



# DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS DIRECTOR'S OFFICE GENERAL INDUSTRY SAFETY STANDARDS

Filed with the Secretary of State on November 15, 1969 (as amended September 15, 1971) (as amended August 13, 1973) (as amended August 2, 1976) (as amended April 2, 1979) (as amended November 15, 1989)

These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the director of the department of consumer and industry services by sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1016, 408.1021, and 445.2001 of the Michigan Compiled Laws)

R 408.10201, R 408.10206, R 408.10208, R 408.10217, R 408.10219, R 408.10223, R 408.10231, R 408.10233, R 408.10235, R 408.10236, R 408.10237, and R 408.10240 of the Michigan Administrative Code, appearing on pages 3449, 3450, and 3452 and 3456 of the 1979 Michigan Administrative Code, are amended, and R 408.10228 and R 408.10230 are added, to read as follows:

## PART 2. FLOOR AND WALL OPENINGS, STAIRWAYS, AND SKYLIGHTS

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### GENERAL PROVISIONS

#### R 408.10201. Scope.

**Rule 201.** This part is intended to provide safety of life and limb in all places of employment where there is a danger of persons falling from, into, or through walking or working surfaces, vats, or skylights or while gaining access to other elevations and places of employment where employees would be injured from materials falling from walking or working surfaces. This part applies to temporary or emergency conditions and permanent conditions; however, where a specific rule is set forth in another general industry safety standard, the otherwise applicable rule of this part is preempted.

#### R 408.10205. Definitions D to F.

**Rule 205.** (1) **“Detour guard”** means a barrier or other device used to direct employees from contact with hazards.

(2) **“Fixed industrial stairs”** means a series of steps leading from 1 level or floor to provide limited access for maintenance or operating employees.

(3) **“Floor hole”** means an opening measuring less than 12 inches but more than 1 inch in its least dimension, in a floor, platform, pavement or yard, through or into which persons, materials or equipment may fall, such as a belt hole, pipe opening or slot opening.

(4) **“Floor opening”** means an opening measuring 12 inches or more in its least dimension, in a floor, platform, pavement or yard, through or into which persons, material or equipment may fall, including but not limited to a hatchway, stair or ladder opening, pit or large manhole. A floor opening occupied by an elevator or dumbwaiter is excluded from this part as it is covered by the elevator law, Act No. 227 of the Public Acts of 1967, being sections 408.801 to 408.824 of the Compiled Laws of 1948.

#### R 408.10206. Definitions H to R.

**Rule 206.** (1) **“Handrail”** means a single member which is supported on brackets from a wall or partition, as on a stairway or ramp, and which is provided to furnish persons with a handhold.

(2) **“Hazardous substance”** means a substance or mixture of substances which is toxic, corrosive, an irritant, a strong sensitizer, or flammable or which generates pressure through decomposition, heat, or other means if the substance or mixture of substances is likely to cause clinical evidence of personal injury or illness during, or as a direct result of, a customary or reasonable anticipated handling or use.

(3) **“Means of egress”** means a continuous path of travel from any point in a building to the open air outside at ground level and consists of 3 separate and distinct parts: the exit access, the exit, and the exit discharge. A means of

egress comprises both vertical and horizontal means of travel.

(4) **“Platform”** means a working surface for 1 or more employees which is elevated above the surrounding floor or ground level, such as a balcony or elevated surface for the operation of machinery and equipment or storage.

(5) **“Removable standard barrier”** means a standard barrier that must be either removed or installed because of specific work operations.

(6) **“Runway”** means a passageway for persons which is elevated above the surrounding floor or ground level, such as a footwalk along shafting or a walkway between buildings.

#### R 408.10207. Definition S.

**Rule 207.** (1) **“Skylight”** means an opening in a roof or floor covered by a translucent or transparent material not capable of supporting 300 pounds applied perpendicularly on any 1 area.

(2) **“Stair railing”** means a barrier erected in conjunction with a stairway to prevent falls of persons.

(3) **“Stairway”** means a flight of stairs of 4 or more risers.

(4) **“Standard barrier”** means a barrier erected along exposed edges of a floor opening, wall opening, ramp, platform or runway to prevent falls of persons or materials.

#### R 408.10208. Definitions T to W.

**Rule 208.** (1) **“Temporary barrier”** means a portable barrier to shield and identify a floor opening.

(2) **“Toe board”** means a barrier at floor level that is erected along exposed edges of a floor opening, wall opening, platform runway, ramp, or a wall hole to prevent materials from falling.

