

## **C. Stairs & Ladders**

1. General Requirements
  - a.

- ii. Except during construction of the actual stairway, skeleton metal frame structures and steps must not be used (where treads and/or landings will be installed later) unless the stairs are fitted with secured temporary treads and landings.
  - iii. Temporary treads must be made of wood or other solid material and installed the full width and depth of the stair.
3. Stair rails and Handrails

The following general requirements apply to all stair rails and handrails:

- a. Stairways having four or more risers, or rising more than 30 inches (76 cm) in height—whichever is less—must have at least one handrail. A stair rail also must be installed along each unprotected side or edge. When the top edge of a stair rail system also serves as a handrail, the height of the top edge must be no more than 37 inches (94 cm) nor less than 36 inches (91.5 cm) from the upper surface of the stair rail to the surface of the tread.
- b. Winding or spiral stairways must have a handrail to prevent using areas where the tread width is less than 6 inches (15 cm).
- c. Stair rails installed after March 15, 1991, must be not less than 36 inches (91.5 cm) in height.
- d. Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members must be provided between the top rail and stairway steps to the stair rail system.
- e. Midrails, when used, must be located midway between the top of the stair rail system and the stairway steps.
- f. Screens or mesh, when used, must extend from the top rail to the stairway step and along the opening between top rail supports.
- g. Intermediate vertical members, such as balusters, when used, must not be more than 19 inches (48 cm) apart.
- h. Other intermediate structural members, when used, must be installed so that there are no openings of more than 19 inches (48 cm) wide.
- i. Handrails and the top rails of the stair rail systems must be able to withstand, without failure, at least 200 pounds (890 n) of weight applied within 2 inches (5 cm) of the top edge in any downward or outward direction, at any point along the top edge.
- j. The height of handrails must not be more than 37 inches (94 cm) nor less than 30 inches (76 cm) from the upper surface of the handrail to the surface of the tread.
- k. Stair rail systems and handrails must be surfaced to prevent injuries such as punctures or lacerations and to keep clothing from snagging.
- l. Handrails must provide an adequate handhold for employees to grasp to prevent falls.
- m. The ends of stair rail systems and handrails must be built to prevent dangerous projections; such as rails protruding beyond the end posts of the system.
- n. Temporary handrails must have a minimum clearance of 3 inches (8 cm) between the handrail and walls, stair rail systems, and other objects.
- o. Unprotected sides and edges of stairway landings must be provided with standard 42-inch (1.1 m) guardrail systems.



must support added anticipated loads caused by ice buildup, winds, rigging, and impact loads resulting from using ladder safety devices.

- b. Individual rung/step ladders must extend at least 42 inches (1.1 m) above an access level or landing platform either by the continuation of the rung spacing as horizontal grab bars or by providing vertical grab bars that must have the same lateral spacing as the vertical legs of the ladder rails.
- c. Each step or rung of a fixed ladder must be able to support a load of at least 250 pounds (114 kg) applied in the middle of the step or rung.
- d. The minimum clear distance between the sides of individual rung/step ladders and between the side rails of other fixed ladders must be 16 inches (41 cm).
- e. The rungs of individual rung/step ladders must be shaped to prevent slipping off the end of the rungs.
- f. The rungs and steps of fixed metal ladders manufactured after March 15, 1991, must be corrugated, knurled, dimpled, coated with skid-resistant material, or treated to minimize slipping.
- g. The minimum perpendicular clearance between fixed ladder rungs, cleats, and steps and any obstruction behind the ladder must be 7 inches (18 cm), except that the clearance for an elevator pit ladder must be 4.5 inches (11 cm).
- h. The minimum perpendicular clearance between the centerline of fixed ladder rungs, cleats, and steps, and any obstruction on the climbing side of the ladder must be 30 inches (76 cm). If obstructions are unavoidable, clearance may be reduced to 24 inches (61 cm), provided a deflection device is installed to guide workers around the obstruction.
- i.

- o. When safety devices are provided, the maximum clearance distance between side

- b. All safety devices must permit the worker to ascend or descend without continually having to hold, push, or pull any part of the device, leaving both hands free for climbing.
- c. All safety devices must be activated within 2 feet (.61 m) after a fall occurs, and limit the descending velocity of an employee to 7 feet/second (2.1 m/sec) or less.
- d. The connection between the carrier or lifeline and the point of attachment to the body belt or harness must not exceed 9 inches (23 cm) in length.

#### 11. Use of all Ladders

- a. When portable ladders are used for access to an upper landing surface, the side rails must extend at least 3 feet (.9 m) above the upper landing surface. When such an extension is not possible, the ladder must be secured, and a grasping device such as a grab rail must be provided to assist workers in mounting and dismounting the ladder. A ladder extension must not deflect under a load that would cause the ladder to slip off its supports.
- b. Ladders must be maintained free of oil, grease, and other slipping hazards.
- c. Ladders must not be loaded beyond the maximum intended load for which they were built nor beyond their manufacturer's rated capacity.
- d. Ladders must be used only for the purpose for which they were designed.
- e. Non-self-supporting ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder. Wood job-made ladders with spliced side rails must be used at an angle where the horizontal distance is one-eighth the working length of the ladder.
- f. Fixed ladders must be used at a pitch no greater than 90 degrees from the horizontal, measured from the back side of the ladder.
- g. Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement.
- h. Ladders must not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces.
- i. Ladders placed in areas such as passageways, doorways, or driveways, or where they can be displaced by workplace activities or traffic must be secured to prevent accidental movement or a barricade must be used to keep traffic or activities away from the ladder.
- j. The area around the top and bottom of the ladders must be kept clear.
- k. The top of a non-self-supporting ladder must be placed with two rails supported equally unless it is equipped with a single support attachment.
- l. Ladders must not be moved, shifted, or extended while in use.
- m. Ladders must have nonconductive side rails if they are used where the worker or the ladder could contact exposed energized electrical equipment. The top or top step of a stepladder must not be used as a step.



**Portable Ladder** – A ladder that can be readily moved or carried.

**Riser Height** – The vertical distance from the top of a tread or platform/landing to the top of the next higher tread or platform/landing.

**Side-Step Fixed Ladder** – A fixed ladder that requires a person to get off at the top to step to the side of the ladder side rails to reach the landing.

**Single-Cleat Ladder** – A ladder consisting of a pair of side rails connected together by cleats, rungs, or steps.

**Stair rail System** – A vertical barrier erected along the unprotected sides and edges of a stairway to prevent employees from falling to lower levels.

**Temporary Service Stairway** – A stairway where permanent treads and/or landings are to be filled in at a later date.

**Through Fixed Ladder** – A fixed ladder that requires a person getting off at the top to step between the side rails of the ladder to reach the landing.

**Tread Depth** – The horizontal distance from front to back of a tread, excluding nosing, if any.