

ASME Record #19-2867 – Revision ASME STS-1-2016 – Ladder Requirements

Underlined additions, Strikethrough deletions

6.3 Fixed Ladders

6.3.1 Application. This section applies to new fixed ladders, permanently attached to the stack or structure, on new or existing steel stacks. Ladders used for steel stack access must conform to ANSI A14.3 (latest edition), Safety Code for Fixed Ladders.

6.3.7 Caged Ladders and Ladder Safety System Length of Climb

A description of the permissible length of climb is provided below for the different ladder configurations presented in Figure 6.3.7-1.

(a) A cage or ladder safety system is not required where the length of climb is 24 ft or less above a ground level, floor or roof. See Figure 6.3.7-1, illustration (a).

(b) A cage or ladder safety system shall be provided where the length of climb is less than 24 ft, but the top of the ladder is at a distance greater than 24 ft above a ground level, floor or roof. See Figure 6.3.7-1, illustration (b).

(c) A ladder safety system shall be provided where a single length of climb is greater than 24 ft. See Figure 6.3.7-1, illustration (c).

(d) Multiple sections of ladders having all single length of climbs not exceeding 24 ft shall be provided with a cage or ladder safety system. See Figure 6.3.7-1, illustration (d). Refer to Par. 6.3.8-3 and 6.3.11-8 for landing requirements when caged ladders are used.

(e) Multiple sections of ladders having at least one single length of climb exceeding 24 ft shall be provided with a ladder safety system in place of a cage. The ladder safety system shall be provided throughout the length of climb. See Figure 6.3.7-1, illustration (d).

(f) Ladders equipped with a ladder safety system shall have rest platforms at maximum intervals of 150 ft. See Figure 6.3.7-1, illustration (e).

(g) When a ladder safety system is combined with a cage the maximum single length of climb shall not exceed 50 ft.

6.3.78 Landing [Rest] Platforms. ~~When caged ladders are used to ascend to heights exceeding 50 ft (except as provided in para. 6.3.10), landing platforms shall be spaced at intervals of 50 ft or less. Where installation conditions (even for a short, unbroken length) require that adjacent sections be offset, landing platforms shall be provided at each offset. The requirements for landing [rest] platforms are provided below.~~

(a) Landing platforms shall be provided at intervals such that the maximum single length of climb provided in para. 6.3.7 is not exceeded.

(b) The total depth of platform shall provide a minimum space of 30 in. from the ladder on the climbing side. The width of the platform shall not be less than 30 in.

(c) Landing platforms for caged ladders shall use additional guarding to prevent fall exposure to the climber on railings adjacent to the side of the ladder and within 4 ft from the center line of the rung, unless otherwise protected. The descending ladder and swing gate placed at the ladder opening shall be so offset to show that it is not reasonably possible for a person to fall past the platform.

(d) The grating and ~~straight-structural~~ requirements for landing platforms shall be the same as work platforms (see ~~para. Section~~ 6.4-3).

6.3.89 Access/Egress

6.3.119 Safety-Caged Ladders. ~~Except as provided in para. 6.3.10, safety cages shall be provided for all ladders to a maximum unbroken length of 50 ft (see para. 6.3.7). The requirements for a cage ladder are provided below.~~

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(a) The top of the Cages shall be extend to a minimum of 3 ft.in. to 6 in. above the top of thea landing unless other acceptable protection is provided.

(b) Cages shall extend down the ladder to a point not less than 7 ft or more than 8 ft above the base of the ladder with the bottom flared not less than 4 in., ~~or the portion of the cage opposite the ladder shall be carried to the base.~~

(c) Cages shall not extend less than 27 in. or more than 30 in. from the centerline of the rungs of the ladder. Cages shall not be less than 27 in. in width. The inside shall be clear of projections. Vertical bars shall be located at maximum spacing of 40 deg around the circumference of the cage. This will give a maximum spacing of approximately 9 ½ in. center-to-center of the vertical bars. There shall be seven vertical bars located inside the hoops.

(d) Hoop bars shall be 2 in. x ¼ in. ~~x 2 in. steel~~ minimum with a maximum spacing of 4 ft on centers.

(e) Vertical bars shall be sized 3/16 in. to 1 ½ in. x 3/16 in. minimum. Vertical bars shall be welded or bolted together and to the hoops with bolt heads countersunk on the inside.