(3) **“Wall hole”** means an opening in a wall or partition which is less than 30 inches but more than 1 inch but less than 18 inches wide and of unrestricted height.

(4) **“Wall opening”** means an opening in a wall or partitions which is not less than 30 inches high and 18 inches wide and through or into which persons may fall.

(5) **“Walking or working surface”** means the floor which an employee walks, climbs, or stands on or other wise uses in his or her place of employment.

#### R 408.10211. Guards for stairway openings.

**Rule 211.** (1) A stairway floor opening shall be guarded by a standard barrier as specified in rules 231 to 236. It shall be provided on all exposed sides, except at the entrance to the stairway. A standard toe board shall be installed where activities present the probability of objects or materials falling or rolling over the edge of the opening.

(2) For a stairway where traffic across the opening prevents the use of a fixed standard barrier such as when located in an aisle space, the barrier shall consist of a hinged floor opening cover as specified in rule 239 and removable standard barriers on all exposed sides, except at the entrance to a stairway. The removable barriers shall be hinged or mounted so as to come into use automatically with the opening of the cover.

(3) Where a door or gate opens directly on a stairway, a platform shall be provided, and the swing of the door or gate shall not reduce the floor area leading to the stairs to a width less than 20 inches.

#### R 408.10213. Guards for open-sided floors, platforms and runways.

**Rule 213.** (1) Regardless of height, an open-sided floor, walkway, platform or runway above or adjacent to dangerous equipment shall be guarded with a standard barrier and toe board as specified in rules 231(1) and 233(2).

(2) An open-sided floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by a standard barrier as specified in rule 231 on all open sides, except where there is entrance to a ramp, stairway or fixed ladder. The barrier shall be provided with a toe board as specified in rule 233(2) where, beneath the open sides:

- (a) Persons can pass,
- (b) There is moving machinery, or
- (c) There is equipment with which falling materials could create a hazard. The intermediate sections of the barrier and the toe board may be eliminated when materials are regularly passed over the end of the floor, as in lumber storage. A stationary elevated platform secured to a building or structure used exclusively for the service and maintenance of overhead bridge cranes and similarly mobile equipment may be equipped with standard barriers and toe boards that are removable in lieu of fixed standard barriers and toe boards on the side adjacent to the machinery, if such barriers and toe boards are secured against falling when they are not serving as protective barriers.

(3) Guards shall be provided for a platform or runway of gratings used as a working area, which will prevent tools or materials from falling on persons below.

(4) Open sides of a loading or storage platform which is used primarily for loading or unloading railroad cars or trucks, and open hearth pouring platforms are exempt from the provisions of this part.

(5) A runway shall be guarded by a standard barrier and toe board as specified in rules 231 and 233 on all open sides 4 feet or more above floor or ground level. The barrier and toe board on 1 side of a runway used exclusively for special purposes, including but not limited to oiling, servicing or filling tank cars, may be omitted if the runway is not less than 18 inches wide.

#### R 408.10215. Guards for other floor openings or platforms.

**Rule 215.** (1) A ladderway floor opening or platform shall be guarded by a standard barrier with standard toe board on all exposed sides and with a gate which swings away from the opening or so offset that a person cannot walk directly into the opening.

(2) A hatchway, floor opening, or floor hole into which persons may accidentally walk or through which material may fall shall be guarded by 1 of the following:

- (a) A hinged floor opening covered as specified in rule 239 and equipped with standard barriers permanently attached thereto so as to leave only 1 exposed side. If the opening is not in use, the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by removable standard barriers.
- (b) A removable standard barrier with toe board on not more than 2 sides of the opening and fixed standard barriers with toe boards as specified in rules 231 and 233(2) on all other exposed sides. The removable standard barriers shall be kept in place when the opening is not in use and should preferably be hinged or mounted so as to be conveniently replaceable. A barrier may be omitted

around the perimeter of a pit used for vehicle servicing, if a yellow caution line is installed around the perimeter of the pit. The line shall be 12 inches wide and maintained so as to be clearly visible.

(c) A floor opening cover as specified in rule 239.

(3) Where operating conditions necessitate the feeding of material into a hatchway or chute opening, protection shall be provided to prevent a person from falling through the opening.

