

Guarding Floor and Wall Openings

OSHA 1910.23 lists the Guarding Floor and Wall Openings Standard

Descriptions of terms used in this training are:

- Handrail: A single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp, to furnish persons with a handhold in case of tripping
- Stair Railing: A vertical barrier erected along exposed sides of a stairway to prevent falls of persons
- Standard Railing: A vertical barrier erected along exposed edges of a floor opening, wall openings, ramp, platform or runway to prevent falls of persons
- Standard Strength and Construction: Any construction of railings, covers, or other guards that meets the requirements of OSHA Standard 1910.23
- Toeboard: A vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway or ramp to prevent any material from falling

What Should Be Guarded?

- Floor openings and holes
- Wall openings and holes
- Open-sided floors, platforms, runways
- Stairways



Compliant Ladder



Compliant Side Rails and Toeboard



Correct Hatch covers



Non Compliant Floor Opening

An opening measuring 12 inches or more in its smallest dimension in any:

- Floor
- Platform
- Pavement
- Yard

Through which a person may fall such as:

- Hatchways
- Stair or ladder openings
- Pits
- Large Manholes
- Belt holes
- Pipe openings
- Slot openings

The construction of floor opening covers may be of any material that meets the strength requirements. Covers projecting not more than 1 inch above the floor level may be used providing all edges are chamfered to an angle with the horizontal of not over 30 degrees. All hinges, handles, bolts, or other parts shall set flush with the floor or cover surface.

Stairways

- Every stairway floor opening shall be guarded by a standard railing. The railing shall be provided on all exposed sides (except at entrance to stairway). For infrequently used stairways where traffic across the opening prevents the use of fixed standard railing (as when located in aisle spaces, etc.), the guard shall consist of a hinged floor opening cover of standard strength and construction and removable standard railings on all exposed sides (except at entrance to stairway).



Correct - railings and side guards on all 3 pictures above

Ladder Access

- Every ladderway floor opening or platform shall be guarded by a standard railing with standard toeboard on all exposed sides (except at entrance to opening), with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.



Not Safe



Correct



Compliant

Hatch Way and Chute Openings

- Every hatchway and chute floor opening shall be guarded by one of the following:
- Hinged floor opening cover of standard strength and construction equipped with standard railings or permanently attached thereto so as to leave only one exposed side. When 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 railings.
- A removable railing with toeboard on not more than two sides of the opening and fixed standard railings with toeboards on all other exposed sides. The removable railings shall be kept in place when the opening is not in use.
- Where operating conditions necessitate the feeding of material into any hatchway or chute opening, protection shall be provided to prevent a person from falling through the
- Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides.
- Every pit and trapdoor floor opening, infrequently used, shall be guarded by a floor opening cover of standard strength and construction. While the cover is not in place, the pit or trap opening shall be constantly attended by someone or shall be protected on all exposed sides by removable standard railings.
- Every manhole floor opening shall be guarded by a standard manhole cover which need not be hinged in place. While the cover is not in place, the manhole opening shall be constantly attended by someone or shall be protected by removable standard railings.

- Every temporary floor opening shall have standard railings, or shall be constantly attended by someone.

Every floor hole into which persons can accidentally walk shall be guarded by either:

- A standard railing with standard toeboard on all exposed sides, or
- A floor hole-cover of standard strength and construction. While the cover is not in place, the floor hole shall be constantly attended by someone or shall be protected by a removable standard railing.
- Every floor hole into which persons cannot accidentally walk (on account of fixed machinery, equipment, or walls) shall be protected by a cover that leaves no openings more than 1 inch wide. The cover shall be securely held in place to prevent tools or materials from falling through.
- Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width to less than 20 inches.

