the car.

**(13.3.2.2.4). §C26-947.0 Location of Counterweight Buffers.**-Counterweight buffers similar to those required for cars shall be installed symmetrically under the counterweights of passenger and freight elevators.

**(13.3.2.2.5). §C26-948.0 Form of Buffer Test.**-Buffers shall be tested by running on to them with contract load at contract speed with final limit switches operative, except as follows: If the buffer stroke has been reduced due to the use of a speed retarding device as permitted in section C26-944.0, the car or counterweight shall be run on to the buffer at the speed corresponding to the buffer stroke used.

**(13.3.2.2.6). §C26-949.0 Buffer Compression Switch.**-Where the car or counterweight oil buffer is compressed more than twenty-five percent of its stroke when the car is level with the lower or upper terminal landing, respectively, buffers shall be provided with a switch which shall prevent movement of the car in a direction to compress such buffers at a speed greater than one-half of the contract speed until such buffers are restored to their normal position.

**(13.3.2.2.7). §C26-950.0 Tests and Approvals of Oil Buffers.**-Each type and size of oil buffer used shall be approved by the board on the basis of the engineering tests listed in sections C26-1186.0 through C26-1191.0. Such tests shall be made by or under the supervision of the board, or a competent testing laboratory designated by the board. Approved buffers shall be marked by the manufacturer with the range of speed and load for which such buffers have been approved, the date of approval and the designating number, if any, of the approval.

**(13.3.2.2.8). §C26-951.0 Precompression of Oil Buffers.**-If spring-return oil buffers are precompressed such buffers shall be so installed that when the car is level with a terminal landing, the remaining buffer stroke shall be fifty percent or more of the gravity stopping distance corresponding to the governor-tripping speed used.

### **SUB-GROUP 3**

#### **Counterweights**

**(13.3.2.3.1). §C26-952.0 Counterweight Guides and Guide Shoes Required.**-Counterweights shall be guided at the top and bottom. The guiding members shall have sufficient strength to withstand the reaction resulting from the normal operation of the counterweight and from the operation of the counterweight safety where such safety is provided. Guide shoes may be provided with non-metallic gibs or rollers of a type approved by the board.

**(13.3.2.3.2). §C26-953.0 Clearance Between Counterweights and Protection of Counterweight Cables.**-If two counterweights run in the same guides, the car counterweight shall be above the machine counterweight and there shall be a clearance of at least eight inches between such counterweights. The cables of the machine counterweight shall be covered or protected by metal or fibre sleeves firmly attached to the cable. Such sleeves shall be at least six inches longer than the car counterweight. The ends of such sleeves shall be carefully reamed before they are placed on the cables.



**(13.3.2.3.3). §C26-954.0 Independent Car Counterweights.**-If an independent car counterweight is used, such counterweight shall be of insufficient weight to cause undue slackening in any of the cables during acceleration or retardation of the car.

**(13.3.2.3.4). §C26-955.0 Counterweight Tie-Rods and Suspension Members.**-Counterweight sections, however carried, shall be secured by at least two tie-rods passing through holes in all the sections, or by other approved means. Such tie-rods and suspension rods shall have lock nuts and cotter pins at each end. Suspension rods shall be free from welds.

### **GROUP 3**

#### **Car Construction and Safeties for Passenger, Freight and Sidewalk Type Elevators**

##### **SUB-GROUP 1**

##### **Car Construction**

**(13.3.3.1.1). §C26-956.0 Materials for Car Frames and Platforms.**-All elevator cars shall have metal car frames and metal outside frames of platforms. Where wood platform flooring is used, the under side of car platform shall be covered with metal at least as thick as No. 27 U.S. gage, except where fireproofed wood is used, and except for sidewalk elevators the travel of which is one story or less.

**(13.3.3.1.2). §C26-957.0 Allowable Working Stresses for Car Frame Members.**-The stresses of rolled steel sections or annealed cast steel used in the construction of car frames and platforms, based on the static load imposed on them, shall be within the values given in the following table for steels meeting the standard specifications of the A.S.T.M., D., A 7-29, for steel having an ultimate strength of from fifty-five thousand to sixty-five thousand pounds per square inch for rolled sections or cast steel, and forty-six thousand to fifty-six thousand pounds per square inch for rivets. Elevators of the plunger type which are without counterweights shall be exempted from these requirements.

<b>Passenger Elevators</b>		
<b>Loading</b>	<b>Maximum Allowable Stress (Pounds per Square Inch).</b>	<b>Basis.</b>
Tension	10,000	Net area
Bending	10,000	Gross section
Shear on shop rivets	8,000	Net area
Bearing of shop rivets	16,000	Net area
Shear on bolts in clearance holes	7,000	Gross section
Bearing on bolts in clearance holes	14,000	Gross section
Bolts or threaded portions of rods in tension	6,000	Gross section
Compression	11,700-49 L/R	Gross area
<b>Freight Elevators</b>		
Tension	12,000	Net area
Bending of car frame member and platform framing at entrance	12,000	Gross section
Bending of platform stringers	15,000	Gross section
Shear on shop rivets	9,500	Net area
Bearing of shop rivets	19,000	Net area
Shear on bolts in clearance holes	8,000	Gross section
Bearing of bolts in clearance holes	16,000	Gross section
Bolts or threaded portions of rods in tension	8,000	Gross section
Compression	14,000-59 L/R	Gross area

L = effective free length of member in inches.

R = least radius of gyration in inches.

**(13.3.3.1.3). §C26-958.0 Special Steels.**-For steels of greater strength the allowable working stresses may be increased proportionately, based on ultimate strength.

**(13.3.3.1.4). §C26-959.0 Use of Cast Iron and Cast Steel.**-It shall be unlawful to use cast iron in the construction of any member of car frames or platforms which is subject to tension, torsion or bending, except for compensating cable anchorages, releasing carriers and guide shoe stands. Plunger heads in tension shall be of cast steel.

**(13.3.3.1.5). §C26-960.0 Use of Other Materials Than Steel.**-When material other than steel is used in the construction of car frames or platforms, the maximum allowable working stress shall be thirteen percent of the ultimate strength of the material for a passenger elevators and fifteen and three-fifths percent for freight elevators.

**(13.3.3.1.6). §C26-961.0 Reductions in Section and Reinforcement of Holes.**-Local reductions in section of a member in bending through bolt holes for the fastening of hoist-rope or compensating rope hitches, and for the fastening of auxiliary apparatus on the crosshead or safety plank, and for the fastening of sheave boxes, and the fastening of the platform to the safety

plank, may be disregarded. Holes in webs of crossheads for sheave pins shall be reinforced by means of a plate at least fifty percent thicker than the web and riveted to such web.

**(13.3.3.1.7). §C26-962.0 Deflection of Crosshead and Safety Planks.-**

a. The deflection of crosshead and safety planks shall be one eighth of an inch or less for each ten feet of span under static conditions with the contract load substantially uniformly distributed over the car platform, except for sidewalk elevators the travel of which is fifteen feet or less.

b. Where the span is other than ten feet, deflection shall be computed in direct proportion to the length of the span.

**(13.3.3.1.8). §C26-963.0 Slenderness ratio.-**The slenderness ratio, L/R, for members not normally subject to compression shall be within two hundred; for members normally subject to compression such ratio shall be within one hundred twenty, except for sidewalk elevators the travel of which is fifteen feet or less. Loadings resulting from buffer or safety operation are abnormal loadings.

**(13.3.3.1.9). §C26-964.0 Treatment of Occasional Stresses.-**The stresses which occur when the load is moved from the hoistway landing to its proper position on the car of freight elevators, especially heavy duty freight elevators, may be dealt with as stresses which occur only occasionally in conjunction with the maximum live load, and may exceed the stresses given in section C26-957.0 for freight elevators, provided that the deflection of car frame or platform members is considered.

**(13.3.3.1.10). §C26-965.0 Car Platform Aprons.-**

a. When car leveling devices are used, the car platform shall be provided with a substantial vertical apron, flush with the outer edge of the platform extending a sufficient distance below the car floor so that there shall be no horizontal opening into the hoistway while the car is within the landing zone and the hoistway door is fully or partially open.

b. An apron shall be provided on the car of each automatic-operation elevator. Such apron shall extend at least nine inches below the top of the car floor for the full width of the opening.

**(13.3.3.1.11). §C26-966.0 Bow Irons and Stanchions for Sidewalk Elevator Hatch Covers.-**

a. Sidewalk elevators using hinged hatch covers shall be provided with bow irons at least seven and one-half feet high, except that, where it shall be necessary to permit the closing of such covers, the superintendent may permit lower bow irons.

b. Sidewalk elevators which use vertically lifting covers shall be provided with stanchions framed together at the upper ends. Such stanchions shall be of sufficient strength to lift and support the hatch cover. Stanchions shall be provided with suitable buffer springs, and shall be of such height as to permit the sidewalk hatch cover to be completely closed when the car platform is level with the first landing below the sidewalk.

**(13.3.3.1.12). §C26-967.0 Guide Shoes for Sidewalk Type Elevators.-**

a. Guide shoes for all sidewalk elevators, except plunger elevators, shall be at least twenty-four inches long unless two sets of shoes are used and spaced at least eighteen inches on centers.

b. Where vertical lift covers are used on sidewalk elevators, the vertical distance between the centers of the guide shoes remaining on the guide rails when the car platform is level with the sidewalk shall be at least one-third of the height of the hatch cover stanchions.

c. Where single guide shoes twenty-four inches long are used, six inches of the shoe may be off the rails when the platform is level with the top landing.

**(13.3.3.1.13). §C26-968.0 Railroad Track in Elevator Cars.-**If there is a railroad track on the elevator car, the tops of the rails shall be flush with the car floor.

**(13.3.3.1.14). §C26-969.0 Lighting in Elevator Cars.-**All elevator cars, except sidewalk elevators, shall be lighted at all times when in use. Electric lights shall be used if available. The minimum illumination shall be one foot candle at the landing edge of the car platform. A light socket or receptacle shall be provided under the car platform and on top of the car for inspection purposes in all elevators, except sidewalk elevators.

**(13.3.3.1.15). §C26-970.0 Use of Glass in Elevator Cars.-**It shall be unlawful to use glass in elevator cars, except to cover certificates, directories, lighting fixtures and appliances necessary for the operation of the car and as a vision panel in the car door. It shall be unlawful to use any piece of glass exceeding one square foot in area unless such glass is laminated or is otherwise shatterproof, but the maximum total area of such glass used in such car in connection with lighting fixtures, whether in one or more pieces, shall be four square feet.

**(13.3.3.1.16). §C26-971.0 Design of Lighting Fixtures for Passenger Elevators.-**

- a. In passenger elevators, all lighting devices, or luminaires, provided with glass or metal shades, or reflectors, shall be of the railroad-train lighting type with integral base, husk and spring-clamp holder. If suspended glass bowls or glass plates are used, such bowls or plates shall rest in, and be fastened to, a metal supporting ring provided with at least three-point suspension. It shall be unlawful to drill such glass bowls or plates for attachment to ring suspensions.
- b. Glass bowls larger than ten inches in diameter shall be of laminated or otherwise shatterproof glass, or such bowls shall be surrounded by a guard made of wire at least 0.0286 inch in diameter (No. 22, steel wire gage) and of a mesh which will reject a one-half inch diameter ball. Guards shall be securely fastened to the holder or suspension.
- c. It shall be unnecessary for bare electric light bulbs to have guards.

## **SUB-GROUP 2 Car Compartments**

**(13.3.3.2). §C26-972.0 Car Compartments.-**

- a. If a passenger or freight elevator car has more than one compartment, each compartment shall be equipped with an operating device. There shall be an operator in each compartment which is in use, and such operator shall have exclusive control of that car door or gate and hoistway door; and it shall be impossible to start the car unless both operating devices are in the starting position.
- b. When any compartment is out of use, its car door or gate shall be locked in the closed position, and when such door or gate is so locked, the car may be started with the operating device in such compartment in the "off" position.
- c. Each compartment shall be equipped with an emergency stop switch and with an emergency release effective for the door or gate of that compartment and the corresponding hoistway door.
- d. Each compartment shall be provided with the emergency exits required by sections C26-971.0 through C26-987.0, and the upper compartment shall have a trap door in the floor connecting with the top exit of the compartment below. Special freight elevators upon which no persons are permitted to ride shall be exempted from this requirement.
- e. Two single elevators may be used in a single hoistway, provided that both such elevators are equipped with all the safeguards required by this title for a single elevator, both with

relation to each other and to top and bottom terminals and provided that an installation of the same type has satisfactorily met such tests as may be required by the superintendent.

### **SUB-GROUP 3**

#### **Car Enclosures**

##### **(13.3.3.3.1). §C26-973.0 Car Enclosures Required.-**

- a. Cars for passenger elevators shall be enclosed at the top and sides, except at the opening necessary for entrance or exit, and except for emergency exits.
- b. Cars for freight elevators shall be enclosed at the sides, except at the opening necessary for loading and unloading, with solid enclosures to a height of at least six feet or to the crosshead if such crosshead is lower. The section of such car enclosures opposite the counterweight shall extend to the crosshead or car top as provided in section C26-975.0.
- c. Cars for sidewalk elevators shall be enclosed at the sides, except at the openings used for loading and unloading, to a height of at least six feet above the platform, except that where the travel is less than seven and one-half feet, the height of the enclosure may be reduced subject to the approval of the superintendent.
- d. Tops shall be unnecessary on sidewalk elevators. It shall be unlawful to use tops on sidewalk elevators unless the clearance between the top and any obstruction above such top when the car is at the limit of its top overtravel is at least two feet.

**(13.3.3.3.2). §C26-974.0 Deflection and Securing of Enclosures.-**It shall be unlawful for any part of a power elevator car enclosure either to deflect so as to reduce the actual running clearance below the amount specified by section C26-860.0, or to exceed a deflection of one-quarter of an inch when subjected to a force of seventy-five pounds applied horizontally at any point. Such car enclosures shall be secured to the car floor and sling in such a manner that such enclosures cannot work loose or become displaced in ordinary service.

##### **(13.3.3.3.3). §C26-975.0 Materials and Design.-**

- a. If any enclosures, including the top, sides and car doors for passenger and freight elevators, except sidewalk elevators the travel of which does not exceed one story, are made of non-fireproof wood or other combustible material, such enclosures shall be covered on the exterior, including the top, with sheet metal at least No. 27 U.S. gage. It shall be unlawful to have any openings in the sides or top of passenger elevator car enclosures except openings required for entrance and ventilation and emergency exits. Vent openings less than seven feet above the car platform shall reject a ball two inches in diameter.
- b. Power freight elevator car enclosures shall be of metal fastened to a substantial metal frame properly reinforced and braced so as to comply with section C26-974.0, and such enclosures shall be at least equal to No. 14 U.S. gage sheet steel (0.078 inch) in strength and stiffness.
- c. The portion of the enclosure opposite the counterweight above the six-foot level may be of open-work which will reject a ball two inches in diameter.
- d. It shall be unlawful to use cast iron for car tops.

**(13.3.3.3.4). §C26-976.0 Number of Entrances to Elevator Cars.-**It shall be unlawful to have more than two entrances to an elevator car, except that where conditions make additional openings essential, such additional openings may be provided at the discretion of the superintendent.

**(13.3.3.3.5). §C26-977.0 Access to Hand Ropes on Freight Elevators.**-If the car enclosure on a freight elevator is cut away to provide access to the hand rope, such enclosure shall be cut low enough to prevent injury to the operator's hand.

**(13.3.3.3.6). §C26-978.0 Tops or Covers for Freight Elevator Cars.-**

a. All freight elevator cars, except sidewalk elevators as provided in section C26-973.0, and except the ends of freight elevator platforms twelve or more feet long where there are no openings above the lowest landing, shall be equipped with solid top covers or wire grille work having a mesh made of wire at least 0.135 inch in diameter (No. 10 steel wire gage) or its equivalent, which wire grille work will reject a ball one and one-half inches in diameter. Such top or cover shall be sufficiently strong to sustain a load of one hundred fifty pounds applied on any four square inches. It shall be unnecessary for the top and its supports to be capable of supporting one hundred fifty pounds on every four square inches of its area simultaneously.

b. Where no car gate is provided, the front section of the elevator car top shall be hinged along a line approximately eighteen inches from the front of the car. Additional hinged panels may be provided if desired.

c. Where a freight elevator car is entirely enclosed, except the sides used for loading and unloading, and the top is unprovided with a hinged section, an emergency exit shall be provided in the top as required by section C26-979.0.

**(13.3.3.3.7). §C26-979.0 Emergency Exits from Passenger Elevator Cars.-**

a. Each passenger elevator car shall be provided with an emergency exit located in the top of the car. When the space between the car enclosure and the nearest wall surface exceeds eight inches, a guard rail to the level of the top of the crosshead shall be provided all that side of the enclosure roof where such emergency exit is located.

b. When no side emergency exit panel is required under this section suitable means, accessible only from the top of the car, shall be provided to permit the car occupants to reach the roof of the car, such as a rope ladder enclosed in a metal box without a latch and with one end of the ladder securely fastened to the car structure.

c. Where there is an elevator in an adjacent hoistway without intervening enclosures, counterweight or similar obstruction and the distance between the car platforms does not exceed three (3) feet, an emergency exit or exits shall also be located in the side of the car adjacent to each such adjoining car. Where the distance between car platforms exceeds three (3) feet, side exits are prohibited.

d. Top emergency exits shall be at least sixteen inches wide and at least four hundred square inches in area, except that where the reduced size of the car platform area makes it impossible to install exits of the size specified, the superintendent may permit smaller exits, but in any case the minimum dimensions of such exits shall be fourteen by twenty-two inches.

e. Top exit panels shall be held in place by thumb screws so arranged that the exit covers can be readily opened from both the inside and outside of the car if the cover is not hinged, such cover shall be secured to the car by a length of chain.

f. Top exit covers shall open outward. Any equipment and working platform mounted above the top of the car shall be so located as not to obstruct access to or from the top emergency exit. If a working platform is placed so as to cover any of the required area of the top emergency exit, such platform shall be provided with a trap door, without a catch, opening upward.

g. Side emergency exits shall comply with the following requirements:

1. Shall be of the hinged type.
2. Shall open only into the car.
3. Shall be not less than fourteen inches in width and shall extend from the floor or base moulding to a clear height of not less than five feet.
4. Shall be so located that the exits in adjacent cars are directly opposite each other and so that passageway of persons is not obstructed by hoisting or counterweight ropes, carframe members or by fixed elevator equipment.
5. Shall be provided with lock bars at the top and bottom and one side which will hold the door securely closed.
6. Lock bars to be operated from inside of car only by a special shaped removable wrench or key and from outside the car by a non-removable handle.
7. In elevators with automatic operation in multiple dwellings the exit door shall in addition be provided with a tumbler type lock of at least the five pin type operated from inside the car by means of a special shaped removable key and from outside the car by means of a non-removable handle.
8. The person responsible for the maintenance and operation of the elevator (per section C26-1171.0) shall maintain on the premises the lock bar key or wrench and the tumbler type lock key. Such wrenches or keys shall be kept where they are readily available to qualified persons in case of emergency but where they are unavailable to the general public.
9. No. handrail or other obstructions on the inside of the car enclosure shall interfere with or prevent the opening of the exit door from the inside or outside.
10. Shall be provided with car door electric contacts conforming to sections C26-982.0 through C26-985.0.
11. Shall conform to section C26-974.0 as regards deflection.