(4) A manhole floor opening shall be covered by a floor hole cover as prescribed in rule 239, which need not be hinged in place when secured or constructed to prevent accidental displacement. When the cover is not in place, the manhole opening shall be constantly attended by an employee or by an outside service, or shall be protected by temporary barriers.

(5) A temporary floor opening shall have a temporary barrier or shall be constantly attended by a person.

(6) A floor hole or floor opening into which persons cannot accidentally walk, on account of fixed machines, equipment or walls, but tools or materials can fall on employees or equipment, shall be protected by a cover that leaves no openings more than 1 inch wide unless this opening is connected to a chute type device. The cover shall be securely held in place to prevent tools or materials from falling through.

(7) An area below a floor hole or floor opening, or wall hole or wall opening, where material is being lowered shall be guarded by a standard fixed or temporary barrier, or attended by a person.

(8) A skylight less than 36 inches above a roof or floor shall be guarded by a standard barrier or skylight guard as prescribed in rules 231 or 240 on all exposed sides.

#### **R 408.10217. Guards for wall openings, holes, and pits above floor or ground level.**

**Rule 217.** (1) A wall opening from which there is a drop of more than 4 feet or where a person is likely to fall on or into a hazard shall be equipped with a standard barrier or a wall opening screen as specified in R 408.10231 and R 408.10237. Where there is exposure below to falling materials, a toe board shall also be provided. If the barrier has to be removable, it should be hinged or mounted so as to be conveniently replaceable. When the opening is not in use for handling materials, the barrier shall be kept in position, even if there is a door covering the opening. Where a removable standard barrier is used, a grab handle, as specified in R 408.10237, shall be provided on each side of the opening, with its center approximately 4 feet above floor level.

(2) A chute wall opening from which there is a drop of more than 4 feet shall be guarded by a barrier as specified in R 408.10231.

(3) A window wall opening which is along a stairway or at a stairway landing, floor, platform, or balcony and from which there is a drop of more than 4 feet and where the bottom of the opening is less than 3 feet above the stair tread, platform, floor, or landing shall be guarded by standard wall opening screens of a standard barrier as specified in R 408.10231 and R 408.10237. Where the window opening is less than 4 inches above the landing, floor, or platform, a standard toe board shall be provided as specified in R 408.10233.

(4) A temporary wall opening shall have barriers and toe boards as specified in R 408.10231 to R 408.10233.

(5) Where there is a hazard of materials falling through a wall hole, where the lower edge of the near side of the hole is less than 4 inches above the floor, and where the far side

of the hole is more than 4 feet above the next lower level, the hole shall be protected by a standard toe board or an enclosing screen either of solid construction or as specified in R 408.10233 and R 408.10237.

(6) If a wall hole has an unrestricted height of 48 inches or more, is more than 12 inches in width, the near side is less than 42 inches above the floor level, and the far side of the hole more than 4 feet above the next lower level, the hole shall be protected to the height of a standard barrier.

(7) Where a stairway or ladder landing ends in direct proximity to hazards, detour guards shall be installed or used to protect employees against contact with such hazards.

#### **R 408.10219. Open tanks or vats.**

**Rule 219.** When the top of an open tank or vat that contains a hazardous substance is less than 36 inches from the floor, platform, or ground level and is not otherwise guarded to prevent an employee from falling into a tank or vat, it shall have a barrier erected to a height of not less than 36 inches above the floor, platform or ground level on all exposed sides.

#### **R 408.10220. Access to other elevations.**

**Rule 220.** (1) One of the following shall be used to gain access to another elevation of more than 16 inches:

- (a) Flight of stairs.
- (b) Fixed industrial stairs.
- (c) Ramp.
- (d) Fixed ladder.
- (e) A portable ladder as prescribed in the general industry safety standards commission standard, Part 4. Portable Ladders, being R 408.10401 to R 408.10456 of the Michigan Administrative Code, may be used for temporary access to another elevation.

(2) After the effective date of this part, a winding stairway shall not be installed except for limited usage or secondary access. A winding stair may be installed on a tank or other round structure with a diameter of not less than 5 feet.

#### **R 408.10221. Stairway railings and guards.**

**Rule 221.** (1) A stairway having 4 or more risers shall be equipped with handrails as specified in rules 235 and 236, or a stair railing as specified in rules 233 and 236, as follows.