Protection for wall openings and holes

Every wall opening from which there is a drop of more than 4 feet shall be guarded by one of the following:

- Rail, roller, picket fence, half door, or equivalent barrier. Where there is exposure below to falling materials, a removable toe board or the equivalent shall also be provided. When the opening is not in use for handling materials, the guard shall be kept in position regardless of a door on the opening. In addition, a grab handle shall be provided on each side of the opening with its center approximately 4 feet above floor level and of standard strength and mounting.
- Extension platform onto which materials can be hoisted for handling, and which shall have side rails or equivalent guards of standard specifications.
- Every chute wall opening from which there is a drop of more than 4 feet shall be guarded by one or more of the barriers specified in paragraph (b)(1) of this section or as required by the conditions.
- Every window wall opening at a stairway landing, floor, platform, or balcony, 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 platform or landing, shall be guarded by standard slats, standard grill work or standard railing.
- Where the window opening is below the landing, or platform, a standard toe board shall be provided.
- Every temporary wall opening shall have adequate guards but these need not be of standard construction.
- Where there is a hazard of materials falling through a wall hole, and the lower edge of the near side of the hole is less than 4 inches above the floor, and the far side of the hole more than 5 feet above the next lower level, the hole shall be

protected by a standard toeboard, or an enclosing screen either of solid construction, or as specified in compliance design.



Not guarded



Outer side is guarded

Protection of open-sided floors, platforms, and runways

- Every open-sided floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by a standard railing on all open sides except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a toeboard wherever, beneath the open sides where:
 - Persons can pass
 - There is equipment with which falling materials could create a hazard
 - Every runway shall be guarded by a standard railing on all open sides 4 feet or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toeboard shall also be provided on each exposed side.
 - Runways used exclusively for special purposes (such as oiling, shafting, or filling tank cars) may have the railing on one side omitted where operating conditions necessitate such omission, providing the falling hazard is minimized by using a runway of not less than 18 inches wide. Where persons entering upon runways become thereby exposed to machinery, electrical equipment, or other danger not a falling hazard, additional guarding than is here specified may be essential for protection.



Toeboard and Side Rails



No Guard - NOT compliant higher than 4 feet



Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, pickling or galvanizing tanks, degreasing units, and similar hazards shall be guarded with a standard railing and toe board.



Correct



Toeboard no side rails



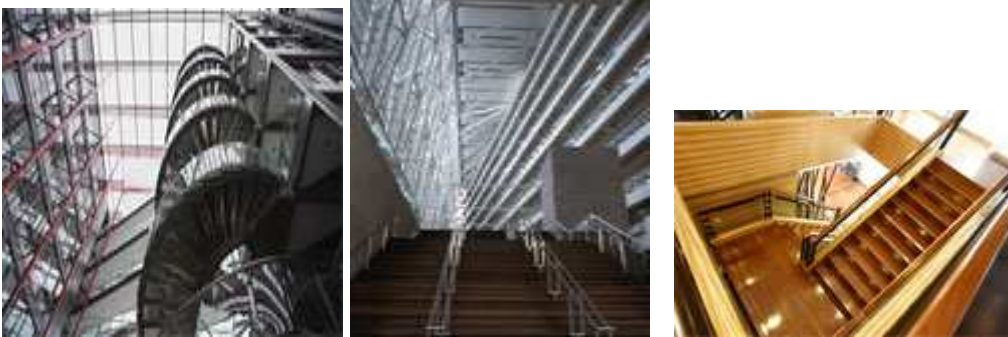
Correct

Stairway railings and guards

Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails, the width of the stair to be measured clear of all obstructions except handrails:

- On stairways less than 44 inches wide having both sides enclosed, at least one handrail, preferably on the right side descending.
- On stairways less than 44 inches wide having one side open, at least one stair railing on open side

- On stairways less than 44 inches wide, having both sides open, one stair railing on each side
- On stairways more than 44 inches wide but less than 88 inches wide, one handrail on each enclosed side and one stair railing on each open side.
- On stairways 88 or more inches wide, one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing located approximately midway of the width.
- Winding stairs shall be equipped with a handrail offset to prevent walking on all portions of the treads having width less than 6 inches.