**(13.3.3.3.8). §C26-980.0 Car Doors or Gates Required.-**

- a. A car door or gate shall be provided at each entrance on all passenger and freight elevator cars, except freight elevators operated from the car and handling motor vehicles or hand trucks of two thousand pounds capacity. Sidewalk elevator cars shall have a gate on the sides used for loading or unloading at the sidewalk level, which gate shall extend from the car platform to the top of the enclosure. Each car door or gate shall be provided with a car door or gate electric contact complying with sections C26-982.0 through C26-985.0.
- b. In passenger and freight elevators which are operated without the presence of an operator in the car, all power car doors or gates, other than doors or gates closed by hand, shall be driven by a mechanism so designed and set that the force necessary to prevent the closing of such door or gate shall be less than thirty pounds, and such mechanism shall further be so designed and set that the computed kinetic energy of the door or gate plus all parts connected rigidly thereto, computed for the average closing speed, shall be less than five foot pounds, provided that if such mechanism also closes the hoistway door, the total computed kinetic energy shall be less than seven foot pounds.
- c. In automatic-operation passenger elevators having power closed, power operated, automatically released self-closing car doors or gates, and manually closed or self-closing hoistway doors, the closing of such car door or gate shall be prevented unless such hoistway door is in the closed position.

- d. When car doors or gates for freight elevators are closed, such doors or gates shall guard the full opening to a height of six feet, or to the top of the enclosure.
- e. A weight used to close a car door or gate automatically shall run in metal guides from which such weight cannot become dislodged, or such weight shall be boxed in. The buttons of the guides or boxes shall be so constructed as to retain the weight if the rope breaks.
- f. When car doors or gates for passenger elevators are closed; such doors or gates shall guard the full height and width of the opening.
- g. The car door or gate in automatic-operation elevators shall be so located with respect to the car platform sill that the total distance from the face of the hoistway door to the face of such car door or gate shall be five and one-half inches or less.
- h. Where such car door consists of two or more sections, the five and one-half inch dimension requirement shall apply to the section nearest to the edge of such car platform sill.
- i. Where the hoistway door consists of two or more sections, the five and one-half inch dimension requirement shall apply to that section which closes against the lock jamb.
- j. It shall be unlawful for any electric automatic push button passenger elevator car to have an open grille in its door, or for the opening of any such elevator car to be equipped with a car gate, except that where the enforcement of this requirement in a structure erected before January first, nineteen hundred thirty-eight, would be impracticable or would impose a hardship, the superintendent may approve the use of a car gate of a suitable type.
- k. When the superintendent has approved car gates of the scissors or pantograph type for passenger elevators, such car gates shall be of such design that, when fully expanded, such car gates will reject a ball three inches in diameter. In freight elevators, except sidewalk elevators, such gates, when fully expanded, shall reject a ball four and one-half inches in diameter.
- l. The openings between vertical bars in the gate of sidewalk elevators shall be eighteen inches or less when the gate is full expanded.

**(13.3.3.3.9). §C26-981.0 Sliding Car Doors and Hangers for Power Operated Car Doors.-**

- a. Sliding car doors may be solid or may be provided with open grille or bars which shall reject a ball three inches in diameter, or may be provided with glass vision panels in accordance with section C26-970.0. Open grilles or bars may extend the full height of the door panel.
- b. Sliding car doors shall be guided top and bottom.
- c. Hangers for power operated car doors shall be so designed as to withstand a downward thrust of five times the weight of the door and an upward thrust of four times the weight of the door.

**(13.3.3.3.10). §C26-982.0 Requirements for Electric Contacts.-**

- a. An electric contact on the car door or gate shall prevent the operation of the car unless such door or gate is within one and one-half inches of full closure against the nearest face of the jamb except that in elevators requiring the presence of an operator in the car, where such car door or gate is provided with a door closer and the requirements specified in section C26-909.0 are fully met, such electric contact on such car door or gate may permit the starting of such car when such door or gate is within four inches of full closure against the nearest face of the jamb.
- b. Such car door or gate electric contact shall permit the operation of the car when the emergency release is in temporary use or when such car is being moved by a leveling device.



**(13.3.3.3.11). §C26-983.0 Design of Contacts.**-Car door or gate contacts shall be designed so that such contacts are positively opened by a lever or other device attached to and operated by the door or gate.

**(13.3.3.3.12). §C26-984.0 Use of Springs or Electric Circuits in Contacts.**-The functioning of a car door or gate contact to prevent the movement of the car shall be independent of the action of a spring or springs in tension, or of the closing of an electric circuit. If springs are used, such springs shall be in compression. The interruption of such electric circuit shall prevent the movement of the car.

**(13.3.3.3.13). §C26-985.0 Tests and approvals of Contacts.-**

a. Each type and make of car door and gate contact shall be tested and approved by the board on the basis of the following engineering tests. Such tests shall be made by or under the supervision of the board or of a competent testing laboratory designated by the board. Approved contacts shall be suitably marked for identification.

1. Endurance test.
2. Current-interrupting test.
3. Test in moist atmosphere.
4. Misalignment test.
5. Test of insulation.

b. Such tests shall be made according to the procedure prescribed in section C26-1179.0.

Minor changes in design may be made without retesting, subject to the approval of the board.

**(13.3.3.3.14). §C26-986.0 Car Door or Gate Releases Prohibited.**-Emergency releases shall not be provided for car doors or gates, except where a car door is operated by the same power door operator as the hoistway door, provision shall be made to render the car operative independent of the position of the car door by means of the emergency release required by section C26-900.0.

**(13.3.3.3.15). §C26-987.0 Protection of Cars Operating in Hoistways Outside of the Structure.**-When freight elevator cars operate in hoistways outside the structure, which hoistways are enclosed only at the ground landing, such cars shall be protected on the exposed side or sides by independently operated gates equipped with electric contacts.

#### **SUB-GROUP 4**

##### **Cars Counterbalancing One Another**

**(13.3.3.4). §C26-988.0 Cars Counterbalancing One Another.**-It shall be unlawful to arrange elevator cars so that such elevator cars counterbalance one another.

#### **SUB-GROUP 5**

##### **Cars and Counterweight Safeties and Speed Governors**

**(13.3.3.5.1). §C26-989.0 Requirements for and Application of Car Safeties.-**

a. All elevator cars suspended by cables, except sidewalk elevators the travel of which is fifteen feet or less, shall be provided with a car safety or safeties attached to the car frame. When one safety is used, such safety shall be located beneath the car frame. When duplex safeties are used, at least one of such safeties shall be located beneath the car frame. Such safety or safeties shall be capable of stopping and sustaining the car with contract load.

b. It shall be unlawful for the application of such safety or safeties to cause the car platform to become out of level in excess of one-half of an inch per foot measured in any direction.

c. When such car safety or safeties apply, no decrease in the tension of the governor cable or motion of the car in the descending direction shall release the car safety or safeties.

d. Car safeties shall be operated by speed governors, except that broken rope type car safeties may be used for:

1. Sidewalk elevators having a travel between fifteen and thirty-five feet;
2. Freight elevators inside the building having a travel of fifteen feet or less, a maximum contract speed of thirty-five feet per minute, and a maximum platform area of fifty square feet;
3. Private residence elevators.

**(13.3.3.5.2). §C26-990.0 Requirements for and Application of Counterweight Safeties.-**

a. Counterweight safeties shall be capable of stopping and sustaining the weight of the counterweight.

b. It shall be unlawful for the application of counterweight safeties to cause the counterweight frame to become out of level in excess of one-half of an inch per foot in any direction.

c. When any counterweight safety is applied, no decrease in the tension of the governor cable or motion of the counterweight in the descending direction shall release the counterweight safety.

d. Counterweight safeties shall be operated by speed governors, except as provided in section C26-992.0.

**(13.3.3.5.3). §C26-991.0 Design of Car and Counterweight Safeties.-**

a. Sleeve bearings for car and counterweight safety drums and screw shafts shall be of non-ferrous material.

b. Jaws and other parts of car and counterweight safeties of the sliding type, if made of forged steel of an ultimate strength of at least fifty-five thousand pounds per square inch and cast steel of an ultimate strength of at least sixty-live thousand pounds per square inch, may, in action, be stressed to seventeen thousand pounds per square inch. For steels of greater strength, the allowable stress may be increased proportionately, based on ultimate strength.

c. Car and counterweight safeties may be released by reversing the direction or motion of the machine.

**(13.3.3.5.4). §C26-992.0 Application of Governor Controlled Safeties.-**

a. For contract speeds of seven hundred feet per minute and less, the car speed governor shall be set to cause the application of the safety at a speed between thirty-three and one-third percent and fifteen percent above the contract speed, except that no governor shall be required to trip at less than one hundred seventy-five feet per minute. For contract speeds exceeding seven hundred feet per minute, the top limit for application of the safety shall not exceed twenty-five percent above contract speed.

b. The counterweight safety, if provided, may be operated by the same governor and governor rope used to operate the car safety, provided such car safety complies with the requirements for and application of counterweight safeties. Provision shall be made to cause the application of the counterweight safety at a speed greater than the car safety, but at ten percent or less above the speed at which the car safety applies. Broken rope safeties of the instantaneous type may be used on counterweights within the limits of the following table:

<b>Contract Speed in Feet Per Minute.</b>	<b>Total Weight of Counterweight in Pounds.</b>
250	2,000
200	3,000
160	4,000
125	5,000

**(13.3.3.5.5). §C26-993.0 Recognized Types of Safeties.-**

a. Safeties shall be classified as follows:

1. Type I, instantaneous.
2. Type W.C., wedge clamp, with constant retarding force.
3. Type G.W.C., gradual wedge clamp, with gradually increasing retarding force.
4. Type F.G.C., flexible guide clamp, with constant retarding force.

b. Each safety shall be marked for identification, preferably with letters cast on the safety jaws.

c. The distance between the safety jaws shall be at least the thickness of the guide rail plus three-thirty-seconds of an inch, and the jaws shall not drag against the rail.

**(13.3.3.5.6). §C26-994.0 Marking of Safeties.-**Safeties shall be marked by the manufacturer with the range of weight and speed for which such safeties are designed; such range of weight shall include the complete car structure, the safety, the contract load in the car, and all moving equipment, the weight of which is borne by such safety.

**(13.3.3.5.7). §C26-995.0 Instantaneous Safeties.-**

a. Instantaneous safeties of the broken rope type shall be used only in accordance with section C26-989.0.

b. Governor controlled safeties of the instantaneous type may be used on the cars and counterweights of elevators having a contract speed of one hundred feet per minute or less, provided that the elevator speed is one hundred ten feet per minute or less on uptravel with the contract load in the car. On overspeed such safeties shall be applied by the governor. On the parting of the hoisting cables such safeties shall apply instantly and independently of the speed action of the governors.

**(13.3.3.5.8). §C26-996.0 Safeties for Ascending Cars.-**It shall be unlawful to have car safeties for stopping ascending cars. If an ascending car is to be stopped on account of overspeed, a safety shall be applied to the counterweight for such purpose. The car safety may be permitted to stop the ascending car above the upper terminal landing, providing that the retardation of the ascending car under such conditions is within thirty-two and one-fifth feet per second. The governor may open the motor circuit and apply the brake in case of overspeed in the up direction.

**(13.3.3.5.9). §C26-997.0 Location of Governor.-**

a. The governor shall be so located that it cannot be struck by the car in case of overtravel and so that there is sufficient space for full movement of governor parts.

b. It shall be unlawful to use clips to hold governor supports.

**(13.3.3.5.10). §C26-998.0 Opening of Motor Control and Brake Control Circuits.-**Where governor controlled safeties are used, the motor control circuit and the brake control circuit shall be opened, before or at the time the governor trips, by a switch located on the governor or car safety device.

**(13.3.3.5.11). §C26-999.0 Materials, Design and Replacement of Governor Cables.-**

a. Governor cables shall be of iron, steel, monel metal, or phosphor bronze. Such cable shall be at least three-eighths of an inch in diameter. It shall be unlawful to use tiller rope

construction for governor cables. A suitable cable of corrosion-resisting metal, such as bronze or monel metal, shall be used on the safety drum.

b. Replacements for governor cables shall be of the same size, material and construction as the cable originally furnished by the manufacturer, except that where a cable of different material or construction is employed, a test of the car or counterweight safety shall be made with the new cable to demonstrate that such cable will successfully operate the safety.

c. Governor ropes shall run clear of governor jaws during the normal operation of the elevator.

d. The size, material and construction of the governor rope, together with the proper tripping speed of the governor, shall either be stamped on the governor stand or on a brass plate attached to such stand in letters at least one-quarter of an inch in height.

**(13.3.3.5.12). §C26-1000.0 Operation of the Governor.-**

a. The arc of contact between the governor rope and its driving sheave shall, in conjunction with a tension device, provide sufficient traction to cause proper operation of the governor.

b. The design and length of governor jaws shall be such as to avoid serious cutting, tearing, or deformation of the rope from the operation of the safety.

c. Except in instantaneous type safeties, the governor shall so function that the safety rope will pull through the governor jaws when a stress exceeding that required to operate the safety is applied so as to stop the car.

d. Each gear driven fly-ball type governor shall have a guard over the sheave and exposed gears. It shall be unlawful to have guards completely covering such governor.

**(13.3.3.5.13). §C26-1001.0 Slack Cable Devices.-**

a. Winding drum machines shall be provided with a slack cable device which will cut off the power and stop the elevator machine if the car is obstructed in its descent.

b. Slack cable switches shall be so constructed that they will not automatically reset when the slack in the cable is removed.

**(13.3.3.5.14). §C26-1002.0 Application of Car Safeties.-**It shall be unlawful to use car safeties which depend for their application upon the completion or maintenance of an electric circuit. Car safeties shall be applied mechanically.

**(13.3.3.5.15). §C26-1003.0 Use of Gripping Surfaces of Safeties.-**It shall be unlawful to use the gripping surfaces of car or counterweight safeties to guide the car or counterweights.

**(13.3.3.5.16). §C26-1004.0 Pawls and Ratchets.-**It shall be unlawful to use pawls and ratchets as a safety device.

**SUB-GROUP 6**

**Car Safety Test**

**(13.3.3.6.1). §C26-1005.0 Car Safety Test Required.-**

a. An overspeed test with contract load in the car shall be made of the safeties of each new elevator before such elevator is placed in regular service, except that governor controlled instantaneous type safeties shall be tested at contract speed, the governor being tripped by hand, and broken rope instantaneous type safeties shall be tested by obtaining the necessary slack rope to cause them to function. Wedge clamp, gradual wedge clamp and flexible guide clamp safeties, shall be tested to determine whether such safety will operate within the allowable limits of the maximum and minimum stopping distances. Over speed tests shall be made with cables attached and with all electric apparatus intact, except for the overspeed contact on the governor.

b. Where the contract load is unable to bring about overspeed in alternating current elevators, the safety governor shall be tripped by hand at maximum obtainable speed.

c. It shall be unlawful to make any test of the safeties with the safe lifting load in the car.

**(13.3.3.6.2). §C26-1006.0 Maximum and Minimum Stopping Distances of Wedge Clamp Safeties.**-The maximum and minimum stopping distances of car and counterweight safeties of the wedge clamp type, with constant retarding force, shall be as provided in table 1.

**TABLE 1**  
**Maximum and Minimum Stopping Distances of Wedge Clamp Safeties With Constant Retarding Force**

Governor Tripping Speed in Feet Per Minute.	Maximum Distance Cars With Contract Load and Counterweights		Minimum Distance Cars With Contract Loads and Counterweights		Minimum Distance Cars With 150-Pound Load	
	Feet	Inches	Feet	Inches	Feet	Inches
175	1	5	0	11	0	10
200	1	6	1	0	0	10
250	1	8	1	2	0	11
300	2	0	1	4	1	0
350	2	5	1	5	1	2
400	2	9	1	7	1	3
450	3	4	1	9	1	4
500	3	11	2	0	1	5
550	4	6	2	4	1	6
600	5	3	2	6	1	7
650	6	0	2	8	1	9
700	6	9	3	0	1	10
750	7	7	3	4	2	0
800	8	7	3	7	2	3
850	9	6	3	11	2	5
900	10	7	4	4	2	7
950	11	9	4	8	2	9
1,000	13	0	5	1	3	0
1,050	14	3	5	6	3	3
1,100	15	7	6	0	3	6
1,150	17	0	6	6	3	8
1,200	18	6	7	0	4	0
1,250	20	0	7	7	4	4
1,300	21	8	8	2	4	6
1,350	23	4	8	8	4	9
1,400	25	0	9	4	5	1
1,450	26	6	9	11	5	5
1,500	28	3	10	6	5	8

**(13.3.3.6.3). §C26-1007.0 Maximum and Minimum Stopping Distances of Gradual Wedge Clamp Safeties.**-The maximum and minimum stopping distances of car and counterweight

safeties of the gradual wedge clamp type, with increasing retarding force, shall be as provided in table 2.

**TABLE 2**  
**Maximum and Minimum Stopping Distances of Gradual Wedge Clamp Safeties With Increasing Retarding Force**

Governor Tripping Speed in Feet Per Minute.	Maximum Distance Cars With Contract Load and Counterweights		Minimum Distance Cars With Contract Loads and Counterweights		Minimum Distance Cars With 150-Pound Load	
	Feet	Inches	Feet	Inches	Feet	Inches
175	6	3	1	10	1	4
200	6	4	1	11	1	4
250	6	7	2	1	1	5
300	6	11	2	3	1	6
350	7	4	2	4	1	7
400	7	10	2	6	1	8
450	8	4	2	8	1	9
500	8	10	2	10	1	10
550	9	5	3	1	2	0
600	9	11	3	4	2	1
650	10	6	3	7	2	3
700	11	1	3	10	2	4
750	11	8	4	3	2	6
800	12	3	4	6	2	8
850	12	9	4	10	2	9
900	13	5	5	4	3	0
950	14	1	5	8	3	4
1,000	14	8	6	2	3	6
1,050	15	4	6	7	3	9
1,100	16	0	7	1	4	0
1,150	16	7	7	6	4	4
1,200	17	3	8	0	4	7
1,250	17	11	8	6	4	10
1,300	18	6	9	0	5	1
1,350	19	2	9	7	5	5
1,400	19	10	10	1	5	8
1,450	20	6	10	7	5	11
1,500	21	2	11	2	6	2

**(13.3.3.6.4.). §C26-1008.0 Maximum and Minimum Stopping Distances of Flexible Guide Clamp Safeties.**-The maximum and minimum stopping distance of car and counterweight safeties of the flexible guide clamp type, shall be as provided in table 3.

**TABLE 3**  
**Maximum and Minimum Stopping Distances of Flexible Guide Clamp Safeties**

Governor Tripping Speed in Feet Per Minute.	Maximum Distance Cars With Contract Load and Counterweights		Minimum Distance Cars With Contract Loads and Counterweights		Minimum Distance Cars With 150-Pound Load	
	Feet	Inches	Feet	Inches	Feet	Inches
175	0	9	0	6	0	5
200	0	10	0	7	0	5
250	1	4	0	8	0	6
300	1	7	0	9	0	7
350	2	0	0	11	0	7
400	2	5	1	1	0	8
450	2	10	1	4	0	9
500	3	5	1	6	0	11
550	4	1	1	8	1	1
600	4	10	1	11	1	3
650	5	7	2	3	1	4
700	6	4	2	6	1	6
750	7	3	2	9	1	8
800	8	2	3	1	1	10
850	9	3	3	6	2	0
900	10	3	3	11	2	3
950	11	7	4	4	2	5
1,000	12	8	4	8	2	7
1,050	14	0	5	3	2	9
1,100	15	2	5	8	3	0
1,150	16	6	6	2	3	3
1,200	18	0	6	8	3	6
1,250	19	6	7	3	3	9
1,300	21	2	7	8	4	0
1,350	23	0	8	3	4	4
1,400	24	8	8	10	4	8
1,450	26	4	9	6	4	11
1,500	28	1	10	1	5	2

**(13.3.3.6.5). §C26-1009.0 Pull-out of the Governor Cable.-**For elevators having a contract speed of four hundred seventy-five feet per minute or more, the pull-out of the governor cable from its normal running position before the safety jaw begins to apply pressure to the guide rails shall be thirty inches or less.