(f) Where a caged ladder is so located that it could be ascended on the uncased side, a sheet steel baffle shall be erected extending from the ground or floor level to a height of at least 8 ft to prevent access to the uncased side of the ladder.

(g) Climbing protection devices may be used in combination with cages if additional protection is desired. When a caged ladder system is combined with a ladder safety device, the cage cannot interfere with the person or the operation of the ladder safety system. A larger cage system may be required.

(h) When a cage is used, each section of ladder shall be horizontally offset from the adjacent sections with sufficient clearances. A landing platform shall be provided for safe access/egress with appropriate clearances to protect the user.

~~**6.3.10 Climbing Protection Devices-Ladder Safety System.** The design requirements and other considerations when using a Ladder Safety System are provided below. Climbing protection devices may be used on ladders in lieu of cage protection. Landing platforms shall be provided at a maximum of 150 ft intervals in these cases. Climbing protection devices that incorporate friction brakes and sliding attachments shall meet the requirements of ANSI A14.3. Special consideration shall be given to increased possibility of corrosion at the top of stacks resulting from the action of stack gases.~~

~~(a) A ladder safety system can be used as a fall protection on ladders without the use of a cage barrier. All components of the ladder safety system shall meet the requirements of Section 7 of ANSI A14.3 Standard for Fixed Ladders. Any system used on a steel stack shall meet the design and testing requirements of this Standard.~~

~~(b) The installation of a ladder safety system shall be per the manufacturer's installation guidelines.~~

~~(c) Individuals using ladder safety systems shall be protected from fall hazards during the process of connecting and disconnecting (transitioning) from the ladder safety system. A suitable anchor point accessible from the ladder shall be used to connect the fall protection system when transitioning.~~

~~(d) Special consideration shall be given to increased possibility of corrosion at the top of stacks resulting from exposure to stack exhaust gases.~~

~~**6.3.11 Short Ladders.** All stack ladders over 10 ft in height shall be caged or have a safety device, unless the ladder extends less than 15 ft above ground.~~

~~**6.3.12 Siderails.** The siderails shall be of flat bar stock and not be less than 2½ in. x 3/8 in. If siderails of other cross sections are desired, they shall be at least equal in strength to the above-sized steel bar. For additional load concentrations, attachment of ladder safety systems, or for spacing of supports that exceeds the maximum spacing recommended, the maximum size of siderails shall be increased in accordance with recognized design practices.~~

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6.3.13 Rungs. Rungs shall not be less than $\frac{3}{4}$ in. in diameter. For ladders exposed to unusually corrosive atmospheres, rungs shall be of at least 1 in. diameter solid bars. Spacing of rungs shall not exceed 12 in. center-to-center and shall be spaced uniformly throughout the length of the ladder. For additional load concentrations or attachment of ladder safety systems, and for clear widths exceeding 16 in., the minimum size (cross section) of steps and rungs shall be increased in accordance with recognized design practices. Rungs shall be inserted through holes in the siderails and shall be welded completely around the circumference of the rung to the outside of the siderails.

6.3.14 Ladder Supports. Ladder supports shall be of steel at least equivalent to the siderails in strength. Ladder supports may be bolted or welded ~~to the siderails but must be welded to the stack shell~~. Ladder supports shall not be more than 10 ft apart based on the size of the siderail recommended. For additional load concentrations, attachment of ladder safety systems, or for variations in size (cross section) of siderails, the spacing of supports shall be adjusted in accordance with recognized design practices. Anchorage of ladders must account for the thermal growth of the stack.

6.2.6 Definitions: [Added]

Lower level means a surface or area to which a person could fall. Such surfaces or areas include, but are not limited to, ground levels, floors, roofs, equipment, and similar surfaces and structures, or portions thereof. The lower level shall be of sufficient size and strength such that a person cannot fall beyond this surface.

Fall protection means any equipment, device, or system that prevents a person from falling from an elevation or mitigates the effect of such a fall.

Guardrail system means a barrier erected along an unprotected or exposed side, edge, or other area of a walking-working surface to prevent employees from falling to a lower level.

Ladder safety system means an assembly of components whose function is to arrest the fall of a user, including the carrier and its associate attachment elements (brackets, fasteners, etc.), safety sleeve, full body harness and connectors, wherein the carrier is permanently attached to the climbing face of the ladder or immediately adjacent to the structure. A cage is not a ladder safety device.