- (a) On a stairway less than 44 inches wide, having both sides enclosed, at least 1 handrail, preferably on the right side when descending.
- (b) On a stairway less than 44 inches wide, having one side open, at least 1 stair railing on the open side.
- (c) On a stairway less than 44 inches wide, having both sides open, 1 stair railing on each side.
- (d) On a stairway 44 or more inches wide, but less than 88 inches wide, 1 handrail on each enclosed side and 1 stair railing on each open side.
- (e) On a stairway 88 or more inches wide, 1 handrail on each enclosed side, 1 stair railing on each open side, and 1 intermediate stair railing located approximately midway of the width.

(2) A winding stairway shall be equipped with a handrail offset to prevent walking on portions of the treads having a width of less than 6 inches. A winding stairway existing at the effective date of this rule is exempted from this requirement. Future alterations shall comply with this rule.

#### **R 408.10223. Stairway slopes, treads, and risers.**

**Rule 223.** (1) A stairway or a fixed industrial stair shall not have a slope of more than 50 degrees or less than 30

degrees from the horizontal, except as prescribed in R 408.10228. Where the slope is less than 18 degrees, a ramp shall be used. Where the slope is more than 75 degrees, a fixed or portable ladder shall be used.

(2) Each tread and riser shall be of uniform dimensions in each flight. The minimum tread run shall not be less than 8 inches. The sum of the tread run and riser shall be a minimum of 17 inches or a maximum of 18 inches. Tread run does not include the nosing.

(3) A stairway that exists on November 15, 1969, is exempt from this rule. Stairway alterations after November 15, 1969, shall comply with this rule.

#### R 408.10227. Fixed industrial stairs and platforms.

**Rule 227.** (1) A fixed industrial stair shall have:

- Design and construction to carry a load of not less than 5 times the normal live load, but never less than 1000 pounds.
- A minimum width of 22 inches.
- A vertical clearance of not less than 7 feet from any tread nose to an overhead object. Projections such as pipes, raceways, air ducts or fixtures between 5 and 7 feet above the tread nose are permissible if guarded and marked.
- The tread and riser as prescribed in subrule (2) of rule 223. A tread shall have a slip resistant surface.

(2) Where a stair platform is used, its width shall be not less than a width of the stair nor shall its length be less than 30 inches measured in the direction of travel.

(3) A stair railing with intermediate rail shall be installed on any open side of a fixed industrial stair and platform. A handrail shall be installed on not less than 1 side of a closed fixed industrial stair, preferably on the right descending side. The railing and handrail shall be installed on stairs of 4 or more risers.

(4) A flight of stairs installed after the effective date of this rule shall consist of not more than a 12 foot continuous rise. An intermediate platform as prescribed in subrule (2) shall be used to provide relief where more than a 12 foot rise is necessary to reach the next level.

#### R 408.10228. Alternating tread-type fixed industrial stair.

**Rule 228.** (1) An alternating tread-type fixed industrial stair shall have a series of treads or steps attached to a center support rail in an alternating manner so that a user of the stairs does not have both feet at the same level at the same time. The center support rail shall be installed at an angle of between 50 and 70 degrees from the horizontal.

(2) Stair rails shall be provided on both sides of alternating tread-type stairs and be of such a configuration to provide an adequate handhold for an employee who grasps the rail or rails to avoid falling.

(3) A minimum distance of 6 inches shall be provided between the stair rail and any other object.

(4) A minimum of 12 inches shall be provided between the stair rails of an adjacent alternating tread-type stair.

(5) An alternating tread-type stair shall comply with all of the following provisions:

- Be designed and constructed to carry a load which is not less than 5 times the normal live load, but not less than 1,000 pounds.
- Have a minimum overall width of 22 inches.
- Have a minimum width of 17 inches, not to exceed 24 inches between the handrails.
- Each tread of an alternating tread-type stair shall have all of the following:
  - A minimum overall length of 8 inches.
  - A minimum width of 7 inches at the nose.