**(13.3.3.6.6). §C26-1010.0. Stopping Distance.-**The term “stopping distance” shall mean the actual slide as indicated by the marks on the rails.

**SUB-GROUP 7**  
**Capacity and Loading**

**(13.3.3.7.1). §C26-1011.0 Contract Load of Elevators.-**

- a. The contract load of a passenger elevator in pounds shall be at least the amount given in table 4.
- b. The minimum contract load of freight elevators in business buildings, public buildings, residence buildings and mixed occupancy buildings shall be determined on the basis of table 4 for passenger elevators, except elevators used for lifting automobiles and carriages and elevators not traveling above the street level. The minimum contract load of freight elevators in warehouses and all elevators not traveling above the street levels, except automobile and carriage elevators, shall be determined on the basis of fifty pounds per square foot for the first one hundred square feet of platform area and twenty-five pounds for each additional square foot. The minimum contract load of elevators lifting automobiles and carriages shall be determined on the basis of fifty pounds per square foot for the first eighty square feet of platform area and twenty pounds for each additional square foot.



**TABLE 4**  
**Capacity and Loading for Passenger Elevators**

<b>Area in Sq. Ft.</b>	<b>Unit Load in Pounds Per Sq. Ft.</b>	<b>Total Capacity.</b>	<b>Area in Sq. Ft.</b>	<b>Unit Load in Pounds Per Sq. Ft.</b>	<b>Total Capacity.</b>
1	61	61	33	80	2,640
2	62	123	34	81	2,740
3	62	187	35	81	2,839
4	63	252	36	82	2,934
5	64	318	37	82	3,034
6	64	386	38	82	3,131
7	65	455	39	83	3,229
8	66	526	40	83	3,332
9	66	597	41	84	3,436
10	67	670	42	84	3,536
11	68	746	43	85	3,638
12	68	820	44	85	3,744
13	69	896	45	86	3,850
14	70	974	46	86	3,954
15	70	1,053	47	86	4,058
16	71	1,133	48	87	4,164
17	71	1,214	49	87	4,265
18	72	1,296	50	87	4,370
19	73	1,379	55	89	4,900
20	73	1,464	60	91	5,448
21	74	1,550	65	92	6,000
22	74	1,637	70	94	6,550
23	75	1,723	75	95	7,117
24	75	1,810	80	96	7,680
25	76	1,900	85	97	8,245
26	77	1,989	90	98	8,793
27	77	2,082	95	99	9,357
28	78	2,173	100	99	9,900
29	78	2,265	105	100	10,448
30	79	2,358	110	100	10,967
31	79	2,452	115	100	11,488
32	80	2,547	120	100	12,000

c. For all passenger and freight elevators having effective platform areas of more than one hundred twenty square feet, except elevators used for lifting automobiles and carriages, elevators not traveling above the street level and freight elevators in warehouses, the contract load shall be at least one hundred pounds per square foot.

**(13.3.3.7.2). §C26-1012.0 Posting of Information.-**

a. A metal plate showing the contract load of the elevator in pounds shall be fastened in a conspicuous place in all passenger elevator cars. Such information shall be stamped, etched or raised on the surface of such plate in letters at least one-quarter of an inch high.

b. The inspection certificate posted in passenger elevator cars as required in section C26-846.0 shall state the allowable number of passengers permitted to be carried by the elevator equal to its rated load in pounds divided by one hundred fifty.

c. A similar metal data plate shall be placed upon the cross-head of each passenger and freight elevator and on the bow iron or frame of each sidewalk type elevator, bearing the following information:

1. The weight of the complete car, including the safeties.
2. The contract speed, in feet per minute, at which the elevator is designed to travel. Sidewalk type elevators shall be exempted from this requirement.
3. The cable data required by section C26-1084.0.

d. The capacity of freight elevators shall be indicated in a conspicuous place in the car in letters and figures at least one inch high by the word "CAPACITY" followed by figures giving the contract load in pounds.

**(13.3.3.7.3). §C26-1013.0 Carrying of Passengers on Freight Elevators.-**

a. It shall be unlawful to use new freight elevator installations to carry passengers, unless such elevators conform to all the requirements of this article for passenger elevators.

b. Passengers may be carried on existing freight elevators provided such elevators conform in all respects to the requirements for existing passenger elevators.

**(13.3.3.7.4). §C26-1014.0 One Piece Loads on Elevators.-**Passenger and freight elevators may be used for carrying safes or other one piece loads greater than the contract load of the elevator, provided that:

1. A locking device shall be provided which will hold the car at any landing independently of the hoisting cables while the safe or other object is being loaded or unloaded.
2. The locking device shall be so designed that it cannot be unlocked unless the entire weight of the car and load is suspended on the cables.
3. The wrench or other device for operating the locking device shall be removable.
4. The locking device shall be designed to withdraw the bars should it come in contact with the landing locks if the car is operated on the up motion.
5. A metal plate bearing the words "Capacity Lifting Safes" followed by figures giving the capacity in pounds for lifting safes for which the machine is designed, shall be provided in the elevator car. Such information shall be stamped, etched or raised on the surface of such plate in letters at least one-quarter of an inch high.
6. The car platform, car frame, sheaves, shafts, cables and locking device shall be designed for the specified capacity lifting safes with a factor of safety of at least five.
7. The car safeties shall be designed to stop and hold the specified capacity lifting safes with the cables intact.
8. Where there is a passageway under the hoistway, the machine shall be designed to operate with the capacity lifting safes at slow speed and the car safety shall be designed to stop and hold the car and capacity lifting safes independently of the cables.
9. Additional counterweights shall be added for traction machines so that the total overbalance is at least equal to forty-five percent of the capacity lifting safes.

**(13.3.3.7.5). §C26-1015.0 Locking Device Required.-**The locking device specified in section C26-1014.0 shall be provided for any passenger elevator installed for carrying safes or other one piece loads where the weight of such safes or one piece loads is seventy-five percent or more of the contract load.

**(13.3.3.7.6). §C26-1016.0 Maximum Capacity Lifting Safes.-**The maximum capacity lifting safes of any traction elevators shall be one and one-third times the contract load of the elevator.

**(13.3.3.7.7). §C26-1017.0 Special Switches.-**Elevator machines equipped for carrying safes or other concentrated loads greater than the contract load of the elevator shall be provided with special switches near the machine for operating under such conditions.

#### **SUB-GROUP 8 Contract Load Test**

**(13.3.3.8). §C26-1018.0 Contract Load Test.-**

- a. A test of every new elevator shall be made with contract load in the car. Such test shall be made under the supervision of the superintendent before such elevator is placed in regular service.
- b. The brakes, limit switches, buffers, car safety and speed governor shall be caused to function in each test, and approval of any elevator shall be granted only upon satisfactory completion of such test.

#### **GROUP 4 Machines, Stopping Devices, Control and Operation**

##### **SUB-GROUP 1 Machines and Machinery**

**(13.3.4.1.1). §C26-1019.0 Design of Drums and Sheaves.-**

- a. Drums and leading sheaves shall be of cast iron or steel, and shall have finished grooves. Such grooves may be faced with materials other than iron and steel if such materials have sufficient traction. "U" grooves shall be at most one-sixteenth of an inch larger than the cables.
- b. Hoisting rope sheaves for traction machines shall have sheave grooves so designed that the traction will not be materially decreased by the wear of the grooves.
- c. The diameters of sheaves or drums for hoisting counterweight cables shall be forty or more times the diameter of the cable except that a ratio of thirty times the diameter of the cable shall be permissible for private residence elevators. Sidewalk elevators shall be exempted from this requirement. Where conditions make impractical the use of sheaves or drums of such size, the superintendent may permit the use of smaller diameter sheaves or drums. Openings in drums shall be drilled at an angle of less than forty-five degrees with the run of the rope and shall be provided with a rounded corner with a radius equal to at least that of the rope.

**(13.3.4.2.2). §C26-1020.0 Factors of Safety.-**The factors of safety based on the static loads (the contract load plus the weight of car, cables, counterweights, and similar parts) to be used in the design of elevator hoisting machines shall be at least eight for wrought iron or steel, and ten for cast iron, cast steel or other materials.

**(13.3.4.1.3). §C26 1021.0 Set Screw Fastenings.-**It shall be unlawful to use set screw fastenings instead of keys or pins except where the connection is not subject to torque.

**(13.3.4.1.4). §C26-1022.0 Friction Gearing or Clutch Mechanisms for Elevators.-**

- a. It shall be unlawful to use friction gearing or clutch mechanisms for connecting the drums or sheaves to the main driving gear.

b. All existing elevator installations except freight elevators not carrying operators shall comply with the provisions of this section.

**(13.3.4.1.5). §C26-1023.0 Use of Belt or Chain-driven Machines or Auxiliary Power Elevators.-**

a. It shall be unlawful to use belt or chain-driven machines or auxiliary power elevators.

b. All existing passenger elevator installations shall comply with the provisions of this section.

**(13.3.4.1.6). §C26-1024.0 Cast Iron Toothed Worm Gears.-**It shall be unlawful to use worm gearing with cast iron teeth.

**(13.3.4.1.7). §C26-1025.0 Brakes Required.-**

a. Winding drum and traction machines shall be equipped with brakes which are applied automatically by springs or gravity when the operating device is at the “stop” position. Electric elevator machines shall be equipped with electrically released brakes.

b. It shall be unlawful to release brakes before power has been applied to the motor.

**(13.3.4.1.8). §C26-1026.0 Action of the Brake Magnet.-**

a. No single ground, short-circuit or counter-voltage shall prevent the action of the brake magnet from allowing the brake to set in the intended manner during normal operation.

b. No motor-field discharge, counter-voltage, single ground or accidental short-circuit shall retard the action of the brake magnet in allowing the brake to set during emergency stops.

## **SUB-GROUP 2**

### **Hydraulic Elevator Machines**

**(13.3.4.2.1). §C26-1027.0 Construction of Hydraulic Elevator Machines.-**Hydraulic elevator machines, whether of the vertical or horizontal type, shall be so constructed and so roped that the piston will be stopped before the car can be drawn into the overhead work. Stops of ample strength shall be provided to bring the piston to rest when under full pressure without causing damage to the cylinder or cylinder head.

**(13.3.4.2.2). §C26-1028.0 Metal Guide Rails and Shoes Required for Traveling Sheaves.-**Traveling sheaves for vertical hydraulic elevators shall be guided. Guide rails and guide shoes shall be of metal.

**(13.3.4.2.3). §C26-1029.0 Side Frames and U-strap Connections.-**

a. Side frames of traveling sheaves for vertical hydraulic elevators shall be either structural or forged steel.

b. It shall be unlawful to use the construction commonly known as the “U-strap connection” between the piston rods and the traveling sheaves.

**(13.3.4.2.4). §C26-1030.0 Equalizing Crossheads and Washers.-**

a. Where more than one piston rod is used in a vertical pulling type hydraulic elevator, an equalizing crosshead shall be provided for attaching the rods to the traveling sheave frame so as to insure an equal distribution of load on each rod.

b. Equalizing or cup washers shall be used under the piston rod nuts to insure a true bearing.

**(13.3.4.2.5). §C26-1031.0 Gas Releases.-**Cylinders of hydraulic elevator machines shall be provided with means for releasing air or other gas.

**(13.3.4.2.6). §C26-1032.0 Factor of Safety and True Bearing of Piston Rods of Hydraulic Elevators.-**Piston rods of tension type hydraulic elevators shall have a factor of safety of at least eight, based on the cross-sectional area at the root of the thread. A true bearing shall be maintained under the nuts at both ends of the piston rods to prevent eccentric loading on the rods.

**(13.3.4.2.7). §C26-1033.0 Outlets of Pressure Tanks.**-Outlets of pressure tanks shall be so located as to prevent the entrance of air or other gas into the elevator cylinder.

**(13.3.4.2.8). §C26-1034.0 Packing of Automatic Stop Valves.**-Automatic stop valves for elevators shall either be packed with cup leathers, or some other means shall be used to prevent sticking of the valve stems.

**(13.3.4.2.9). §C26-1035.0 Relief Valves.**-Each pump connected to the pressure tank of a hydraulic elevator shall be equipped with a relief valve. Such valve shall be so installed that it cannot be shut off. Such relief valve shall be of sufficient size and so set as to pass the full capacity of the pump at full speed without exceeding the safe working pressure of the pump or tank. Such relief valve shall be piped to discharge into the discharge tank or the pump suction. Two or more relief valves may be used to obtain the capacity.

**(13.3.4.2.10). §C26-1036.0 Automatic By-passes.**-Elevator pumps, unless equipped with pressure regulations which control the motive power, shall be equipped with automatic by-passes.

**(13.3.4.2.11). §C26-1037.0 Pressure Tanks.**-Pressure tanks shall be made and tested in accordance with the requirements for unfired pressure vessels of the American Society of Mechanical Engineers' Boiler Code, nineteen hundred thirty.

**(13.3.4.2.12). §C26-1038.0 Gages.**-

a. Each pressure tank shall be provided with a water gage glass having brass fittings and valves. Such gage glass shall be attached directly to such tank and shall be so located as to show the level of the water when the tank is more than half filled.

b. Each pressure tank shall have a pressure gage which will indicate the pressure correctly to at least one and one-half times the normal working pressure allowed in the tank. Such gage shall be connected to the tank by a brass or other corrosion resisting pipe in such a manner that the gage cannot be shut off from the tank, except by a cock with a "T" or lever handle, such "T" or lever being set in line with the direction of the flow. The cock shall be in the pipe near the gage.

c. Pressure tanks shall be provided with a one-quarter of an inch pipe size valved connection so that an inspector's gage may be attached while the tank is in service.

**(13.3.4.2.13). §C26-1039.0 Vacuum Relief Valves.**-

a. Pressure tanks which may be subject to vacuum shall be provided with one or more vacuum relief valves.

b. Vacuum relief valves shall have openings of sufficient size to prevent the collapse of the tank if a vacuum occurs. If necessary, more than one vacuum relief valve may be used to obtain sufficient capacity.

**(13.3.4.2.14). §C26-1040.0 Inspection of Pressure Tanks.**-Pressure tanks shall be so located and supported that the entire exterior may be inspected.

**(13.3.4.2.15). §C26-1041.0 Discharge Tanks.**-Discharge tanks which are open to the atmosphere shall be so designed that when such tanks are completely filled, the factor of safety shall be at least four, based on the ultimate strength of the material. Discharge tanks shall be covered to prevent the entrance of foreign material and shall be provided with a suitable vent to the atmosphere.

**(13.3.4.2.16). §C26-1042.0 Hydraulic Elevators Operated by Steam or Gas.**-When hydraulic elevators are operated from a pressure tank and the fluid pressure is obtained by directly admitting steam, air or other gas to such tank, such elevators shall comply with all the rules governing hydraulic elevators.

**(13.3.4.2.17). §C26-1043.0 Design of Plunger Elevators.**-In the design of plunger elevators adequate provision shall be made to stop the plunger as well as the car.

### **SUB-GROUP 3**

#### **Terminal Stopping and Safety Devices**

**(13.3.4.3.1). §C26-1044.0 Normal Terminal Stopping Devices Required.**-All elevators shall be provided with upper and lower normal terminal stopping devices. Such devices shall be so arranged as to stop the car automatically from any speed attained in normal operation within the top and bottom overtravel independent of the operating devices, the final terminal stopping device and the buffers, except that in the case of hand rope or rod operating devices, the normal terminal stopping device may operate in conjunction with such operating devices.

**(13.3.4.3.2). §C26-1045.0 Installation of Normal Terminal Stopping Devices.**-Normal terminal stopping devices shall be installed as follows:

1. All electric elevators having winding drum machines, except sidewalk type elevators and except elevators operated by hand rope wheel or lever devices shall have stopping switches, on the car or in the hoist way, operated by the movement of the car.
2. All electric elevators having traction machines, except elevators operated by hand rope devices, shall have stopping switches on the car, or in the machine room, or in the hoistway. Such switches shall be operated by the movement of the car. Where such stopping devices are located in the machine room, an automatic safety switch shall be provided which will stop the machine if the driving member should fail.
3. All electric elevators with hand rope or rod operating devices shall have stop balls securely fastened to the rope or rod, which stop balls shall be so arranged as to center the operating device. If winding drum machines are used, such elevators, except sidewalk elevators, shall also have an additional device to center the operating device automatically.
4. Hydraulic elevators having a contract speed in excess of one hundred feet per minute shall have an automatic stop valve independent of the normal control valve or valves operated by the car or by the machine.
5. Hydraulic elevators having a contract speed of one hundred feet per minute or less with hand rope or rod operating devices shall have stop balls on the operating device.
6. Electric elevators having winding drum machines with lever or wheel operating devices shall have a device to center the operating device automatically.
7. Electric sidewalk type elevators having winding drum machines and hand rope or pull chain operating devices shall have a stopping device on the machine and on the operating device.
8. Electric sidewalk type elevators having winding drum machines and either automatic or continuous pressure operation shall have a stopping device on the machine and in the hoistway. Such stopping devices may control the same switches only when two or more separate and independent switches are provided, two of which switches shall be closed to complete the motor and brake circuit in each direction of travel.

**(13.3.4.3.3). §C26-1046.0 Final Terminal Stopping Devices Required.**-

- a. All electric elevators, except sidewalk type elevators shall be provided with upper and lower final terminal stopping devices. Such stopping devices shall be arranged to stop the car and counterweight automatically from contract speed within the top clearance and bottom overtravel, independently of the operation of the normal terminal stopping devices and the

operating device, but with buffers operative. Auxiliary stopping devices for the car and counterweight shall be used when necessitated by this requirement.

b. Final limit switches and oil buffers shall be so located that the engagement of the buffer and the opening of the limit switch will occur as simultaneously as possible. When spring buffers are provided, the final limit switches shall be opened before the buffer is engaged.

c. Where means are provided to prevent jumping of the car or counterweight, it shall only be necessary that the limit switch open before the buffer is fully compressed.

**(13.3.4.3.4). §C26-1047.0 Installation of Final Terminal Stopping Devices.**-Final terminal stopping devices shall be installed in connection with all electric elevators except sidewalk type elevators, as follows:

1. Electric elevators having winding drum machines shall have stopping switches on the machines and mounted in the hoistway. Such switches shall be operated by the movement of the car.

2. Electric elevators having traction machines shall have stopping switches mounted in the hoistway and operated by the movement of the car.

3. The final terminal stopping devices shall depend upon the interruption of one or more electric circuits. The conductors for such circuits shall be stationary. It shall be unlawful for such conductors to be carried through the car traveling cables.

**(13.3.4.3.5). §C26-1048.0 Action and Switches of Final Terminal Stopping Devices.**-

a. The final terminal stopping device shall act to prevent the car from moving in either direction. The normal and final stopping devices may control the same switches on the controller only when two or more separate and independent switches are provided, two of which switches shall be closed to complete the motor and brake circuit in each direction of travel. When two-phase or three-phase alternating current is used to operate the elevator, such switches shall be of the multi-pole type. In the case of hand rope rod, wheel or level operating devices, the normal and final terminal stopping devices may control the same switch on the controller.

b. When the final terminal stopping device controls the same controller switch or switches as the operating device or the or the normal terminal stopping device, such final stopping device shall be connected into the control circuit on the opposite side of the line.

**(13.3.4.3.6). §C26-1049.0 Prohibited Types of Final Terminal Stopping Devices.**-It shall be unlawful to use chain, rope or belt driven machine final terminal stopping devices for elevators having winding drum machines.

**(13.3.4.3.7). §C26-1050.0 Automatic Terminal Stopping Devices Required.**-All electric elevators having winding drum machines driven by two-phase or three-phase alternating current motors, except elevator machines with alternating current motors and direct current brakes and direct current main line or potential switches controlled by final terminal hoistway stopping switches, shall have the main line circuit to the motor and brake directly opened either by contacts in the machine stop-motion switch or by hoistway limit switches operated by a cam attached to the car. The opening of such contacts shall take place before, or simultaneously with, the opening of the final terminal stopping device and such opening shall prevent movement of the machine in either direction.