All 6 stairways pictured immediately above and below are compliant with guarding and hand rails



Railing, Toe Boards, and Cover Specifications

- A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches nominal from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.
- A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches or less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.
- For wood railings, the posts shall be of at least 2-inch by 4-inch stock spaced not to exceed 6 feet; the top and intermediate rails shall be of at least 2-inch by 4-inch stock. If top rail is made of two right-angle pieces of 1-inch by 4-inch stock, posts may be spaced on 8-foot centers, with 2-inch by 4-inch intermediate rail.
- For pipe railings, posts and top and intermediate railings shall be at least 1 1/2 inches nominal diameter with posts spaced not more than 8 feet on centers.
- For structural steel railings, posts and top and intermediate rails shall be of 2-inch by 2-inch by 3/8-inch angles or other metal shapes of equivalent bending strength with posts spaced not more than 8 feet on centers.
- The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail.
- Other types, sizes, and arrangements of railing construction are acceptable provided they meet the following conditions:
 - A smooth-surfaced top rail at a height above floor, platform, runway, or ramp level of 42 inches nominal
 - A strength to withstand at least the minimum requirement of 200 pounds top rail pressure
 - Protection between top rail and floor, platform, runway, ramp, or stair treads, equivalent at least to that afforded by a standard intermediate rail;
- A standard toeboard shall be 4 inches nominal in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than 1/4-inch clearance above floor level. It may be made of any substantial material either solid or with openings not over 1 inch in greatest dimension.
- Where material is piled to such height that a standard toeboard does not provide protection, paneling from floor to intermediate rail or to top rail shall be provided.
- A handrail shall consist of a lengthwise member mounted directly on a wall or partition by means of brackets attached to the lower side of the handrail so as to offer no obstruction to a smooth surface along the top and both sides of the

handrail. The handrail shall be of rounded or other section that will furnish an adequate handhold for anyone grasping it to avoid falling. The ends of the handrail should be turned in to the supporting wall or otherwise arranged so as not to constitute a projection hazard.

- The height of handrails shall be not more than 34 inches or less than 30 inches from upper surface of handrail to surface of tread in line with face of riser or to surface of ramp.
- The size of handrails shall be: When of hardwood, at least 2 inches in diameter; when of metal pipe, at least 1 1/2 inches in diameter. The length of brackets shall be such as will give a clearance between handrail and wall or any projection thereon of at least 3 inches. The spacing of brackets shall not exceed 8 feet.
- The mounting of handrails shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction at any point on the rail.
- All handrails and railings shall be provided with a clearance of not less than 3 inches between the handrail or railing and any other object.

Floor opening covers may be of any material that meets the following strength requirements:

- Trench or conduit covers and their supports, when located in plant roadways, shall be designed to carry a truck rear-axle load of at least 20,000 pounds.
- Manhole covers and their supports, when located in plant roadways, shall comply with local standard highway requirements if any; otherwise, they shall be designed to carry a truck rear-axle load of at least 20,000 pounds.
- The construction of floor opening covers may be of any material that meets the strength requirements. Covers projecting not more than 1 inch above the floor level may be used providing all edges are chamfered to an angle with the horizontal of not over 30 degrees. All hinges, handles, bolts, or other parts shall set flush with the floor or cover surface.
- Skylight screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied perpendicularly at any one area on the screen. They shall also be of such construction and mounting that under ordinary loads or impacts, they will not deflect downward sufficiently to break the glass below them. The construction shall be of grillwork with openings not more than 4 inches long or of slat-work with openings not more than 2 inches wide with the length unrestricted.
- Wall opening barriers (rails, rollers, picket fences, and half doors) shall be of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a load of at least 200 pounds applied in any direction (except upward) at any point on the top rail or corresponding member.
- Wall opening grab handles shall be not less than 12 inches in length and shall be so mounted as to give 3 inches 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 at least 200 pounds applied in any direction at any point of the handle.

- Wall opening screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied horizontally at any point on the near side of the screen. They 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 with length unrestricted.