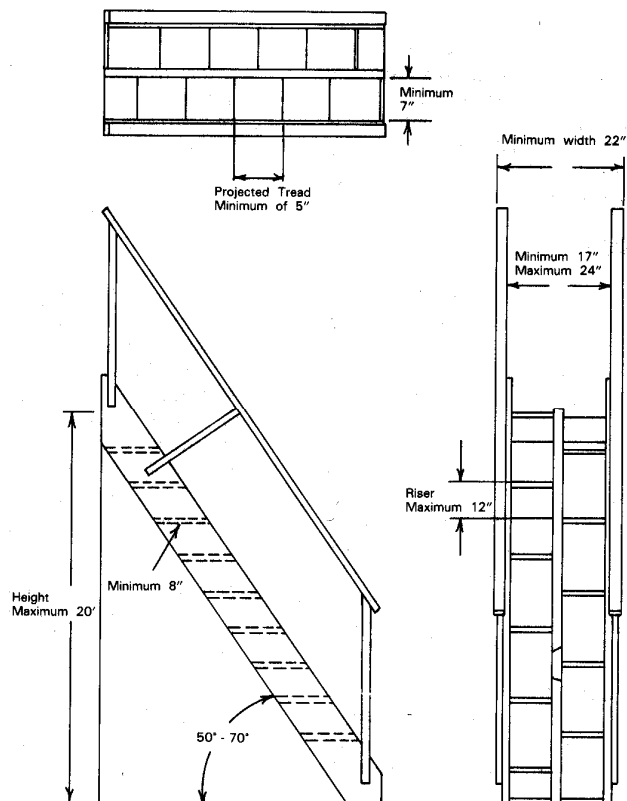
- A maximum rise of 12 inches to the next tread surface of the alternating tread.
  - A minimum of 5 inches of projected tread surface between consecutive treads. This projected distance shall be measured horizontally between the noses on consecutive stairs.
  - A slip-resistant surface.
- (e) Have a vertical clearance of not less than 7 feet from any tread nose to an overhead object. Projections such as pipes, raceways, air ducts, or fixtures between 5 and 7 feet above a tread nose are permissible if guarded and marked.

(6) Where a stair platform or landing is used, its width shall not be less than the width of the stair or less than 30 inches in length measured in the direction of travel. The initial tread of the stair shall begin at the same elevation as the platform or landing.

(7) A flight of alternating tread-type stairs shall consist of not more than a 20-foot continuous rise. An intermediate platform, as prescribed in subrule (6) of this rule, shall be used to provide relief where more than a 20-foot rise is necessary to reach the next level.

(8) An example of an alternating tread-type stair is shown as follows:

**Figure 1**  
**Alternating Tread-type Stair**



#### R 408.10230. Removable standard barrier specification.

**Rule 230.** A removable standard barrier may be used in place of a standard barrier if the removable standard barrier, and any component thereof, is capable of withstanding a load of not less than 200 pounds applied in any direction, except vertically upward when a minimum lift of 6 inches is required for removal.

**R 408.10231. Standard barrier specifications.**

**Rule 231.** (1) A standard barrier shall consist of a vertical barrier that extends not less than 42 inches above the floor, ramp, platform, runway, or other walking or working surface. A standard barrier that is installed before August 29, 1973, to a height of not less than 36 inches is exempt from the 42-inch requirement, except that all future alterations shall comply with the 42-inch requirement.

(2) The top of a standard barrier used as a handrail or a stair rail shall have a smooth surface.

(3) The anchoring and framing of all members of a standard barrier shall be constructed so that the completed barrier is capable of withstanding a load of not less than 200 pounds applied in any direction at any point.

(4) Where a standard barrier is likely to receive heavy stresses from crowds, trucking, or materials, the standard barrier shall be constructed to withstand these loads.

(5) A standard barrier shall not have protruding objects or sharp edges which might be hazardous.

(6) If a rail-type system is used as a standard barrier, all of the following requirements shall be compiled with:

- (a) The barrier shall consist of a top rail, intermediate rail or rails, and supporting posts.
- (b) The top rail shall be located not less than 42 inches above the floor, ramp, platform, runway, or other walking or working surface, except as provided in subrule (1) of this rule.
- (c) The top rail shall not overrun the terminal posts unless the overrun is not a hazard.
- (d) The intermediate rail shall be located halfway between the top rail and the floor, ramp, platform, runway, or other walking or working surface. If the distance between the top rail and the intermediate rail would be more than 24 inches, additional intermediate rails shall be installed to assure that the distances between intermediate rails, the lowest intermediate rail and the walking or working surface, and the highest intermediate rail and the top rail are not more than 24 inches.
- (e) Screen, paneling, or other equivalent material of sufficient strength to meet the requirements of subrule (3) of this rule may be used between the top rail and the walking or working surface.

**R 408.10232. Temporary barriers.**

**Rule 232.** (1) A temporary barrier shall consist of a freestanding frame of stanchions 42 inches high with a top and midrail of 2 x 4's, pipe, rope, or chain.