**(13.3.4.3.8). §C26-1051.0 Enclosure of Terminal Stopping Switches.**-Normal and final terminal stopping devices on the car or in the hoistway, shall be of the enclosed type.

**(13.3.4.3.9). §C26-1052.0 Mounting of Terminal Stopping Devices.**-Normal and final terminal stopping devices on the car or in the hoistway shall be securely mounted in such a manner that

the movement of the switch lever or roller to open the contacts shall be as nearly as possible in a direction at right angles to a line drawn between the faces of the car guide rails.

**(13.3.4.3.10). §C26-1053.0 Location of Operating Cams.-**The cams for operating the terminal stopping switches shall be of metal and shall be so located and of sufficient length to maintain the switch in the open position when the car is in contact with the overhead structure or when such car is resting on the fully compressed buffer with the overhead structure and the buffer in their normal position.

#### **SUB-GROUP 4**

##### **Operation and Control**

**(13.3.4.4.1). §C26-1054.0 Maximum Speed for Direct Hand Operated Elevators.-**It shall be unlawful to operate elevators, having a contract speed in excess of one hundred feet per minute, by direct hand operated ropes, cables or rods.

**(13.3.4.4.2). §C26-1055.0 Maximum Speed of Elevators Operated by Wheels or Levers; Marking of Hydraulic Elevator Operating Devices.-**

a. It shall be unlawful to operate any elevators, having a contract speed in excess of one hundred fifty feet per minute, except hydraulic elevators, by wheel or lever mechanisms.

b. Hydraulic elevators operated by a wheel operating device shall be provided with an indicating device in the car to show the position of the control valve. Such device shall be marked and shall indicate “up”, “down” and “off”. Such wheel operating device shall be marked to indicate the direction of motion.

**(13.3.4.4.3). §C26-1056.0 Access to Operating Ropes or Cables from Outside of the Hoistway.-**It shall be unlawful to operate elevators by a rope or cable, access to which is obtained from the outside of the hoistway.

**(13.3.4.4.4). §C26-1057.0 Overhead Tension Weights.-**Overhead tension weights for hand ropes shall be secured by chains or cables attached to the weights and to a suitable anchorage.

**(13.3.4.4.5). §C26-1058.0 Hand Rope Guards.-**Guards shall be installed which will keep the hand ropes on the sheaves.

**(13.3.4.4.6). §C26-1059.0 Centering Devices Required.-**Freight elevators, except sidewalk type elevators, operated by means of a direct operated hand rope, shall be provided with a centering device which will insure the operating mechanism being placed in the stop position when it is desired to stop the car.

**(13.3.4.4.7). §C26-1060.0 Arrangement and Number of Operating Devices.-**

a. The handle of every car switch operating device shall be arranged to return to the stop position and lock there automatically when the hand of the operator is removed.

b. Where more than one operating device is used in a car, except in automatic operation elevators, the operating devices shall be so interlocked that only one such device can be used at a time. If a single operating device is used, it shall be so located as to be near the car opening serving the greatest number of landing openings.

**(13.3.4.4.8). §C26-1061.0 Emergency Stop Switches.-**

a. For electric elevators, an emergency stop switch, which will cut off the source of power, shall be provided in the car adjacent to the operating device. If the stop button of an automatic operation or continuous pressure operation elevator is a red button marked “stop”, such button may be used as the emergency stop switch.

b. Where electric elevators have winding drum machines, one lead to the emergency stop switch shall be run to the car through a separate and independent traveling cable.



c. The emergency stop button or emergency stop switch in each self-service elevator in a multiple dwelling shall be so connected and arranged that the operation of the emergency stop button or emergency stop switch will cause the alarm bell to ring and to continue ringing until stopped by resetting of the alarm bell circuit outside of the car, except that when an additional alarm bell located outside of the shaft, the bell system may be arranged to ring only during the period when the elevator remains stationary either because of operating the emergency stop switch or the emergency stop button. This provision shall apply to both present existing and new installations except when materials to effect compliance in existing installations are unobtainable due to Federal Government wartime emergency restrictions, the department shall defer enforcement until the said materials are obtainable.

**(13.3.4.4.9). §C26-1062.0 Disconnecting Switch Required.-**

a. A manually operated multi-pole disconnecting (service) switch shall be installed in the main line of electric elevator machinery.

b. Such switch shall be so located as to be adjacent to and visible from the elevator machine or motor generator set. It shall be unlawful to make any provision for closing the disconnecting switch from any other part of the building. When practicable, such switch shall be located in the machine room at the lock-jamb side of the entrance door.

**(13.3.4.4.10). §C26-1063.0 Independent Breaks Required With Metal-to-Metal Contacts.-**

Where gravity or spring opened metal-to-metal contacts, or a combination of the two, are used on controller switches for stopping elevator machines, at least two independent breaks shall be provided.

**(13.3.4.4.11). §C26-1064.0 Use of Springs or Electric Circuits as Circuit Breakers.-**

Breaking the circuit to stop an automatic control elevator at the terminals shall be independent of the operation of springs in tension or the completion of another electric circuit. If springs are used, such springs shall be in compression. The interruption of the electric circuit shall prevent the movement of the car.

**(13.3.4.4.12). §C26-1065.0 Grounding of Frames.-**The frame of the electric elevator machine, the frame of the controller, the operating rope if used, and the frames of electric appliances in or on the elevator car, shall be effectively grounded.

**(13.3.4.4.13). §C26-1066.0 Enclosure of Slack Cable Switches.-**The electric slack cable switches shall be enclosed.

**(13.3.4.4.14). §C26-1067.0 Forbidden types of Control Systems.-**

a. It shall be unlawful to use control systems which depend on 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 safeties or the closing of a contactor by an emergency stop button. Dynamic-braking and speed control devices are exempted from these requirements.

b. It shall be unlawful to install or to continue in use on any passenger elevator a movable platform which will permit the operation of the elevator with either the car gate or car door open.

**(13.3.4.4.15). §C26-1068.0 Arrangement of Operating Levers.-**Car switch and hand operating levers shall be so arranged that the movement of the lever toward the opening which the operator usually faces will cause the car to descend and the movement of the lever away from such opening will cause the car to ascend.

**(13.3.4.4.16). §C26-1069.0 Rope Locks Required.-**All freight elevators operated by hand ropes shall be equipped with rope locks for holding the car at any landing except:

1. Sidewalk type elevators;
2. Elevators equipped with an emergency switch;
3. Elevators equipped with interlocks or electric contacts.

**(13.3.4.4.17). §C26-1070.0 Operation of Directional Switches or Operating Valves on Passenger Elevators.-**On mechanically operated passenger elevators, the operation of directional switches or operating valves shall not depend solely upon belts or upon cast or malleable iron chains. If a hand rope is used, the cable shall be securely anchored to the operating sheave or drum.

**(13.3.4.4.18). §C26-1071.0 Automatic Fire Alarm Circuit Breakers.-**It shall be unlawful to use a circuit breaker operated automatically by a fire alarm system to cut off the power, or to interrupt the operating circuit of a passenger elevator.

**(13.3.4.4.19). §C26-1072.0 Automatic Operation Elevators.-**Automatic operation elevators, except sidewalk elevators the travel of which is one story or less, shall comply with the following requirements:

1. If the car has started for a given landing, it shall be impossible for an impulse to be given from any landing to send the car in the reverse direction until such car has reached the destination corresponding to the first impulse. The car may be stopped at any intermediate landing to take on or discharge passengers or attendants going in the original direction.
2. If the car has been stopped to take on or to discharge passengers or freight and such car is to continue in the direction determined by the first impulse, the car may be started by the closing of the car gate.
3. It shall be impossible to start the car under normal operation unless every hoistway door is closed and locked in the closed position. It shall be unlawful to use devices employing locks and contacts of a type where the contact is made when the door is closed and the locking of the door takes place subsequently.
4. Passenger elevators in multiple dwellings shall not be prodded with operating buttons at any landing which will send the car to any other landing.
5. An inspector's switch shall be installed on the controller to render all landing buttons inoperative and when the opening of the emergency stop switch or button does not cancel all registered car and hall calls, the inspector's switch on the controller shall also render all car buttons inoperative and there shall be furnished in the car an "up" and "down" inspection switch or button which will enable the inspector to operate the elevator in either direction as long as the switch or button is held in contact. The terminal floor buttons may be used as inspection buttons in lieu of separate "up" and "down" buttons.

**(13.3.4.4.20). §C26-1073.0 Continuous Pressure Operation.-**It shall be unlawful to use continuous pressure operation for passenger elevators, except when such elevators are provided with all of the safety devices required for automatic operation elevators.

**(13.3.4.4.21). §C26-1074.0 Polyphase Alternating Current Motors.-**Each electric elevator driven by a polyphase alternating current motor shall be provided with a device which will, except in the case of alternating current motors used in motor generator sets, prevent the starting of the motor if the phase rotation is in the wrong direction, or if there is failure in any phase.

**(13.3.4.4.22). §C26-1075.0 Starting of Electric Elevators After Failure of Power.-**

- a. Electric elevators operated by hand cables, lever or wheel operating devices, shall be so arranged that, in case of failure of power, or the opening of car gate, landing door or limit switches, it will be necessary to return the operating device to the "off" position before the elevator can again be started.

b. All existing electric elevators operated by hand cables, lever or wheel operative devices and which are equipped with electric brakes as required in section C26-1025.0 shall comply with the provisions of this section.

**(13.3.4.4.23). §C26-1076.0 Use of Overload Circuit Breakers and Rectifiers.-**

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

b. Where a direct current elevator motor, or motors, derive current from all alternating current power source through a non-rotating rectifying unit, means shall be provided to absorb a sufficient amount of the energy regenerated by the motor, or motors, under overhauling load conditions to prevent any elevator from attaining at any time more than 115 percent of contract speed.

c. Where a change in power supply from direct current to alternating current is made to an existing direct current elevator and a non-rotating type of rectifying unit is used to supply direct current to the elevator motor, or motors, the requirements of subdivision b of this section shall apply.

**(13.3.4.4.24). §C26-1077.0 Operation of Sidewalk Elevators.-**The operation of power sidewalk elevators through openings in the sidewalk or other areas accessible to the public protected by hinged doors or vertical lifting covers, shall conform to the following:

1. The elevator shall be operated through the opening, in both the up and down direction, only from the sidewalk or other area. The operation to be by means of a detachable flexible cord, five feet or less in length, with up and down continuous pressure type operating buttons on the free end.

2. A special type plug receptacle for connecting the cord shall be mounted in a weatherproof box and shall be installed above the sidewalk or other area on the side of the building wall eighteen inches or less horizontally distant from one side of the opening.

3. Operating buttons may be provided in the elevator car and at any landings below the top landing provided that such buttons shall operate the car only when it is not in contact with the doors or cover at the sidewalk or other area.

4. All operating buttons used shall be of the continuous pressure operation type and it shall be possible to operate car when it is in contact with the sidewalk doors or cover only by means of the up and down buttons on the flexible cord specified in subdivision 1 of this rule.

5. The flexible cord shall be removed from the wall receptacle as soon as the elevator has come to a stop at the top or bottom and shall not be left where it can be used by unauthorized persons.

**(13.3.4.4.25). §C26-1078.0 Installation of Condensers and Other Devices which will Interfere with the Safe Operation of the Elevator.-**It shall be unlawful to install any condensers, the installation, operation or failure of which will hold in any magnet or keep alive any circuit so as to interfere with safe operation of any elevator apparatus, or to install any other devices or equipment, not provided for in this code, the installation or operation of which will interfere with the safe operation thereof.

**SUB-GROUP 5**

**Limits of Speed**

**(13.3.4.5.1). §C26-1079.0 Maximum Speed of Freight and Passenger Elevators.-**The maximum contract speed of passenger and freight elevators, except as otherwise specified in

sections C26-1080.0 through C2G-1082.0, shall be limited only by the top and bottom clearances as determined by sections C26-865.0 through C26-868.0.

**(13.3.4.5.2). §C26-1080.0 Maximum Speed of Sidewalk Type Elevators.**-The maximum contract speed of sidewalk type elevators shall be thirty-five feet per minute.

**(13.3.4.5.3). §C26-1081.0 Maximum Speed of Freight Elevators Without Regular Operators.**-The maximum contract speed of freight elevators without a regular operator, except sidewalk type elevators, shall be one hundred feet per minute, unless such freight elevators are provided with automatic operation or continuous pressure operation.

**(13.3.4.5.4). §C26-1082.0 Maximum speed of Continuous Pressure Operation Freight Elevators.**-The maximum contract speed of electric freight elevators with continuous pressure operation, except sidewalk type elevators, shall be one hundred fifty feet per minute.

**GROUP 5  
Cables and Signal Systems for Elevators**

**SUB-GROUP 1  
Cables**

**(13.3.5.1.1). §C26-1083.0 Materials for Cables.**-Car and counterweight cables shall be iron or steel without covering, except that where liability to excessive corrosion or other hazard exists, marline covered cables may be used for freight elevators. It shall be unlawful to use marline covered cables for passenger elevators. It shall be unlawful to use chains for hoisting, except for sidewalk elevators the travel of which is fifteen feet or less.

**(13.3.5.1.2). §C26-1084.0 Information on Data Plates.**-

a. Where winding drum machines are used, the data plate required in section C26-1012.0 shall include the following cable information:

<b>Cable Specifications.</b>			
<b>Cable.</b>	<b>Number.</b>	<b>Diameter in Inches.</b>	<b>Rated Ultimate Strength in Pounds.</b>
Hoisting	..	....	.....
Car Counterweight	..	....	.....
Machine Counterweight	..	....	.....

b. Where traction machines or drum machines without counterweights are used, the data plate required in section C26-1012.0, shall include the following cable information:

<b>Cable Specifications.</b>			
<b>Cable.</b>	<b>Number.</b>	<b>Diameter in Inches.</b>	<b>Rated Ultimate Strength in Pounds.</b>
Hoisting Cables	..	....	.....

c. Where hydraulic machines are used, the data plate required in section C26-1012.0, shall include the following cable information:

<b>Cable Specifications.</b>			
<b>Cable.</b>	<b>Number.</b>	<b>Diameter in Inches.</b>	<b>Rated Ultimate Strength in Pounds.</b>
Hoisting	..	....	.....
Car Counterweight	..	....	.....

d. In addition a metal tag shall be attached to the cable fastenings. The diameter, rated ultimate strength and material of the cable, and the date of the cable installation, shall be given on such tag.

**(13.3.5.1.3). §C26-1085.0 Load Limit for Cables of Unknown Strength.**-Where the rated ultimate strength and material of the cable are unknown, the loads shall be limited to the loads allowed for iron cable of the same diameter.

**(13.3.5.1.4). §C26-1086.0 Factors of Safety.**-

a. The factors of safety based on static loads for car and counterweight cables for elevators shall be at least those given as corresponding to the contract speed of the car in tables 5 and 6.

b. The factor of safety based on static loads for chains used for hoisting sidewalk elevators shall be at least five, and for cables, seven.

**TABLE 5**

**Factors of safety for hoisting and counterweight cables for passenger elevators**

Car Speed in Feet Per Minute	Factors of Safety	Car Speed in Feet Per Minute	Factors of Safety	Car Speed in Feet Per Minute	Factors of Safety
50	7.5	550	10.5	1,050	11.65
100	7.85	600	10.7	1,100	11.7
150	8.25	650	10.85	1,150	11.725
200	8.5	700	11.0	1,200	11.75
250	8.85	750	11.1	1,250	11.775
300	9.2	800	11.2	1,300	11.8
350	9.5	750	11.3	1,350	11.825
400	9.8	900	11.4	1,400	11.85
450	10.0	950	11.5	1,450	11.875
500	10.3	1,000	11.6	1,500	11.885

**TABLE 6**

**Factors of safety for hoisting and counterweight cables for freight elevators**

Car Speed in Feet Per Minute	Factors of Safety	Car Speed in Feet Per Minute	Factors of Safety	Car Speed in Feet Per Minute	Factors of Safety
50	6.7	400	8.7	1,000	10.3
100	7.0	450	8.9	1,100	10.4
150	7.5	500	9.1	1,200	10.5
200	7.6	600	9.5	1,300	10.5
250	7.9	700	9.8	1,400	10.6
300	8.2	800	10.0	1,500	10.6
350	8.4	900	10.2		

**(13.3.5.1.5) §C26-1087.0 Number and Diameter of Cables and Computed Load.**-

a. The number and diameter of the cables shall be determined by using the factor of safety found in section C26-1086.0 together with the rated ultimate strength of the cable. The computed load on the cables shall be the weight of the car, plus its contract load, plus the weight of the hoisting cables and the compensation, minus the weight of the independent car counterweight, if any.

b. The minimum number of hoisting cables used with traction elevators shall be three, except that private residence elevators shall have at least two hoisting cables. The minimum number of cables used with winding drum elevators shall be two car hoisting cables and two cables for each counterweight used.

c. It shall be unlawful to use hoisting ropes less than one-half of an inch in diameter for elevators, except that where conditions make it impractical to use one-half inch rope, the superintendent may permit the use of rope seven-sixteenths of an inch in diameter, and except that for private residence elevators, hoisting cables at least three-eighths of an inch in diameter may be used. The ratio of cable diameter to sheave or drum diameters shall comply with the requirements of section C26-1019.0.

**(13.3.5.1.6). §C26-1088.0 Anchoring of Cables to Winding Drums.-**Cables anchored to winding drums shall have at least one turn of cable on the winding drum when the car or counterweight has reached the extreme limit of its overtravel.

**(13.3.5.1.7). §C26-1089.0 Lengthening or Repairing Cables by Splicing Unlawful.-**It shall be unlawful to repair or to lengthen any car or counterweight cables by splicing.

**(13.3.5.1.8). §C26-1090.0 Securing Winding Drum Ends of Cables.-**The winding drum ends of car or counterweight cables shall be secured by clamps on the inside of the drums or by one of the methods specified in the following paragraphs for fastening cables to cars or counterweights.

**(13.3.5.1.9) §C26-1091.0 Fastening Car and Counterweight Ends of Cables.-**

a. The car and counterweight ends of cables shall be fastened by individual tapered babbitted sockets, or by other methods approved by the superintendent, except that it shall be unlawful to use spliced eyes and return loops. Other fastenings may be used for compensating counterweight cables and for plunger elevators.

b. Adjustable shackle rods shall be used to attach cables to cars and counterweights in such a manner that all portions of the cable, except the portion in the socket, shall be readily visible.

c. It shall be unlawful to use cable equalizers or their fastenings, unless they have been previously approved by the board on the basis of tests conducted by or under the supervision of the board or on the basis of tests made in a competent laboratory designated by the board for such tests. Approval shall be withheld from such equalizers and their fastenings, unless the tests shall have indicated that the equalizer and its fastenings in its several parts and assembly has a strength of at least ten percent in excess of the minimum cable strength required by section C26-1087.0.