Opening means a gap or open space in a wall, walking-working surface, or similar surface that is at least 30 inches high and at least 18 inches wide, through which a person can fall to a lower level.

Unprotected sides and edges mean any side or edge of a walking-working surface (except an entrance and other points of access) where there is no wall, or guardrail system to protect a person from falling to a lower level.

Single length of climb means the vertical distance travelled on a ladder from a lower level to the top of a landing or platform in which the person must exit the ladder.

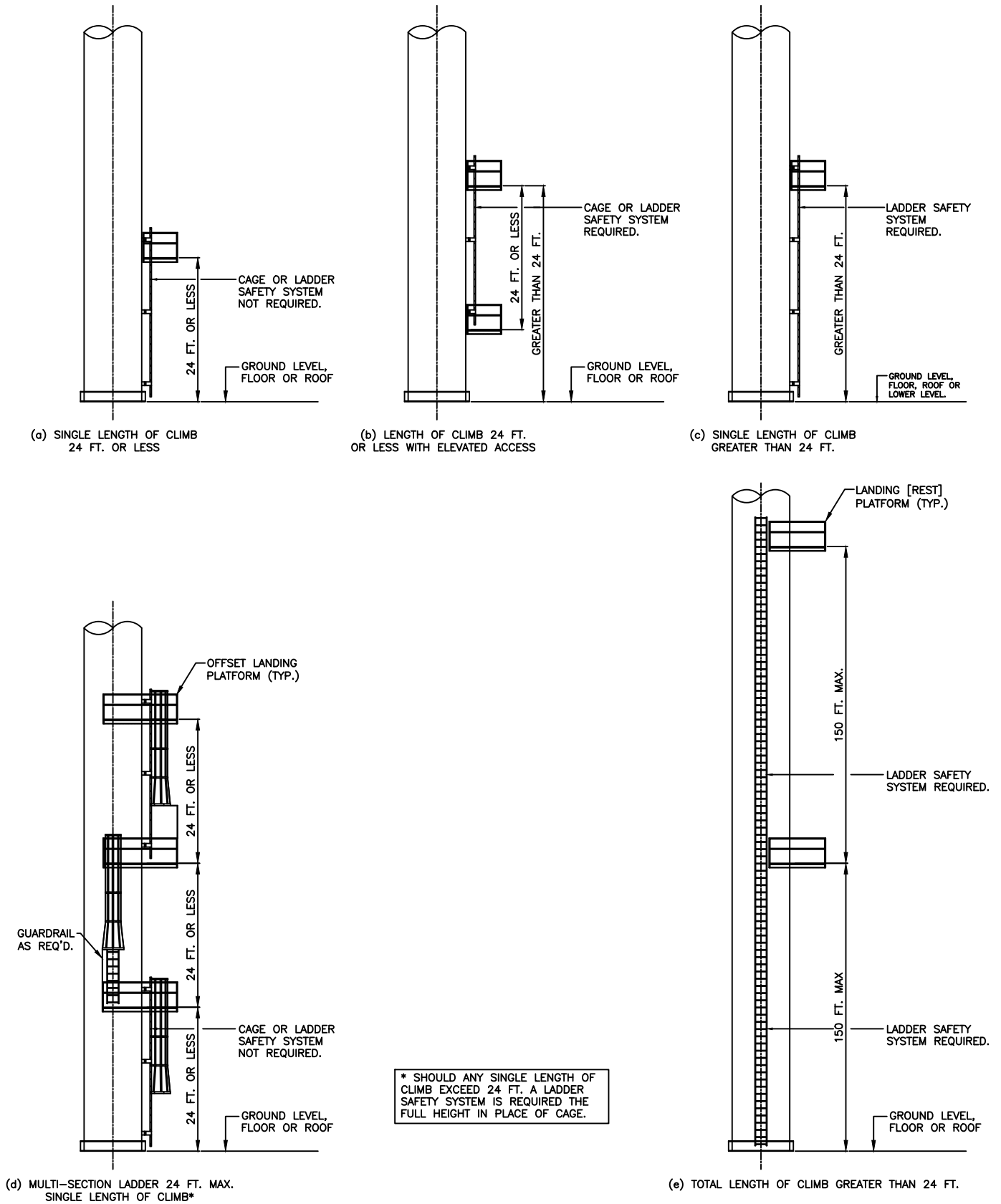


FIGURE 6.3.7-(a-e) LENGTH OF CLIMB