(2) A temporary barrier shall be identified by a warning device including but not limited to a light, flags, or colors to warn persons of a hazardous area.

**R 408.10233. Stair railing and toe board specifications.**

**Rule 233.** (1) A stair railing shall be constructed in a similar manner to a standard barrier as required in R 408.10231, but the vertical height shall be not more than 34 inches nor less than 30 inches from the upper surface of the top rail to the surface of the tread in line with the face of the riser. The 34-inch requirement is modified to 38 inches for a stair railing that exists on November 15, 1969.

(2) A standard toe board shall be not less than 4 inches in vertical height from its top edge to the level of the walking or working surface. A toe board shall be securely fastened in place with not more than  $\frac{1}{4}$  of an inch of clearance above the level of the walking or working surface. The toe board shall be constructed of solid material or material that has openings that are not more than 1 inch in their greatest dimension.

(3) Where material or tools are piled to such a height that a standard toe board does not keep the material or tools from falling, paneling, screening, or other equivalent material shall be provided between the toe board and the intermediate rail or the top rail or to a height necessary to retain the materials or tools. If the additional paneling, screening, or other equivalent material does not have openings of more than 1 inch in their greatest dimension, the standard toe board may be eliminated.

**R 408.10235. Handrail specifications.**

**Rule 235.** (1) A handrail shall consist of a lengthwise member that is mounted on a wall or partition in a manner which does not obstruct a smooth surface along the top and both sides of the handrail. The handrail shall be of a configuration that will furnish an adequate handhold for a person grasping it to avoid falling. The ends of the handrail shall be arranged so as not to constitute a hazard.

(2) The handrail shall be not more than 34 inches and not less than 30 inches in height from the upper surface of the handrail vertically to the surface of the tread in line with the face of the riser or to the surface of the ramp. The 34-inch requirement is modified to 38 inches for a handrail that exists on November 15, 1969.

(3) A handrail shall be of such size and so mounted that the completed structure is capable of withstanding a load of not less than 200 pounds applied in any direction at any point on the rail.

**R 408.10236. Clearance for handrail and stair railings.**

**Rule 236.** (1) A handrail, stair railing, and the top of a standard barrier used as a railing shall be provided with a clearance of not less than 1 1/2 inches between the handrail or railing and any other object.

(2) A handrail or stair railing that exists before the effective date of this part may have a clearance of not less than 1 1/4 inches between the handrail or stair railing and any other object.

**R 408.10237. Wall opening grab handles and screens.**

**Rule 237.** (1) A wall opening grab handle shall be not less than 12 inches in length and shall be mounted to give not less than 3 inches of clearance from the side framing of the wall opening. The size, material, and anchoring of the grab handle shall be such that the completed structure is capable of withstanding a load of not less than 200 pounds applied in any direction at any point on the handle.

(2) A grab rail that exists before September 15, 1971, may have a clearance of less than 3 inches, but not less than 1 1/2 inches, between the grab rail and any other object.

(3) A wall opening screen shall be constructed and mounted to withstand a static load of not less than 200 pounds applied horizontally at any point on the screen. The screen may be of solid construction, of grillwork with openings not more than 8 inches long, or of slat work with openings not more than 4 inches wide and with length unrestricted.

**R 408.10239. Floor opening and floor hole covers.**

**Rule 239.** (1) A floor opening and floor hole cover shall be of any material or construction that will support at least 3 times the normal load, except that when located in a plant roadway, it shall be designed to carry a truck rear axle load of 24,000 pounds.

(2) The top of a cover shall be of materials no more slippery than the surrounding floor surface and should be flush with the surface. A cover projection not more than 1 inch above the floor level may be used if all edges are

chamfered to an angle with the horizontal of not more than 30 degrees.

(3) Hinges, handles, bolts or other parts shall be set flush with the floor or cover surface.

**R 408.10240. Skylight guards.**

**Rule 240.** (1) A skylight guard shall be designed and constructed to withstand a 200-pound load that is applied perpendicularly at any 1 area on the screen.

(2) The guard construction shall be of grillwork with openings not more than 4 inches long or slatwork with an

opening not more than 2 inches wide with length unrestricted. Ordinary loads or impacts shall not deflect the material downward to break the skylight glass.

**R 408.10241. Maintenance.**

**Rule 241.** Floors, platform stair treads and landings shall be maintained free of broken, worn, splintered or loose pieces that would constitute a tripping or falling hazard. Material used for repair of these components shall meet the design strength of the component.



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