**(13.3.5.1.10). §C26-1092.0 Method of Socketing Cables.-**

a. If a babbitted socket is used, the length of such socket shall be at least four and three-quarter times the diameter of the cable. The hole at the small end shall be as given in the following table:

Nominal diameter of cables in inches	Maximum inside diameter of small end of cable socket
1/4 to 7/16 inclusive	1/16 of an inch larger than actual cable diameter
1/2 to 3/4 inclusive	3/32 of an inch larger than actual cable diameter
7/8 to 1 1/8 inclusive	1/8 of an inch larger than actual cable diameter
1 1/4 to 1 1/2 inclusive	3/16 of an inch larger than actual cable diameter

b. The small end of the socket shall be free from cutting edges. The hole at the large end of the socket shall be at least two and one-quarter times the diameter of the cable. Every socket shall be drop-forged steel or a steel casting. The socket shall be of such strength that the cable will break before the socket is perceptibly deformed.

c. The ends of wire rope to be socketed shall be served with three seizings at each side of any point at which the rope is to be cut.

d. Only annealed iron wire shall be used as seizing wire. The wires shall be wound tight and even. The twisted ends of the seizings shall be so placed that they fall into the valleys between strands and away from the ends of the rope.

e. The first two seizings shall be at least one-half of an inch long, and the third seizing shall be at least three-quarters of an inch long. The first seizing shall be close to the cut and the second seizing shall be spaced within two and one-quarter inches from the first seizing. The third seizing shall be at a distance from the second seizing equal to the length of the socket.

f. For larger cables longer seizings than above specified shall be provided.

g. It shall be unlawful to use tape as a substitute for annealed iron wire seizing.

h. The ropes thus served shall be slipped sufficiently into the socket for manipulating. After the first two seizings are removed, the strands shall be opened up and the hemp center shall be cut out as closely as possible to the remaining seizing.

i. All grease shall be wiped off the extended strands, and the lubricant shall be carefully removed by washing with a suitable solvent, preferably non-flammable. The ends of the strands shall then be bent in and bunched close together, and the rope shall be pulled back as far as possible so that the strands rest in the basket with the third seizing slightly projecting outside of the mouth of the socket.

j. When the socket is thus made ready for pouring the babbitt, the socket shall be warmed and shall be held in a position which is vertical and truly axial with the rope to be socketed. Tape or waste may be wound around the rope at the base of the socket to prevent the metal from seeping through, but such tape or waste must be removed after the babbitt has cooled off. Only pure babbitt, free of dross, shall be used, and such babbitt shall be heated to a temperature which is just sufficient to produce fluidity.

k. If the original and uniform relation of tension obtained by correct manufacture is undisturbed, it shall be an indication that the seizing and socketing has been done properly; any loss of rope lay shall be a clear indication of careless seizing and socketing.

**(13.3.5.1.11). §C26-1093.0 Reroping and Shortening of Cables.**-Whenever an elevator is reroped or its ropes are shortened, the top car and counterweight clearances shall be at least those specified in section C26-867.0.

## **SUB-GROUP 2**

### **Emergency Signals**

**(13.3.5.2.1). §C26-1094.0 Emergency Signals or Telephones Required.**-Automatic operation passenger or freight elevators, except sidewalk elevators the travel of which is fifteen feet or less, shall be provided with an audible emergency signal or, except in automatic self-service elevators in multiple dwellings, with a telephone. Such emergency signal shall be operative from the car and shall be located outside of the hoistway. The emergency alarm shall be a bell of at least six inches in diameter and shall be so located as to be clearly audible in some space or room in which an employee is ordinarily located.

**(13.3.5.2.2). §C26-1095.0 Telephone Connection Required.**-Passenger elevators in private residences shall be provided with a telephone permanently connected to a central exchange and with an emergency alarm bell as provided in section C26-1094.0.

**(13.3.5.2.3). §C26-1096.0 Signal Systems on Elevator Hoistways.**-The hoistway of every elevator, except automatic operation, continuous pressure operation and sidewalk elevators and

except installations in retail establishments where the elevator regularly stops each time it reaches each landing it services, shall be provided with a signal system by means of which system signals can be given from any landing whenever the elevator is desired at that landing. Signalling systems shall be maintained in effective operating condition. The requirements of this section shall apply to all existing installations.

## **Sub-Article 5. Hand Power Elevators**

### **GROUP 1**

#### **Hoistway Construction**

##### **(13.4.1.1.1). §C26-1097.0 Fire Resistive Hoistway Enclosures.-**

a. Hoistways to Be Fire Resistive.-Hoistway enclosures of all elevators, except sidewalk elevators, the travel of which is one story or less, shall comply with sections C26-638.0 through C26-647.0 and sections C26-660.0 through C26-665.0, and, in factory buildings, with the provisions of the labor law, and in multiple dwellings, with the provisions of the multiple dwelling law.

(13.4.1.1.2). b. Landing Openings to Be Protected.-Landing openings in a fire resistive hoistway enclosure shall be provided with the resistive doors, panels or fronts which comply with sections C26-638.0 through C26-647.0, and sections C26-660.0 through C26-665.0, and, in factory buildings, with sections two hundred sixty-one and two hundred seventy of the labor law, except that such openings shall first comply with section C26-896.0. For elevators whose contract load is two thousand pounds or more, the aggregate clear width of the hoistway doors shall be at least thirty inches and the clear height shall be at least seventy-eight inches.

(13.4.1.1.3). c. Strength of Hoistway Enclosure.-The hoistway enclosure which is adjacent to a landing opening shall be of sufficient strength to support in true alignment the hoistway doors with their operating mechanism.

(13.4.1.1.4). d. Pits.-It shall be unnecessary to have pits at the bottom of hand power elevator hoistways.

(13.4.1.1.5). e. Ramps.-When ramps are used, such ramps shall be the same width as the entrance door and shall be inclined at a rate of five inches or less per foot and shall have a flat surface of at least two inches at the top.

##### **(13.4.1.2). §C26-1098.0 Non-Fire Resistive Hoistway Enclosures.-**

a. General. Non-fire resistive hoistway enclosures shall be permitted only for sidewalk elevators, the travel of which is one story or less. Where non-fire resistive construction is permitted, hoistways shall be enclosed to a height of six feet, except on the sides used for loading or unloading.

(13.4.1.2.1). b. Materials for Enclosures.-

1. Enclosures shall be building walls, solid or latticed partitions, or of incombustible material, grille work, metal grating, expanded metal or fireproofed wood. Where wire grille work is used, the wire shall be at least 0.0915 inch in diameter (No. 13 steel wire gage), and the maximum size of mesh shall be two inches. Where expanded metal is used, its minimum thickness shall be 0.094 inch (No. 13 U.S. gage).

2. The maximum spacing between vertical bars shall be one inch.



**(13.4.1.3.1). §C26-1099.0 Clearance Between Cars and Hoistway Enclosures.-**

a. Clearance Between Car Platforms and Landing Saddle.-The maximum clearance between the car platform and the landing saddle shall be three inches for freight elevators and two inches for passenger elevators, except that where the operating rope is located at the side of the platform, such clearance shall be one inch or less.

(13.4.1.3.2). b. Clearance Between Hoistway Enclosure and Loading Side of Car Platform.- The maximum clearance between a hoistway enclosure and a loading side of the car platform opposite a car entrance shall be five inches, except that when the doors are installed wholly within the hoistway, the maximum permissible clearance shall be seven and one-half inches.

**(13.4.1.4). §C26-1100.0 Overtravel for Hand Elevators.-**An overtravel of at least eighteen inches shall be provided at the top for all hand elevators, except sidewalk elevators. It shall be unnecessary to have any overtravel at the bottom.

**(13.4.1.5.1). §C26-1101.0 Machine Supports, Loads on Supports and Factors of Safety.-**

a. Machine Supports.-Machinery and sheaves shall be supported and held so as effectually to prevent any part from becoming displaced. The supporting beams shall be of steel or reinforced concrete. It shall be unnecessary to have any beams under machinery supported on an independent foundation or on the floor of the machine room, if such foundation or floor is properly constructed to support the loads.

(13.4.1.5.2). b. Loads on Supports.-Loads on overhead beams and their supports shall be computed as follows:

1. The total load on overhead beams shall be assumed to be equal to the weight of all apparatus resting on such beams plus twice the maximum load suspended from such beams.
2. The load resting on such beams shall include the complete weights of machine, sheaves and similar equipment. The load suspended from such beams shall include the sum of the tensions of all cables suspended from such beams.

(13.4.1.5.3). c. Hanging of Machinery Underneath Supporting Beams.-It shall be unlawful to hang elevator machinery underneath the supporting beams at the top of the hoistway, except for idler or deflecting sheaves with their guards and frames and devices for limiting or retarding the car speed and their accessories.

(13.4.1.5.4). d. Factors of Safety.-The factor of safety for overhead beams and their immediate supporting beams, based on the ultimate strength of the material which, if of steel, shall conform to the standard specifications of the A.S.T.M., D., A7-29, the loads being assumed as in subdivision b of section C26-1101.0, shall be at least the following:

1. For steel.....4
2. For reinforced concrete.....7

**(13.4.1.6). §C26-1102.0 Gratings Under Machinery.-**A metal grating capable of supporting fifty pounds per square foot shall be installed under the overhead machinery. Openings in such gratings shall reject a ball one and one-half inches in diameter.

**(13.4.1.7). §C26-1103.0 Thoroughfares Under Elevator Hoistways or Counterweights.-**It shall be unlawful to have thoroughfares or occupied spaces under hoistways or counterweights, unless there is a structure under the hoistway or counterweight, which structure is sufficiently strong to withstand the impact of the car with contract load, or the impact of the counterweight, when either is dropped freely in its guides from the upper limit of overtravel; provided that, for cars or counterweights equipped with broken rope safeties and speed retarders, the impact shall be computed for the maximum attainable speed.

## **GROUP 2**

### **Hoistway Guards and Screens**

**(13.4.2.1). §C26-1104.0 Hatch Covers for Sidewalk Elevators.-**

- a. Where the top hatch opening of sidewalk elevators is wholly or partially outside of the building wall, the hatch covers shall be of the hinged type or the vertically lifting type and shall be capable of sustaining a live load of three hundred pounds per square foot. The maximum dimensions of sidewalk openings, except by permission of the superintendent, shall be five feet at right angles to and six feet parallel to the building line. The side of the opening nearest the building shall be four inches or less from the building wall, except that where conditions make this impractical, such distance may be increased subject to the approval of the superintendent.
- b. Where hinged type covers are used, the line of the hinges shall be at right angles to the building line. Where the covers open toward any obstruction, the space between the fully opened cover and such obstruction shall be at least eighteen inches. Where vertically lifting covers are used, there shall be a clearance of at least two feet between the cover and any obstruction above it when the elevator is at the top of its overtravel.
- c. Hatch covers shall be self-closing. It shall be unlawful to fasten or to bolt open such covers when the car is away from the top landing, except where the hatch opening is in an area inaccessible to the public.
- d. Where the top hatch opening of sidewalk elevators is wholly outside the budding wall, hinged or vertically lifting type covers may be used, or doors may be provided complying with sections C26-1106.0 through C26-1113.0. Such doors shall be so arranged that they can only be opened or unlocked from the outside of the hoistway when the car is at the landing.
- e. An electric waterproof signal gong, at least four inches in diameter, shall be provided and such gong shall ring before the hatch covers at the sidewalk begin to open. A warning sign shall be mounted on the building ten feet or less above the sidewalk. Such sign and bell shall conform to the rules of the board.

**(13.4.2.2). §C26-1105.0 Counterweight Runways Outside of the Hoistway.-**Where runways for counterweights are located outside of the elevator hoistway, such runways shall be solidly enclosed throughout their height, except that when the runway is located outside of the building, such runway shall be enclosed to a height of at least seven feet from the ground.

## **GROUP 3**

### **Hoistway Doors for Hand Power Elevators**

**(13.4.3.1). §C26-1106.0 Automatic Fire Doors Functioning by Heat.-**It shall be unlawful for any automatic fire door, the functioning of which is dependent on the action of heat, to lock any landing opening in the hoistway enclosure of any passenger elevator or to lock any exit leading from any hoistway landing door to the outside of the structure.

**(13.4.3.2). §C26-1107.0 Protection of Landing Openings.-**

- a. Landing openings in hoistway enclosures shall be protected by sliding or swing doors. Such doors shall comply with the fire resistive requirements for doors in such enclosures.
- b. In addition to such doors landing openings in hoistway enclosures, except enclosures for one-story sidewalk elevators, shall be furnished with gates at least thirty inches high which gates close when the car leaves the landing, unless the landing doors are made in two parts, one part above the other, with the lower part extending at least thirty inches above the floor,

and with such lower part so arranged as to open only after the upper part has been opened and to be closed before the top part can be closed.

**(13.4.3.3). §C26-1108.0 Opening of Hoistway Doors.**-It shall be unlawful for hoistway doors of elevators serving more than two floors to be capable of being opened from the landing side unless:

1. The word “elevator” is conspicuously displayed on the landing side of the doors, and
2. Unless the hoist way door is equipped with two spring locks or latches, one of which is at least six feet above the floor.

**(13.4.3.4). §C26-1109.0 Hanger guards and stops.**-Means shall be provided to prevent hangers for all sliding hoistway doors from jumping the tracks. Stops shall also be provided to prevent the hanger carriage from leaving the ends of the track, or suitable stops may be provided on the door only.

**(13.4.3.5). §C26-1110.0 Vision Panels.**-For elevators which can be operated from outside of the hoistway, hoistway doors may be provided with a vision panel. Such panels shall be of clear wired glass with a maximum area of eighty square inches.

**(13.4.3.6). §C26-1111.0 Strength of Hoistway Doors.**-Every hoistway door shall be capable of withstanding a force of seventy-five pounds applied perpendicularly to such door at any point without such door being sprung from its guides.

**(13.4.3.7). §C26-1112.0 Size of Hoistway Doors.**-When hoistway doors are closed such doors shall guard the full width of the landing openings and shall extend the full height from the landing saddle to the top of the landing opening.

**(13.4.3.8). §C26-1113.0 Door Counterweight Enclosures.**-Door counterweights shall run in metal guides from which they cannot become dislodged, or shall be boxed in. The bottoms of such guides or boxes shall be so constructed as to retain such counterweight if the counterweight rope breaks.

## **GROUP 4**

### **Car Construction and Safeties**

**(13.4.4.1.1). §C26-1114.0 Car Construction.-**

a. Car enclosures.-

1. All cars, except for sidewalk elevators, shall be enclosed on the top and sides, except at the openings necessary for entrance and exit. Enclosures shall be solid or of openwork rigidly braced with steel. Where slats, bars or wire mesh are used, the openings shall reject a ball two inches in diameter. Where sheet metal is used, it shall be at least as thick as No. 16 U.S. gage. Where wire mesh is used, the wire shall be at least 0.135 inch in diameter (No. 10 steel wire gage). An enclosure shall deflect only one-quarter of an inch or less when a force of seventy-five pounds is applied perpendicularly to the enclosure at any point. The car enclosure shall be securely fastened to the car platform or frame so that such enclosure cannot work loose or become displaced in ordinary service.

2. Cars for sidewalk elevators shall be enclosed to the spring of the how iron on such sides as are not used for entrance but such cars shall be enclosed to a height of at least four feet above the platform. If the enclosure is open-work of bars, slats or wire mesh, the openings shall reject a ball four inches in diameter; wire mesh enclosures shall be of wire at least 0.0915 inch in diameter (No. 13 steel wire gage).

(13.4.4.1.2). b. Car Frames and Platforms.-

1. Car frames and platforms shall be of metal or sound seasoned wood. Such platforms shall be designed with a factor of safety of at least four for metal, and a factor of at least six for wood, on the contract load uniformly distributed. The frame members shall be securely bolted and braced and shall be provided with guide shoes.

2. Guide shoes for sidewalk elevators of the two point suspension type shall be at least twelve inches long unless two sets of shoes, spaced eighteen inches on centers, are used. Where the four point suspension type of elevator is used, guide shoes shall be at least four inches long.

(13.4.4.1.3). c. Use of Glass in Hand Power Elevators.-It shall be unlawful to use any glass in elevator cars, except to cover certificates, directors, lighting fixtures and appliances necessary for the operation of the car. It shall be unlawful to use any piece of glass exceeding one square foot in area unless such glass is laminated or is otherwise shatterproof, but the maximum total area of such glass used in such car in connection with lighting fixtures, whether in one or more pieces, shall be four square feet.

(13.4.4.1.4). d. Protection of Cars Operating in Hoistways Outside of the Structure.-When elevator cars operate in hoistways outside of the structure, which hoistways are enclosed only at the ground landing, such cars shall be protected on the exposed sides by independently operated gates or by self-closing gates.

**(13.4.4.2). §C26-1115.0 Car Compartments.-**Hand elevator cars upon which persons are permitted to ride shall have only one compartment.

**(13.4.4.3). §C26-1116.0 Car Safeties.-**If the rise of all elevator exceeds fifteen feet, such elevator shall be equipped with an approved safety device attached to the underside of the car, which safety device will immediately stop and hold the car and contract load, if the suspension means breaks.

**(13.4.4.4.1). §C26-1117.0 Capacity and Loading.-**

a. Minimum contract load of passenger elevators.-The contract load of passenger elevators shall be at least fifty pounds per square foot of platform area inside of the car enclosure.

(13.4.4.4.2) b. Information Plate Required.-A metal plate shall be fastened in a conspicuous place in the elevator car and shall bear the following information, in at least one-quarter inch letters or figures, stamped, etched or raised on the surface of the plate:

1. The contract load of the elevator in pounds;
2. The maximum number of passengers to be carried based on one hundred fifty pounds per person in the case of a passenger elevator.

(13.4.4.4.3). c. Tests.-A contract load test of every new hand power elevator as to operation of the car safety, brake and speed retarding devices shall be made before such elevator is placed in regular service.

## **GROUP 5**

### **Guides, Buffers and Counterweights**

**(13.4.5.1). §C26-1118.0 Guide Rails.-**Car and counterweight guide rails shall be of steel for elevators in structures of Class 1 or Class 2 construction and for elevators where the car travel exceeds thirty-five feet and for all sidewalk elevators. Where steel guide rails are not required, they shall be of steel or wood. Joints in steel rails shall be either tongued and grooved or doweled and fitted with splice plates. Joints in wood rails shall be tongued and grooved or doweled and screwed to backing pieces or brackets. Guide rails shall be securely fastened with through bolts,

wood screws or clips of such strength, design and spacing that the maximum deflection of the guide rails and their fastenings under normal operation shall be one-quarter of an inch or less, particularly where in contact with the guide shoe when the car is at the landing. Guide rails shall withstand the application of the safety when the safety is stopping either a fully loaded car or the counterweight. The guiding surfaces of the guide rails for elevators requiring safeties shall be finished smooth. Guide rails shall be bottomed on suitable supports and extended at the top to prevent guide shoes running off in case the overtravel is exceeded.

**(13.4.5.2). §C26-1119.0 Car and Counterweight Buffers.-**

- a. Car buffers of the spring type or their equivalent shall be installed in the pits of passenger elevators.
- b. Buffers shall be located symmetrically with reference to the center of the car.

**(13.4.5.3). §C26-1120.0 Counterweights.-**

- a. Counterweights shall run in guide rails and shall not be boxed unless incombustible material is used for such boxing.
- b. Sections of counterweights for passenger elevators, whether carried in frames or otherwise, shall be secured by at least two tie-rods passing through holes in the section. The tie-rods shall have lock nuts at each end. Such lock nuts shall be secured by cotter pins.

## **GROUP 6**

### **Machines and Suspension Members**

#### **SUB-GROUP 1**

##### **Machines and Machinery**

**(13.4.6.1.1). §C26-1121.0 Brakes Required.-**Elevators shall be equipped with a hand brake operating in both directions of motion or a combined automatic brake and speed retarder operating in both directions of motion, except when motive power is derived through use of a self-locking or non-overhauling worm gear drive.

**(13.4.6.1.2). §C26-1122.0 Factors of Safety.-**The factors of safety based, on the static loads to be used in designing parts of hoisting machines shall be at least eight for wrought iron or steel, and ten for cast iron or other materials.

**(13.4.6.1.3). §C26-1123.0 Set Screw Fasteners.-**It shall be unlawful to use set screw fastenings instead of keys or pins, except where the connection is not subject to torque.

**(13.4.6.1.4). §C26-1124.0 Suspension of Sheaves or Idlers.-**It shall be unlawful to suspend sheaves or idlers in cast iron stirrups from the underside of the supporting beams.

**(13.4.6.1.5). §C26-1125.0 Conversion to Power Elevator Unlawful.-**It shall be unlawful to equip a hand power elevator machine with any means or attachment for applying any other power, unless such elevator is completely converted into a power elevator complying with the requirements for power elevators.

**(13.4.6.1.6). §C26-1126.0 Rope Gripping Attachments or Clutch Mechanisms.-**It shall be unlawful to apply power to hand elevators by means of rope gripping attachments or clutch mechanisms.

**SUB-GROUP 2**  
**Suspension Members**

**(13.4.2.6.2.1).** §C26-1127.0 **Suspension Fastening Tag.**-A metal tag stating the sizes, rated ultimate strength and material of the suspension and the date of its installation, shall be attached to the suspension fastening.

**(13.4.6.2.2).** §C26-1128.0 **Suspension Members and Factor of Safety.**-

a. The number of suspension members for both car and counterweight shall be at least two. Suspension members shall be of iron, steel or marline covered.

b. The factor of safety used in determining the size of the suspension member shall be at least five, based on the weight of the car and its contract load.

**(13.4.6.2.3).** §C26-1129.0 **Adjustment of Suspension Members.**-Suspension members shall be so adjusted that either the car or the counterweight shall bottom before the counterweight or the car strikes any part of the overhead structure.

**(13.4.6.2.4).** §C26-1130.0 **Securing of Suspension Members.**-

a. Suspension members secured to a winding drum shall have at least one complete turn of the suspension member around the winding drum when the car or counterweight has reached the extreme limit of its overtravel.

b. The drum end of cables shall be secured by clamps or sockets inside the drum.

**(13.4.6.2.5).** §C26-1131.0 **Platform Elevators.**-It shall be unlawful to use platform elevators for passenger service. The maximum travel of a platform elevator shall be fifteen feet and the maximum platform area shall be fifty square feet.

**SUB-ARTICLE 6**  
**Dumbwaiters**

**GROUP 1**  
**Hoistway Construction**

**(13.5.1.1.1).** §C26-1132.0 **Fire Resistive Hoistway Enclosures.**-

a. Hoistways to Be Fire Resistive.-Hoistway enclosures of all dumbwaiters, except dumbwaiters the travel of which is one story or less, shall comply with sections C26-638.0 through C26-647.0, and sections C26-660.0 through C26-665.0, and, in factory buildings, with the provisions of the labor law, and in multiple dwellings with the provisions of the multiple dwelling law.

(13.5.1.1.2). b. Landing Openings to Be Protected.-Landing openings in a fire resistive hoistway enclosure shall be provided with fire resistive doors, panels or fronts which comply with sections C26-638.0 through C26-647.0, and sections C26-660.0 through C26-665.0, and, in factory buildings, with the provisions of the labor law.

**(13.5.1.2.1).** §C26-1133.0 **Use of Non-Fire Resistive Hoistway Enclosures.**-

a. Non-fire Resistive Enclosures.-Non-fire resistive hoistway enclosures shall be permitted only for dumbwaiters the travel of which is one story or less. When non-fire resistive enclosures are permitted, hoistways for power dumbwaiters shall be enclosed to the full height of the hoistway, except on the sides for loading or unloading.

(13.5.1.2.2). b. Enclosure of Hoistway Sides Used for Loading and Unloading.-The hoistways of power dumbwaiters shall be enclosed from floor to ceiling except for the landing openings.

(13.5.1.2.3). c. Materials for Enclosures.-

1. Enclosures shall be building walls, solid or latticed partitions, or of incombustible material, grille work, metal grating, expanded metal or fireproofed wood. Where grille work is used, the wire shall be at least 0.0915 inch in diameter (No. 13 steel wire gage) and the maximum size of mesh shall be two inches. Where expanded metal is used, its minimum thickness shall be 0.094 inch (No. 13 U.S. gage).
2. The maximum spacing between vertical bars shall be one inch.

(13.5.1.2.4). d. Netting Required on Enclosures.-When either of the following conditions exists, the openings in the enclosures shall be covered with a netting of square mesh, one-half of an inch or less in size, made of wire at least 0.0348 inch in diameter (No. 20 steel wire gage):

1. The clearance between the enclosure and any part of the car, counterweight or any sliding landing door is less than one inch.
2. The enclosure is grille or open work having openings which will pass a one-half inch diameter ball, and the openings in the enclosure are less than six feet above any landing, stairway, floor or platform.

**(13.5.1.3.1). §C26-1134.0 Supports and Factors of Safety.-**

a. Machine Supports.-Machinery and sheaves shall be so supported and held as effectually to prevent any part from becoming displaced. The supporting beams shall be of steel or reinforced concrete. It shall be unnecessary to have beams under machinery supported on an independent foundation or on the floor of the machine room, if such foundation or floor is properly constructed to support the loads.

(13.5.1.3.2). b. Loads and Supports.-Loads on overhead beams and their supports shall be computed as follows:

1. The total load on overhead beams shall be assumed to be equal to the weight of all apparatus resting on such beams plus twice the maximum load suspended from such beams.
2. The load resting on such beams shall include the complete weights of machine, sheaves, controller and similar equipment. The load suspended from such beams shall include the sum of the tensions of all cables suspended from such beams.

(13.5.1.3.3). c. Factors of Safety.-The factor of safety for overhead beams and their immediate supporting beams, based on the ultimate strength of the material which, if of steel, shall conform to the standard specifications of the A.S.T.M., D., A7-29, the loads being assumed as in subdivision b of this section shall be at least the following:

1. For steel.....4
2. For reinforced concrete.....7

**(13.5.1.4). §C26-1135.0 Thoroughfares and Occupied Spaces Under Dumbwaiters and their Counterweights.-**

a. It shall be unlawful to have thoroughfares or occupied spaces under hoistways of dumbwaiters or their counterweights, unless there is a structure under the hoistway sufficiently strong to withstand the impact of the car with contract load, or the impact of the counterweight, when either the car or counterweight is dropped freely in its guides from the upper limit of overtravel; provided that, for cars or counterweights equipped with governor operated safeties, the impact shall be computed for governor tripping speed.

b. When broken rope safeties are used, the impact shall be computed for a free drop of the car from one-third of its travel.

**(13.5.1.5). §C26-1136.0 Counterweight Runway Enclosures.**-Where runways for counterweights are located outside of the dumbwaiter hoistway, such runways shall be solidly enclosed throughout their height, except that when the runway is located outside of the structure, such runway shall be enclosed to a height of at least seven feet from the ground.

**(13.5.1.6). §C26-1137.0 Cable Enclosures.**-Where cables of power dumbwaiters pass through floors outside the hoistway enclosures, such cables shall be guarded to a height of at least six feet from each floor with a standard transmission guard. It shall be unlawful to have floor openings greater than is necessary for the free passage of the cables.

## **GROUP 2 Landings**

### **SUB-GROUP 1**

#### **Doors at Dumbwaiter Landings**

**(13.5.2.1.1). §C26-1138.0 Doors Required on Dumbwaiter Landing Openings.**-Landing openings in power dumbwaiter enclosures and in fire resistive enclosures for hand power dumbwaiters shall be equipped with doors.

**(13.5.2.1.2). §C26-1139.0 Doors at Power Dumbwaiter Landings.**-Hoistway doors for power dumbwaiters shall be equipped with electric contacts and locks which will prevent the operation of the machine while any hoistway door is open, and which will prevent the opening of the door unless the car is at a landing.

**(13.5.3.1.1). §C26-1140.0 Strength and Stiffness.**-Dumbwaiter cars shall be of such strength and stiffness that they will not deform appreciably if the load leans or falls against the sides of the car.

## **GROUP 3 Dumbwaiter Construction**

### **SUB-GROUP 1 Car Construction**

**(13.5.3.1.2). §C26-1141.0 Materials and Construction.**-

a. Cars shall be made of wood, fireproofed wood or metal, and shall be reinforced at the point of suspension.

b. Metal cars, if sectional, shall be rigidly riveted, welded or bolted together. Cars may be provided with hinged, removable or movable shelves and, such cars may have such other sectional parts as are desired.

**(13.5.3.1.3). §C26-1142.0 Allowable Loads.**-

a. Dumbwaiter cars, machines and suspension means shall at least be capable of sustaining the contract load.

b. Cars having a platform area of four square feet or more shall be capable of sustaining the loads given in the following table, but the motive power may be insufficient to raise the structural capacity load.



**Minimum Allowable Dumbwaiter Capacities Corresponding to Effective Platform Area.**

<b>Horizontal Area in Square Feet.</b>	<b>Structural Capacity in Pounds.</b>
4	100
5	150
6.25	300
9	500

**(13.5.3.1.4). §C26-1143.0 Information Plate.-**A metal plate bearing the name of the manufacturer and the contract load shall be placed in a conspicuous place in the dumbwaiter car and on the machine.

**SUB-GROUP 2**

**Dumbwaiter Machines**

**(13.5.3.2.1). §C26-1144.0 Fastenings and Factors of Safety.-**Dumbwaiter machines shall be securely fastened to their supports. The factors of safety, based upon the ultimate strength of the material, and the contract load plus the weight of the car, suspension means, counterweights, and similar apparatus to be used in the design of dumbwaiter machines shall be at least six for steel, and nine for cast iron or other materials. It shall be unlawful to use set screw fastenings, or pins driven at right angles to the shaft, in place of keys or pins, except where the connection is not subject to torque.

**(13.5.3.2.2). §C26-1145.0 Suspension of Sheaves or Idlers.-**It shall be unlawful to suspend sheaves or idlers in cast iron stirrups from the under side of the supporting beam.

**SUB-GROUP 3**

**Guides**

**(13.5.3.3.1). §C26-1146.0 Material for Guides.-**Guides shall be of maple or other hardwood or metal, except that metal guides shall be used where the travel exceeds four floors or fifty feet and, in structures of Class 1 or Class 2 construction.

**(13.5.3.3.2). §C26-1147.0 Fastenings and Joints of Guides.-**

- a. Guides shall be rigidly secured to the hoistway, and the joints of metal guides shall be fitted with splice plates. Joints in wood guides shall be tongued and grooved or doweled and screwed to backing pieces or brackets.
- b. One set of guides may be used for both the car and the counterweight.

**SUB-GROUP 4**

**Counterweights**

**(13.5.3.4). §C26-1148.0 Counterweights.-**

- a. Sectional counterweights for hand dumbwaiters and power dumbwaiters having a contract load of less than one hundred pounds and a contract speed of less than one hundred feet per minute shall be carried in suitable frames.
- b. Sections of counterweights for power dumbwaiters having a capacity exceeding one hundred pounds or a speed exceeding one hundred feet per minute, shall be secured by at least two tie-rods passing through holes in all sections, unless suitable counterweight frames or boxes are provided. Such tie-rods shall have lock nuts at each end. Such lock nuts shall be secured by cotter pins.

**SUB-GROUP 5**  
**Suspension Means**

**(13.5.3.5.1). §C26-1149.0 Required Suspension Means.-**

- a. Suspension means for dumbwaiters shall be of metal, except that any manually operated dumbwaiter with a car area of two square feet or less may have suspension means of hemp.
- b. Where suspension means of metal are exposed to corrosive elements, such suspension means shall be provided with an approved protective covering.
- c. Where steel cable is used for suspension means, the ends shall be babbitted in sockets.
- d. Suspension means may consist of a single member.

**(13.5.3.5.2). §C26-1150.0 Factor of Safety.-**

- a. The minimum factor of safety of the suspension means for power dumbwaiters shall be at least the values given in the following table corresponding to the contract speed of the car.
- b. The minimum factor of safety of suspension means for hand power dumbwaiters shall be five.
- c. The minimum factor of safety for tapes shall be twenty-five percent greater than that given in the following table:

**TABLE 7.**  
**Factors of Safety for Cables.**

<b>Contract Speed</b>	<b>Factor of Safety</b>	<b>Contract Speed</b>	<b>Factor of Safety</b>	<b>Contract Speed</b>	<b>Factor of Safety</b>
50	5.2	250	6	450	7.
100	5.4	300	6.3	500	7.3
150	5.6	350	6.5	550	7.5
200	5.8	400	6.8	600	7.7

**(13.5.3.5.3). §C26-1151.0 Number and Size of and Computed Load on Suspension Means.-**

The number and size of the suspension means shall be determined by using the factor of safety found in section C26-1150.0, and the rated ultimate strength of the suspension means. The computed load on the suspension means shall be the sum of all suspended weights, plus the contract load.

**(13.5.3.5.4). §C26-1152.0 Lengthening or Repairing of Suspension Means by Splicing Unlawful.-**It shall be unlawful to lengthen or to repair the car or counterweight suspension means of dumbwaiters by splicing.

**(13.5.3.5.5). §C26-1153.0 Securing of Winding Drum Ends of Suspension Means.-**

- a. The winding drum ends of the car and counterweight suspension means shall be secured by clamps or sockets inside the winding drum.
- b. Suspension means secured to a winding drum shall have at least one turn on the winding drum when the car or counterweight has reached the extreme limit of its overtravel.

**GROUP 4**

**Speed, Control and Safeties for Power Dumbwaiters**

**(13.5.4.1.1). §C26-1154.0 Speed and Control.-**

- a. Maximum Speed for Dumbwaiters Controlled by Hand Ropes.-The maximum speed for power dumbwaiters controlled by hand ropes shall be fifty feet per minute.
- (13.5.4.1.2). b. Guards Required.-Guards shall be installed which will keep the ropes on the sheaves, unless means are used to maintain the hand ropes in proper tension automatically.

(13.5.4.1.3). c. Brakes Required.-All power dumbwaiters, except hydraulic dumbwaiters, shall be equipped with brakes which are automatically applied when the power is cut off the motor.

**(13.5.4.2). §C26-1155.0 Slack Cable Devices Required.**-Power dumbwaiters shall be provided with an approved device which will cut off the power and stop the machine if the car is obstructed in its descent.

**(13.5.4.3). §C26-1156.0 Terminal Stops.**-Power dumbwaiters shall be provided with means, independent of manual operation, to stop the car automatically at each terminal within the limits of overtravel.

## **GROUP 5**

### **Tests**

**(13.5.5). §C26-1157.0 Tests.**-Tests of the car with contract load shall be made on an dumbwaiter before such dumbwaiters are placed in service.

## **Sub-Article 7. Escalators**

### **GROUP 1**

#### **Escalator Construction**

**(13.6.1.1). §C26-1158.0 Angle of Inclination.**-The maximum angle of inclination of an escalator shall be thirty degrees from the horizontal.

**(13.6.1.2). §C26-1159.0 Width of Escalators.-**

- a. The width of an escalator shall be measured between the balustrading at a vertical height of twenty-four inches above the nose line of the treads.
- b. Escalators shall be between twenty-four and forty-eight inches wide.
- c. Escalators shall have a horizontal tread formation.

**(13.6.1.3.1). §C26-1160.0 Balustrading.-**

a. Form and Changes in Width of Balustrade.-

1. Escalators shall be provided on each side with solid balustrading. On the escalator side the balustrading shall be smooth, without depressed or raised paneling or molding except for necessary protective moldings parallel to the run of the steps and vertical moldings used to cover panel joints. Moldings shall not project more than one-quarter inch beyond the face of the balustrading and shall be beveled the full depth of the molding. It shall be unlawful to use glass panels for balustrading except that approved tempered glass not less than one-quarter inch shall be permitted.

2. It shall be unlawful to have abrupt changes in the width between the balustrading on the two sides of the escalator. Should any change in width be necessary, the maximum change shall be eight percent of the greatest width.

3. In changing from the greater to the smaller width, the maximum change in the direction of the balustrading shall be fifteen degrees from the line of the escalator travel.

4. Where the intersection of the outside balustrade or deck board and the ceiling or soffit is within twenty-four inches of the centerline of the handrail, a solid guard shall be provided in the intersecting angle. The vertical face of the guard shall project at least fourteen inches horizontally from the apex of the angle. The exposed edge of the guard shall be rounded to eliminate shear hazard. Guards may be of glass if shatterproof.

b. Handrail Required.-

1. Each balustrading shall be equipped with a hand rail moving at the same speed and in the same direction as the travel of the escalator.
2. Each moving hand rail shall extend at normal hand rail height not less than twelve inches beyond the line of the comb plate teeth at the upper and lower landings.
3. Hand or finger guards shall be provided at the point where the hand rail enters the balustrading.

**(13.6.1.4). §C26-1161.0 Treads and Landings.-**

- a. Step treads shall be horizontal. Step treads, comb-plates and landing plates shall be of incombustible material and shall afford secure foothold. Landing plates shall extend to the end of the hand rail newel or newel skirt.
- b. The maximum rise of any step shall be eight and one-half inches and the minimum depth of any tread shall be fifteen and three-quarters inches.
- c. The maximum clearance between treads on the horizontal run shall be one-eighth inch.
- d. The tread surface of each tread shall be slotted in a direction parallel to the travel of the escalator. Each slot shall be not more than a quarter-inch wide, nor less than three-eighths of an inch deep, and the distance from center to center of adjoining slots shall be not more than three-eighths of an inch.
- e. The distance measured horizontally between the top of the tread and the skirt shall not exceed one-eighth inch.
- f. There shall be a comb-plate at the entrance and exit of every escalator. The comb plate teeth shall be meshed with and set into the slots in the surface of the tread, so that the points of the comb-teeth are always below the top surface of the treads. Comb-plates shall be adjustable both horizontally and vertically. Sections forming the comb-plate teeth shall be arranged so as to readily be replaceable without the use of special tools.
- g. Clear and unobstructed access and egress shall be provided for each escalator.
- h. When the nose-line of a step at the lower end of a descending escalator is twelve (12) inches from the line of the comb-plate teeth, the step tread surface shall be not more than one-half (1/2) inch above the surface of the preceding step and the nose-line shall be not less than four (4) inches from the line of the comb-plate teeth when the step becomes level with the plane upon which it will enter the comb-plate.

**(13.6.1.5.1). §C26-1162.0 Strength of Trusses or Girders.-**

- a. Factor of Safety.-The factor of safety to be used in the design of escalator trusses or girders shall be at least five, based on the static loads.

(13.6.1.5.2). b. Design of Trusses or Girders.-Escalator trusses or girders shall be so designed that they will safely retain the steps and running gear in case of failure of the track system to retain such running gear in its guides.

**(13.6.1.6). §C26-1163.0 Track Arrangement.-**The track arrangement shall be designed to prevent the displacement of the treads and running gear if a tread chain breaks.

**(13.6.1.7). §C26-1164.0 Capacity and Loading.-**

- a. The contract load, in pounds, on an escalator shall be computed by the following formula:

Contract load = 4.6 WA

- b. In such formula, W is the width of the escalator in inches and A is the horizontal projected length in feet of the exposed treads. The contract load shall be expressed in pounds.

## **GROUP 2**

### **Safety Requirements for Escalators**

**(13.6.2.1). §C26-1165.0 Limits of Safety.**-The maximum permissible speed of an escalator, measured along the angle of inclination shall be one hundred twenty-five feet per minute, except that if the line of entrance and exit is not in the vertical plane of travel, the maximum permissible speed shall be one hundred feet per minute.

**(13.6.2.2). §C26-1166.0 Application of Power.-**

- a. Each escalator shall be driven by an individual electric motor, except that two or more escalators placed side by side and operated as a single unit may be driven by one motor.
- b. Chains shall have a factor of safety of at least ten, except that where the chain is composed of cast steel links thoroughly annealed, the factor of safety shall be at least twenty.

**(13.6.2.3.1). §C26-1167.0 Escalator Safeties.-**

- a. Brakes Required.-Every escalator shall be provided with an electrically released, mechanically applied brake which shall automatically stop the escalator, with contract load, when the power is interrupted from any cause.

(13.6.2.3.2). b. Emergency stop button or switch.-

1. An emergency stop button or other type of switch accessible to the public shall be conspicuously located at the top and bottom of each escalator landing. Stop buttons or switches shall be guarded against accidental contact, but break-glass covers shall not be used.
2. The operation of either one of these buttons or switches shall open the power circuit, apply the brakes and stop the escalators. It shall be impossible to start an escalator by means of such buttons or switches.
3. Such buttons or switches shall be marked "STOP BUTTON" or "EMERGENCY STOP."
4. Starting switches shall be of the key operated type, and shall be so located that the person operating them has an unobstructed view of the escalator runway.

(13.6.2.3.3). c. Safety mechanisms on ascending and reversible escalators.-Each escalator operating in the ascending direction shall be equipped with a safety mechanism so that in case of accidental reversal of the escalator, the power shall be shut off, the brake applied and escalator stopped. On a reversible escalator such safety mechanism shall be arranged to be inoperative when the escalator is descending, and such mechanism shall be arranged to be operative when the escalator is ascending.

(13.6.2.3.4). d. Speed governors.-Escalators shall be provided with a safety mechanism which will open the power circuit, apply the brake and bring the escalator to a gradual stop, in case the speed exceeds the normal running speed by forty percent, except that such safety mechanism may be made operative at a speed less than forty percent in excess of the normal running speed.

(13.6.2.3.5). e. Safety device to operate when tread chains break.-Each escalator shall be provided with a safety device which will open the power circuit in case a tread chain breaks.

(13.6.2.3.6). f. Retention of tension weights.-Where escalators are equipped with tightening devices which operate by means of tension weights, provision shall be made to retain such weights in the escalator truss in case the weights should fall.

**(13.6.2.4.1). §C26-1168.0 Landing and Machine Room Lights and Access.-**

- a. When an escalator is in service the step treads, the top and bottom comb-plate edges and the landing area shall be illuminated. The intensity of the illumination shall be not less than two-foot candles.
- b. Suitable lights which can be lighted without passing over or reaching over any part of the machinery shall be provided in every escalator machine room.
- c. Access to interior of the escalator.-Reasonable access to the interior of the escalator shall be provided for inspection and maintenance.

**(13.6.2.5). §C26-1169.0 Marking of Escalators.-**Each escalator shall be marked by the manufacturer with the contract load and contract speed for which that size and type of escalator has been tested and approved in accordance with section C26-1192.0. Such marking shall be accepted in lieu of actual load tests made on each escalator installation.

**(13.6.2.6). §C26-1170.0 Tests and Approvals of Escalators.-**

- a. Before any escalator of any contract load and type is put in service the superintendent shall test an escalator of the same load and type with contract loads on the basis of the engineering tests listed in section C26-1192.0. Such test shall be made in a structure or in the manufacturer's shop.
- b. Each escalator installation shall be tested in the field without load in accordance with section C26-1192.0.

**Sub-Article 8. Inspection, Maintenance and Operation**

**GROUP 1**

**Inspection and Maintenance**

**(13.7.1.1.1). §C26-1171.0 Responsibility.-**

a. Responsibility of Owner.-The owner of the structure, in which an elevator, escalator or dumbwaiter is installed, shall be responsible for the safe operation and proper maintenance of such elevator, escalator or dumbwaiter, after such elevators, escalator or dumbwaiter has been approved by the superintendent.

(13.7.1.1.2). b. Responsibility for inspection and maintenance.-The owner of the structure, in which an elevator, escalator or dumbwaiter is installed, or his duly appointed agent shall cause periodic inspections to be made of all parts of each elevator, escalator and dumbwaiter installation. Such owner or agent shall maintain all parts of such elevator, escalator and dumbwaiter installation in proper working order in accordance with the provisions of this title and the rules of the board.

**(13.7.1.2). §C26-1172.0 Inspection.-**

- a. All hoistway doors, car gates, interlocks, contacts, control apparatus, controllers, automatic stops, limit stops, car and counterweight cables, safeties, guide rails, buffers, elevator machines and the lighting of the cars and of the machine rooms, in passenger and freight elevator installations, shall be thoroughly inspected by the superintendent at least four times a year.
- b. Plunger shoes, by-passes and piston-rods of hydraulic elevators shall be exposed and thoroughly cleaned by the owner and inspected by the superintendent at least once in three years.
- c. Pressure and discharge tanks of hydraulic elevators shall be thoroughly cleaned by the owner and inspected by the superintendent at least once in three years.

d. Car and counterweight safeties and oil buffers shall be inspected periodically to determine the condition of the visible sliding surfaces and the visible working parts. Tests of safeties shall be made at least once in two years. Governor controlled safeties shall be tested at the lowest operating speed and with fifty percent of the contract load. Broken rope instantaneous type safeties may be tested without load.

**(13.7.1.3). §C26-1173.0 Maintenance.-**

- a. Cables, guides and all parts of machinery shall be kept well lubricated. The oil in bearings and gear casings shall be renewed every six months.
- b. Pressure tanks of hydraulic elevators shall be tested at least once every three years with a hydrostatic pressure of fifty percent in excess of the maximum working pressure.

**(13.7.1.4). §C26-1174.0 Care or Installation.-**

- a. Elevator hoistways and pits shall be kept clean. It shall be unlawful to use elevator pits for storage or for the accumulation of rubbish.
- b. Material which is not a permanent part of the elevator equipment shall be kept off the top or cover of an elevator car.
- c. It shall be unlawful to substitute any wire or current carrying device for the proper fuse or circuit breaker in an elevator circuit.
- d. Freight elevators shall have legible signs posted in the car and at each landing prohibiting unauthorized persons from riding in or on the elevator car.
- e. The water level in the pressure tank of a hydraulic elevator shall be maintained at two-thirds of the capacity of the tank.

## **GROUP 2**

### **Qualifications and Duties of Elevator Operators**

**(13.7.2.1). §C26-1175.0 Qualifications of Operators.-**Elevator operators shall be at least eighteen years of age, free from serious physical or mental defects and shall be selected with consideration of their ability to perform their duties in a careful and competent manner.

**(13.7.2.2). §C26-1176.0 Training of Operators.-**Before a new operator is placed in charge of a passenger elevator, he shall have had sufficient previous experience or training under the direction of a competent instructor.

**(13.7.2.3). §C26-1177.0 Instructions to Operators.-**Elevator operators shall be instructed:

1. To be sure that the control mechanism is in the "stop" position before they close the service switch.
2. To report any defects promptly to the person in charge.
3. Not to make any repairs, adjustments or replacements.
4. To carry no passengers or freight while inspections, repairs or adjustments are in progress and to operate the car only in response to directions from the inspector or person in charge. To move the car when any person is in the pit or on top of the car, only as such person may direct.
5. Not to ride in the elevator or allow others to ride therein while a safe or other heavy object in excess of the rated capacity of the elevator is being carried.
6. That it is unlawful to use any hand elevator for carrying safes or other concentrated loads greater than the normal rated capacity of such elevator.
7. That hoistway doors must always be locked in the closed position and car doors or gates must be closed before the car is started.

8. To keep car doors or gates closed while the elevator is in motion, and, where no car doors or gates are provided, to keep passengers away from the open edge of the car platform.
9. To limit the number of passengers to the rated capacity of the car and to prevent crowding.
10. Not to reverse the control suddenly, but to stop before reversing.
11. To move the control mechanism to the “stop” position on approaching minimal landing without waiting for the terminal stopping device to come into action.
12. To move the control mechanism to the “stop” position and to start the car in the usual manner upon return of the power, if the power goes off while the car is in motion.
13. To stay on the car if the car refuses to stop, since the car will be stopped by the application of the safeties or by the automatic terminal stops at either end of the hoist way, if the car attains excessive speed of descent.
14. To call for the person in charge and to operate the machine only at his direction if the car should stop suddenly.
15. To return the control to the “stop” position, if the car fails to start. To remove part of the load and try the controller if the car is apparently overloaded. If the car fails, to return the controller to the “stop” position and to notify the engineer or other qualified person.
16. To lock the hand rope on hand rope controlled cars before allowing freight to be loaded or unloaded.
17. To familiarize themselves with the emergency devices, to understand their functions and to know how to operate them.
18. Never to leave the car in the ordinary course of operation, nor leave the control mechanism operative unless the landing door is closed and locked and the car door or gate is closed.
19. Always to leave a hydraulic elevator, operated by a lever, at the lower landing with the lever in the position for down motion.

### **GROUP 3**

#### **Carrying of Freight or Passengers on Top of Elevator Cars**

**(13.7.3). §C26-1178.0 Carrying of Freight or Passengers on Top of Elevator Cars.-**It shall be unlawful to carry freight or passengers on top of an elevator car.

### **Sub-Article 9. Tests and Approvals**

#### **GROUP 1**

##### **Tests of Interlocks**

**(13.8.1). §C26-1179.0 General.-**

- a. Hoistway door interlock devices shall be examined with respect to their proper performance of the prescribed functions at temperatures from twenty-five to one hundred forty degrees Fahrenheit (minus four to sixty degrees Centigrade). Where the functioning of any such device might be affected by a change of temperature, and coefficients of thermal expansion of the affected parts are known or measured, the effect of temperatures may be computed and tests need be carried out at only one temperature.
- b. For interlocks employing a single switch, operated by wire or tape, to protect several hoist way doors, the master switch shall be marked with the physical properties of the wire or tape used, and the certificate of approval shall cover the allowable maximum length of tape or wire of a given material which may be used with the device.



c. Interlocks shall have electrical parts connected in series in a circuit in which two amperes is flowing from a source of two hundred twenty volts direct current. During the tests described in sections C26-1180.0, C26-1182.0 and C26-1183.0, the electrical circuit shall be closed, but such circuit shall not be broken at the contact within the device on each cycle of operation.

d. A separate device shall be used in each of the tests described in sections C26-1180.0, C26-1182.0 and C26-1183.0.

**(13.8.1.1). §C26-1180.0 Endurance Test.-**In order to satisfy the endurance test, the interlock device with initial lubrication and adjustment only shall complete one hundred thousand cycles of operation without failure of any kind and without evident indication of approaching failure. If an interlocking device is not a complete and separate unit for each hoistway door, but includes any part which is common to the interlock operation of more than one hoistway door, that portion of such device shall complete four hundred thousand additional cycles of operation, a total of five hundred thousand cycles, without failure of any kind and without evident indication of approaching failure.

**(13.8.1.2). §C26-1181.0 Current Interruption Test.-**In order to satisfy the current interruption test, one thousand cycles of operation shall be performed by the device used in section C26-1180.0, while making and breaking the circuit at the contact within such device.

**(13.8.1.3). §C26-1182.0 Tests in Moist Atmosphere.-**In order to satisfy the test in moist atmosphere, prior to such test, the device, fully lubricated, shall be given a wearing-in run of ten thousand cycles. The interlocking device, except self-lubricating bearings and bearings of a type which do not require frequent replacement of lubricant, shall then be taken apart and freed of lubricant by washing in gasoline. After it is reassembled, such device shall be subjected continuously for seventy-two consecutive hours in a closed hoistway, to an atmosphere saturated with a three and one-half percent solution of sodium chloride. Such device shall be operated for only ten consecutive cycles at the end of each of the first two twenty-four hour periods and shall be exposed to the air for an additional twenty-four hours without failing in such a manner as to create an unsafe condition. After such device has been lubricated, it shall without adjustment and without further attention, complete fifteen thousand cycles of operation without failure of any kind.

**(13.8.1.4). §C26-1183.0 Tests Without Lubrication.-**In order to satisfy the test without lubrication, prior to such test, the device, fully lubricated, shall be given a wearing-in run of ten thousand cycles. The interlocking device, except self-lubricating bearings and bearings of a type which do not require frequent replacement of lubricant, shall then be taken apart and freed of lubricant by washing in gasoline. After it is reassembled, such device shall, without any other attention than the usual initial adjustment, that is, without adjustment especially made to meet the conditions of this particular test, and without any further attention, complete twenty-five thousand cycles of operation without failure of any kind, and without any evident indication of approaching failure.

**(13.8.1.5). §C26-1184.0 Misalignment Test.-**

a. In order to satisfy the misalignment test, when the car cam, or other equivalent device used in making the misalignment test has been displaced horizontally from its normal position, that is, the position in which it was when the device was installed, such device shall operate successfully in the following successive manners:

1. In a direction perpendicular to the edge of the landing, backward one-quarter of an inch, forward one-quarter of an inch;

2. In a direction parallel with the edge of the landing, to the right one-quarter of an inch, to the left one-quarter of an inch.
- b. For horizontal sliding doors the device shall operate successfully:
  1. When the bottom of the hoistway door has been displaced horizontally from its normal position in a direction perpendicular to the edge of the landing, backward one-quarter of an inch, forward one-quarter of an inch;
  2. When the top of the hoistway door has been displaced horizontally from its normal position in a direction perpendicular to the edge of the landing, backward one-eighth of an inch, forward one-eighth of an inch.

**(13.8.1.6). §C26-1185.0 Insulation Test.**-Insulation of electrical parts shall be tested with a sixty cycle effective voltage twice the rated voltage plus one thousand volts, applied for one minute.

**GROUP 2**

**Tests of Oil Buffers**

**(13.8.2). §C26-1186.0 General.**-Each type and size of oil buffer shall be subjected to and shall meet the requirements of the following tests:

1. Retardation test.
2. Oil leakage test.
3. Churning test.
4. Plunger-return test.
5. Test for lateral movement of plunger.

**(13.8.2.1). §C26-1187.0 Retardation Test.**-

- a. The buffer shall be installed upon a suitable foundation so that the axis of the cylinder is vertical. Such buffer shall be filled with oil provided by the manufacturer.
- b. An elevator car of suitable size shall be dropped freely in its guides upon the buffer, from two different heights as specified below. The method shall be as follows:
  1. The travel of the car after it comes in contact with the plunger and the travel of the plunger for its entire stroke, shall be recorded by a drum chronograph or by other approved means. The error in the time readings, by any method, shall be five one-thousandths of a second or less.
  2. The velocity and the retardation of the car shall be computed from the time-travel curve, and plots shall be made of the car travel, car velocity and car retardations together with the pressure-time curve. The manufacturer shall be furnished with copies of each curve.

<b>Schedule of Drops</b>		
	<b>Test drop in inches, bottom of car to striker or top of buffer</b>	<b>Total load in pounds, weight of car plus loading</b>
<b>A</b>	S (the effective stroke of the buffer in inches)	1. Manufacturer's rated minimum.
		2. Manufacturer's rated maximum.
		3. 110 percent manufacturer's rated maximum.
<b>B</b>	Buffer stroke under 24 inches.....51S	1. Manufacturer's rated minimum.
	24 inches to 30 inches.....56S	2. Manufacturer's rated maximum.
	Exceeding 30 inches.....64S	3. 110 percent manufacturer's rated maximum.

- c. Every acceleration peak having a duration greater than one-twenty-fifth of a second shall be two and one-half times gravity (eighty and one-half feet per second) or less for tests A-1

and A-2 and B-1 and B-2. The results of tests A-3 and B-3 shall be recorded for the purpose of examination to detect any abnormal performances. Upon completion of all tests every part of the buffer shall be without any deformation or injury.

**(13.8.2.2). §C26-1188.0 Oil Leakage Test.**-The oil leakage test shall be made simultaneously with the retardation tests. The oil level in the buffer, when filled prior to the test, shall be carefully marked. At the completion of the six drops, three different loads at each of two speeds, the buffer shall be allowed to stand one-half of an hour in order to permit the return of the oil to the reservoir and to permit the escape of any entrained air. After such time, the oil level shall again be measured. The oil level at the completion of these tests shall be less than one-sixteenth of an inch lower than the level at the start of the test for each foot of buffer stroke.

**(13.8.2.3). §C26-1189.0 Churning Test.**-

a. In the churning test, the time of the buffer stroke after the car has dropped a distance equivalent to the stroke of the buffer, shall be determined either from the chronograph or other approved record or by means of an automatic timer. Any automatic timing device which is used shall be accurate, shall have the minimum possible lag, and shall be capable of being read to one one-hundredth of a second.

b. The car, with cables attached, shall then be run on to the buffer at approximately one-half the velocity used in retardation test B, at intervals of one minute until ten such strokes have been made. The oil shall then be examined for foam. No oil foam shall appear on the outside of the buffer after such test. Immediately upon completion of the ten strokes at one-half speed, another free-fall equivalent to the buffer stroke shall be made, and the time of such stroke shall be taken. The time of such second free-fall test shall be at least seventy-five percent of the time of the drop test made prior to the churning.

**(13.8.2.4). §C26-1190.0 Plunger-return Test.**-In the buffer test, the buffer shall not stick on the return stroke after removal of the load. If such buffer does stick the manufacturer shall submit either a duplicate buffer or a new pressure cylinder and piston, and a second test shall be run on such equipment. If sticking again results, the buffer shall be rejected.

**(13.8.2.5). §C26-1191.0 Test for Lateral Movement of the Plunger.**-The lateral movement of the top of the plunger shall be accurately measured while the buffer casing is clamped or otherwise securely fastened to a firm base as the plunger head is being moved from its extreme right to the extreme left in a vertical plane. This total movement shall be divided by two to determine the movement from the vertical position. The maximum movement from the vertical shall be one-sixteenth of all inch per foot of buffer stroke.

### **GROUP 3**

#### **Escalator Tests**

**(13.8.3). §C26-1192.0 Escalator Tests.**-Each size and type of escalator shall be subjected to the following tests:

(13.8.3.1). 1. Speed Tests.-The application of the overspeed safety device shall be obtained by causing the escalator to travel at the governor tripping speed as specified in subdivision d. of section C26-1167.0. In the case of an escalator driven by an alternating current motor, the governor may be tripped by hand while the escalator is traveling at its normal rate of speed.

(13.8.3.2). 2. Reversal Tests.-The application of the reversal safety device required by subdivision c. of section C26-1167.0, shall be obtained by manually opening the non-reversing device contact.

(13.8.3.3). 3. Broken Chain Tests.-The application of the broken chain safety device required by subdivision c. of section C26-1167.0, shall be obtained by operating the safety by hand.

(13.8.3.4). 4. Miscellaneous Safety Devices.-Brake and emergency stop buttons or switches shall be tested to determine whether such buttons or switches function properly.

### **Sub-Article 10. Manlifts**

#### **(13.9.1). §C26-1192.10 Definitions.-**

a. A manlift is a device consisting of a power-driven endless belt provided with steps or platforms and handholds attached to it for the transportation of personnel from floor to floor.

b. A handhold is a device attached to the belt to assist a passenger in maintaining balance.

1. Open type. One which has a handgrip surface fully exposed.

2. Closed type. A cup-shaped device in which the handgrip surface is available only in the direction of travel and is covered on the opposite run.

c. Limit switch. A device the purpose of which is to cut off the power to the motor and apply the brake to stop the carrier in the event that a loaded step passes the top terminal landing.

d. A step (platform) is a passenger carrying unit.

e. Rated speed is the speed for which the device is designed and installed.

f. The factor of safety is the ratio of the ultimate strength of the material to the allowable stress when a part is subjected to full load operation.

**(13.9.1.1). §C26-1192.11 Application.-**Manlifts may be constructed only in commercial garages, where the cars are parked only by employees of the garage. Manlifts shall be used to carry only the garage employees and shall not be available to the general public and, if located in parts of buildings to which the public has access, such manlift or manlifts shall be located in an enclosure protected by self-closing spring-locked doors. Keys to such doors shall be limited to employees.

#### **(13.9.1.2). §C26-1192.12 Scope and Purpose.-**

a. This sub-article applies to the construction, maintenance, inspection, and operation of manlifts in relation to accident hazards to employees. Manlifts covered by this scope consist of platforms or brackets mounted on, or attached to an endless belt, cables, or chains, or similar method of suspension; such belt, cables, or chains operating in a substantially vertical direction and being supported by, and driven through, pulleys, sheaves, or sprockets at the top and bottom. These manlifts are intended for conveyance of persons only. It is not intended that this scope cover moving stairways, elevators with enclosed platforms ("Paternoster" elevators), gravity lifts, nor conveyors used only for conveying materials.

b. The purpose is to provide reasonable safety for life and limb. In case of practical difficulty or unnecessary hardship the enforcing authority may grant exceptions from the literal requirements or permit the use of other devices or methods, but only when it is clearly evident that reasonable safety is thereby secured.

#### **(13.9.1.3). §C26-1192.13 Floor Openings.-**

a. Allowable size. Floor openings for both the "up" and "down" runs shall be not less than 28 inches nor more than 36 inches in width for a 12-inch belt, not less than 34 inches nor more than 38 inches for a 14-inch belt, and not less than 36 inches nor more than 40 inches for a 16-inch belt and shall extend not less than 24 inches, nor more than 28 inches from the face of the belt.

b. Uniformity. All floor openings for a given manlift shall be uniform in size and shall be approximately circular, and each shall be located vertically above the opening below it.

**(13.9.1.4). §C26-1192.14 Landings.-**

- a. Vertical clearance. The clearance between the floor or mounting platform and the lower edge of the conical guard above it shall be not less than 6 feet, 8 inches. Where this clearance cannot be obtained no access to the manlift shall be provided and the manlift runway shall be enclosed where it passes through such floor.
- b. Clear landing space. The floor space adjacent to the floor openings shall be free from obstruction and kept clear at all times.
- c. Lighting of landings. Adequate lighting, not less than 3-foot candles shall be provided at each floor landing at all times when the lift is in operation.
- d. Landing surface. The landing surface at the entrances and exits to the manlift shall be so constructed and maintained as to provide safe footing at all times with a coefficient of friction of not less than 0.5.
- e. Emergency landings.
  1. Where there is a travel of 50 feet or more between floor landings, one or more emergency platforms shall be provided so that there will be a landing, either floor or emergency, for every 25 feet or less of manlift travel.
  2. Such emergency landings shall be accessible from both runs of the manlift and shall give access to the ladder required in section C26-1192.20.
  3. Emergency platforms shall be completely enclosed with a standard railing and toeboard.

**(13.9.1.5). §C26-1192.15 Floor Opening Guards.-**

- a. On the ascending side of the manlift all landings shall be provided with a bevel guard or cone meeting the following requirements:
  1. Slope. The cone shall make an angle of not less than 45 degrees with the horizontal. An angle of 60 degrees or greater shall be used where ceiling heights permit.
  2. Extent. The lower edge of this guard shall extend at least 42 inches outward from any handhold on the belt. It shall not extend beyond the upper surface of the floor above.
  3. Material and construction. The cone shall be made of not less than No. 18 U.S. gage sheet steel or material of equivalent strength or stiffness. The lower edge shall be rolled to a minimum diameter of 1/2 inch and the interior shall be smooth with no rivets, bolts or screws protruding.

**(13.9.1.6). §C26-1192.16 Protection of Entrances and Exits.-**

- a. Guardrail requirement. The entrances and exits at all floors or landings affording access to the manlift shall be guarded by a maze (staggered railing) or a handrail equipment with self-closing gates, unless enclosed as provided in subdivision g of this section or unless enclosed as a shaft.
- b. Construction. The guardrails shall be provided with toeboards and shall be not less than forty-two inches in height, shall be constructed of steel or other metal and shall be constructed in a substantial manner.
- c. Gates. Gates, if used, shall open outward and shall be self-closing. Corners of gates shall be rounded.
- d. Maze. Maze or staggered openings shall offer no direct passage between enclosure and outer floor space.
- e. Rails shall be located at least 2 feet from edge of opening measured at right angles to the face of the belt. The intersection of the top rail and the end post at openings shall be a bend or standard long sweep “ell”.

f. Except where building layout prevents entrances at all landings shall be in the same relative position.

g. Enclosure. Manlifts shall be enclosed in those parts of structures to which the public has access, from floor to ceiling with a wire mesh guard or grill of not less than number 10 U.S. gage steel wire or its equivalent, located not less than four feet from the lift belt, with a self-closing door equipped with a key-operated spring-lock, hung to swing, away from the manlift. Keys to such gates shall be restricted to the operating personnel. Where a manlift is enclosed as a shaft, the enclosure shall be at least four feet from the lift belt.

**(13.9.1.7). §C26-1192.17 Guards for Openings.-**

a. Construction. The floor opening at each landing shall be guarded on sides not used for entrance or exit by a standard railing and toeboard or by panels of wire mesh of not less than No. 10 U.S. gage, expanded metal of not less than No. 13 U.S. gage or sheet metal of equivalent strength or metal on a frame of angle iron not less than 1 1/4-inch by 1 1/4-inch by 1/8-inch or of 1 1/4-inch iron pipe.

b. Height and Location. Such rails or guards shall be at least 42 inches in height on the up-running side and 66 inches on the down-running side. If a guardrail is used the section of the guard above the rail may be of the construction specified in paragraph a. above or may consist of vertical or horizontal bars which will reject a ball 6 inches in diameter. Rails or guards shall be located not more than 2 feet from the edge of the floor opening.

**(13.9.1.8). §C26-1192.18 Bottom Arrangement.-**

a. Bottom landing. At the bottom landing the clear area shall be not smaller than the area enclosed by the guardrail on the floors above, and any wall in front of the down-running side of the belt shall be not less than 48 inches from the face of the belt. This space shall not be encroached upon by stairs or ladders.

b. Location of lower pulley. The lower (boot) pulley shall be installed so that it is supported by the lowest landing served.

c. Mounting platform. A mounting platform shall be provided in front or to on side of the up-run at the lowest landing, unless the floor level is such that the following requirement can be met: The floor or platform shall be at or above the point at which the upper surface of the ascending step assumes a horizontal position.

**(13.9.1.9). §C26-1192.19 Top Clearances.-**

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

b. Pulley clearance.

1. There shall be a clearance of at least 5 feet between the center of the head pulley shaft and any ceiling obstruction.

2. The center of the head pulley shaft shall be not less than 6 feet above the top terminal landing.

**(13.9.1.10). §C26-1192.20 Emergency Exit Ladders.-**

a. Where required. A fixed metal ladder accessible from both the “up” and “down” run of the manlift shall be provided where the vertical distance between landings exceeds 20 feet.

b. Construction. Such ladder shall be in accordance with the existing state laws for ladders except that enclosing cages shall not be provided. In the absence of state ladder requirements the following is recommended:

1. Metal side rails when made of mild steel or wrought iron shall not be less than 9/16 inch in cross-section for lengths 12 feet and under, and not less than 3/4 inch in cross-section for lengths over 12 feet with a minimum thickness not less than 3/8 inch. These dimensions are based upon the removal of not more than 1/2 inch of material for the attachment of the steps. Where more material is removed from the side rails for step attachments or when side rails are made of other metal or shapes, they shall be equivalent thereto in strength. Manlift supporting members may be used as side rails if desired.
2. Metal rungs of solid round steel shall have a minimum center diameter of 5/8 inch and tenon diameter of 1/2 inch.
3. Metal rungs when made of pipe shall not be smaller than 1 inch standard steel pipe.
4. Metal rungs when made of angle section shall have minimum dimensions of 3/4 inch by 3/4 inch by 1/8 inch.
5. Metal treads if used shall have a width as specified in the following table. In cross-section metal treads shall be a channel or equivalent section equal in strength to support 250 pounds applied to the middle of the tread without appreciable deflection.

Length of treads (inches)	Width (inches)
Up to and including 16	3
Over 16, up to and including 20	3 1/4
Over 20, up to and including 24	3 1/2
Over 24, up to and including 28	4
Over 28, up to and including 32	4 1/2

**(13.9.1.11). §C26-1192.21 Illumination.-**

- a. General. Both runs of the manlift shall be illuminated at all times when the lift is in operation. An intensity of not less than 1 foot-candle shall be maintained at all points.
- b. Control of illumination. Lighting of manlift runways shall be by means of circuits permanently tied in to the building circuits (no switches), or shall be arranged to be turned on by the starting switch controlling the manlift motor, or shall be controlled by switches at each landing. Where separate switches are provided at each landing, any switch shall turn on all lights necessary to illuminate the entire runway.

**(13.9.1.12). §C26-1192.22 Machines.-**

- a. Types. Machines shall be of the direct-connected type or shall be driven by multiple V-belts. Cast-iron gears shall not be used.
- b. Brake. A mechanically-applied, electrically-released brake shall be applied to the motor shaft for direct-connected units or to the input shaft for belt-driven units. The brake shall be capable of stopping and holding the manlift when the descending side is loaded with 250 pounds on each step.
- c. Belt.
  1. Material. The belt shall be of hard-woven canvas, rubber-coated canvas, leather, or other material meeting the strength requirements of section C26-1192.22 c (3) and having a coefficient of friction such that when used in conjunction with an adequate tension device it will meet the brake test specified in section C26-1192.22 b.

2. Width. The width of the belt shall be not less than 12 inches for a total travel not exceeding 100 feet, not less than 14 inches for a travel greater than 100 feet but not exceeding 150 feet, and 16 inches for a travel exceeding 150 feet.

3. Strength. The strength of the belt shall be not less than 1,500 pounds per inch of belt width for belts having a distance between pulley centers not in excess of 100 feet and 1,800 pounds per inch of belt width for belts having a distance between pulley centers of over 100 feet but not in excess of 200 feet; for over 200 feet, 2,450 pounds per inch of belt width.

4. Belt Fastenings. Belts shall be fastened by a lapped splice or shall be butt-spliced with a strap on each side of the belt. For lapped splices, the overlap of the belt at the splice shall be not less than 3 feet where the total travel of the manlift does not exceed 100 feet and not less than 4 feet if the travel exceeds 100 feet. Where butt splices are used the straps shall extend not less than 3 feet on one side of the butt for a travel not in excess of 100 feet, and 4 feet for a travel in excess of 100 feet. For 12-inch belts, the joint shall be fastened with not less than 20 special elevator bolts, each of a minimum diameter of 14 inch. These bolts shall be arranged symmetrically in five rows so arranged as to cover the area of the joint effectively. The minimum number of bolts for a belt width of 14 inches shall be not less than 23 and for belt widths of 16 inches, the number of bolts shall be not less than 27.

5. Pulleys. Drive pulleys and idler (“boot”) pulleys shall have a diameter not less than given in table 1.

<b>Table 1</b>		
<b>Belt construction</b>	<b>Minimum strength (pounds per inch of width)</b>	<b>Minimum pulley diameter (inches)</b>
5 ply	1,500	20
6 ply	1,800	20
7 ply	2,100	22

(The above values are based on 32 ounce duck: 300 pound per linear inch per ply.)

d. Pulley protection. The machine shall be so designed and constructed as to catch and hold the driving pulley in event of shaft failure.

**(13.9.1.13). §C26-1192.23 Speed.-**

a. Maximum speed. No manlift designed for a speed in excess of 80 fpm shall be installed.

b. All manlifts in a given building or plant should run at approximately the same speed.

**(13.9.1.14). §C26-1192.24 Platforms or Steps.-**

a. Minimum depth. Steps or platforms shall be not less than 12 inches nor more than 14 inches deep, measured from the belt to the edge of the step or platform.

b. Width. The width of the step or platform shall be not less than the width of the belt to which it is attached.

c. Distance between steps. The distance between steps shall be equally spaced and shall be not less than 16 feet measured from the upper surface of one step to the upper surface of the next step above it.

d. Angle of step. The surface of the step shall make approximately a right angle with the “up” and “down” run of the belt, and shall travel in an approximately horizontal position with the “up” and “down” run of the belt.



e. Surfaces. The upper or working surfaces of the step shall be of a material having inherent nonslip characteristics with a coefficient of friction not less than 0.5, or shall be covered completely by a nonslip tread securely fastened to it.

f. Strength of step supports. When subjected to a load of 400 pounds applied at the approximate center of the step, step frames or supports and their guides shall be of adequate strength to:

1. Prevent the disengagement of any step roller.
2. Prevent any appreciable misalignment.
3. Prevent any visible deformation of the step or its support.

g. Prohibition of steps without handholds. No step shall be provided unless there is a corresponding handhold above or below it meeting the requirements of section C26-1192.25. If a step is removed for repairs or permanently, the handholds immediately above and below it shall be removed before the lift is again placed in service.

**(13.9.1.15). §C26-1192.25 Handholds.-**

a. Location. Handholds attached to the belt shall be provided and so installed that they are not less than 4 feet nor more than 4 feet 8 inches above the step tread. These shall be so located as to be available on both the “up” and “down” run of the belt.

b. Size. The grab surface of the handhold shall be not less than 4 1/2 inches in width. Fastenings for handholds shall not come within one inch of the edge of the belt.

c. Strength. The handhold shall be capable of withstanding without damage a load of 300 pounds applied parallel to the run of the belt.

d. Prohibition of handhold without steps. No handhold shall be provided without a corresponding step. If a handhold is removed permanently or temporarily, the corresponding step and handhold for the opposite direction of travel shall also be removed before the lift is again placed in service.

e. Type. All handholds shall be of the closed type.

**(13.9.1.16). §C26-1192.26 Up Limit Stops.-**

a. Requirements. Two separate automatic stop devices shall be provided to cut off the power and apply the brake when a loaded step passes the upper terminal landing. One of these shall consist of a switch mechanically operated by the belt or step roller. The second may consist of any of the following:

1. Roller switch placed above and out of line with the first limit switch.
2. Photocell and light source (“electric eye”).
3. A switch actuated by a lever, rod, or plate, the latter placed above the head pulley so as to just clear a passing step.

b. Manual reset location. After the man lift has been stopped by this device it shall be necessary to reset the automatic stop manually. The device shall be so located at the top landing that a person resetting it shall have a clear view of both the “up” and “down” runs of the man lift. It shall not be possible to reset the device from any step or platform.

c. Cut-off point. The device shall function so that the manlift will be stopped before the loaded step has reached a point 24 inches above the top terminal landing.

d. Electrical requirements.

1. Where such switches open the main motor circuit directly they shall be of the multiple type.

2. Where photoelectric devices are used they shall be so designed and installed that the failure of the light source, or of the light sensitive element, or of any other vacuum tubes employed in the circuit will result in shutting off the power to the driving motor.
3. Where flammable vapors or dusts may be present all electrical installations shall be in accordance with national electrical code requirements for such locations.
4. Unless of the oil-immersed type, controller contacts carrying the main motor current shall be copper to carbon, except where the circuit is broken at two or more points simultaneously.

**(13.9.1.17). §C26-1192.27 Emergency Stop.-**

- a. Requirement. An emergency stop means shall be provided.
- b. Location. This stop means shall be within easy reach of the ascending-descending runs of the belt.
- c. Operation. This stop means shall be so connected with the control lever or operating mechanism that it will cut off the power and apply the brake when pulled in the direction of travel.
- d. This stop may consist of a cotton rope with a wire center, manila or sisal rope, or may be made up of suitable lengths of metallic pipe or tubing. If rope is used, it shall be not less than 3/8 inch in diameter. Wire rope, unless marlin-covered, shall not be used.
- e. Normal stopping use. This emergency stop may be used for normal stopping and starting where the man lift does not run continuously.

**(13.9.1.18). §C26-1192.28 Factor of Safety.-**All parts of the machine shall have a factor of safety of 6 based on a load of 200 pounds on each horizontal step on the “up” and “down” runs.

**(13.9.1.19). §C26-1192.29 Instruction and Warning Signs.-**

- a. Instruction signs at landings or on belt. Signs of conspicuous and easily read style giving instructions for the use of the manlift shall be posted at each landing or stenciled on the belt.
  1. Size and legibility. Such signs shall be of letters not less than 1 inch in height and of a color having high contrast with the surface on which it is stenciled or painted (white or yellow on black or black on white or gray).
  2. Inscription. The instructions shall read approximately as follows:
    - “Face the Belt.”
    - “Use the Handhold.”
    - “To Stop-Pull Rope.”
- b. Top floor warning sign or light.
  1. Requirement. At the top floor an illuminated sign shall be displayed bearing the following wording: “Top Floor-Get Off.”
  2. Size of letters. Signs shall be in block letters not less than 2 inches in height.
  3. Color. Letters shall be red on a white background.
  4. Location. This sign shall be located within easy view of an ascending passenger and not more than 2 feet above the top terminal landing.
  5. Alternate warning light. As an alternate for the sign required by section C26-1192.29 (1) above, a red light of not less than 40-watt rating may be provided immediately below the upper terminal landing and so located as to shine in a passenger's face will be accepted.
- c. Visitor warning.
  1. Requirement. A conspicuous sign having the following legend, “Employees Only-Visitors Keep Off-Use By Visitors Unlawful” shall be displayed at each landing.

2. Size of letters. Sign shall be of block letters not less than 2 inches in height and shall be of a color offering high contrast with the background color.

3. Color. Letters shall be red on a white background.

**(13.9.1.20). §C26-1192.30 Carrying of Materials and Tools.-**

a. No freight or packaged goods shall be carried on any man lift.

b. No pipe, lumber, or other construction materials shall be handled on any manlift.

c. No tools except those which will fit entirely within a pocket in usual working clothes shall be carried on any manlift except as provided in section C26-1192.30 (d) below.

d. Tools may be carried in a canvas bag having dimensions not larger than 11 inches and provided with carrying loops or handles. Such bag shall be provided with a leather bottom. Such bag shall not be provided with shoulder straps but shall be carried in the passenger's hand while he is riding the manlift.

**(13.9.1.21). §C26-1192.31 Acceptance Tests.-**

a. Up capacity. The manlift with 200 pounds on each horizontal step of the “up” run shall show no appreciable slip of the belt when:

1. Standing.

2. Running at rated speed.

b. Down capacity, brake. The man lift with 200 pounds on each horizontal step of the “down” run shall show no appreciable slip of the belt when:

1. Standing.

2. Running at rated speed.

The brake shall stop and hold the belt with test load.

c. Loaded step deflection. Each step shall be subject to a 400-pound proof load applied to the center of the step with the machine stationary. The guides shall not be displaced and there shall be no visible deformation or misalignment of the step or its support during the test.

d. Strength of handhold. Each handhold shall support a load of 300 pounds without appreciable deformation or injury to its fastenings. Test to be made with machine stationary.

e. Final limit stop. The “up” final limit shall be tested by placing a weight of 100 pounds on the approximate center of the step or platform and running the machine in the “up” direction until the lift is stopped by the limit stop.

f. Emergency stop. The machine shall be stopped on both the “up” and “down” run by means of the emergency stop.

g. Speed. Speed shall be taken and checked against specified (rated) speed. It shall not exceed the rated speed by more than 10 percent when running empty.

**(13.9.1.22). §C26-1192.32 Periodic Inspection.-**

a. Frequency. All manlifts shall be inspected by a competent designated person at intervals of not more than 30 days.

b. Items covered. This periodic inspection shall cover but is not limited to the following items:

Steps

Step fastenings

Rails

Hail supports and fastenings

Rollers and slides

Belt and belt tension

Handholds and fastenings

Floor landings  
Guardrails  
Lubrication  
Warning signs and lights  
Signal equipment  
Drive pulley  
Bottom (boot) pulley and clearance  
Pulley supports  
Motor  
Driving mechanism  
Brake  
Electrical switches

c. Inspection log. A written record shall be kept of findings at each inspection. Records of inspection shall be made available to inspectors of the department.

**(13.9.1.23). §C26-1192.33 Rules and Regulations.**-The commissioner shall have the power to promulgate such rules and regulations as may be necessary to enforce the foregoing provisions.