Ladder Requirements

According to the Centers for Disease Control and Prevention (CDC), across all workers, approximately 20% of all fall injuries involve a ladder. Among construction workers – especially roofing, framing, siding, and painting contractors – the dangers of ladder falls are even more clear: An estimated 81% of fall injuries treated in emergency rooms across the country involve a ladder. Construction has the highest rate of ladder fall injuries of any industry.

Ladders come in a variety of shapes, sizes, and materials. They are useful in many industries for a variety of applications. This document offers an overview of the Occupational Safety and Health Administration (OSHA) and the American National Standards Institute (ANSI) Accredited Standards Committee (ASC) standards for ladders, along with tips for proper ladder usage. A critical component of fall prevention is making sure all ladders meet OSHA and ANSI-ASC standards. Read on to see if yours pass the test.

OSHA Regulatory Requirements

In late 2016, OSHA published an update to its walking-working surface rule (subpart D) for general industry. Subpart D applies to all general industry workplaces and covers all walking-working surfaces unless specifically excluded by an individual section of the subpart. Specifically, the update incorporates advances in technology, industry best practices and national consensus standards to provide effective and cost-efficient worker protection addressing slip, trip and fall hazards.

The update ushered in some sweeping changes where ladders were concerned. As part of the update, OSHA combined its previously separate regulations for portable wood ladders, portable metal ladders and fixed ladders under one comprehensive ladder standard: 29 Code of Federal Regulations (CFR) 1910.23 which applies to all ladders used in general industry with a few exceptions. Those exceptions are ladders used in emergency operations such as firefighting, rescue and tactical law enforcement operations, or training for those operations, and ladders that are an integral part of a machine or piece of equipment.

The four main components of OSHA’s ladder standard cover:

- General Requirements for all ladders
- Portable Ladders
- Fixed Ladders
- Mobile Ladder Stands and Mobile Ladder Stand Platforms

Under the General Requirements for all ladders, 29 CFR 1910.23(b)(11-13), OSHA addresses proper ladder climbing technique When ascending or descending a ladder, employees must always maintain three points of contact by:

- Facing the ladder
- Using at least one hand to firmly grasp the ladder
- Not carrying any object or load that could cause them to lose balance and fall

Employers are required to ensure that every employee follows this climbing technique.

The General Requirements for all ladders also covers the design specifications for rungs and steps used on ladders and stepstools. The design for rungs and steps must meet the following criteria:

Ladder Rungs, Steps and Cleats 29 CFR 1910.23(b)(1) – (4)(iv)
Parallel, level and uniformly spaced when the ladder is in position for use.
Spaced not less than 10 inches and not more than 14 inches apart.
Rungs and steps in elevator shafts must be spaced not less than six inches or more than 16.5 inches apart
Fixed ladder rungs and steps on telecommunication towers must be spaced not more than 18 inches apart
Minimum clear width of 11.5 inches on portable ladders and 16 inches for fixed ladders.
Manhole entry ladders rungs and steps supported by the manhole opening must have a minimum clear width of nine inches.
Telecommunication center rolling ladders rungs and steps must have a minimum clear width of eight inches.
Stepstools must have a minimum clear width of 10.5 inches and the steps are not spaced less than eight inches or more than 12 inches apart.

In addition, the General Requirements for all ladders mandate the following:

General Requirements 29 CFR 1910.23(b)(5) – (10)
Wooden ladders must not be coated with any material that may obscure structural defects.
Metal ladders must be made with corrosion-resistant material or protected against corrosion.
Ladder surfaces must be free of puncture and laceration hazards.
Ladders must only be used for the purpose for which they were designed.
Ladders must be inspected before initial use in each work shift, and more frequently as necessary, to identify any visible defects that could cause employee injury.
Any ladder with structural or other defects must be immediately tagged "Dangerous: Do Not Use," or with similar language in accordance with 29 CFR 1910.145, and removed from service until repaired in accordance with 29 CFR 1910.22(d) or replaced.

Portable Ladders

OSHA defines a portable ladder as one that can readily be moved or carried, usually consisting of side rails joined at intervals by steps, rungs, or cleats.(29 CFR 1910.21(b)). They can be self-supporting or lean against a supporting structure (non-self-supporting).

Employers must ensure that:

Portable Ladders 29 CFR 1910.23(c)(1) – (13)
Rungs and steps of portable metal ladders are corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize the possibility of slipping
Each stepladder or combination ladder used in a stepladder mode is equipped with a metal spreader or locking device that securely locks ladder in open position.
Ladders are not loaded beyond maximum intended load.
Ladders are used only on stable and level surfaces unless they are secured or stabilized to prevent accidental displacement.
No single rail ladders are used.
Ladders are secured to prevent accidental displacement or guarded by a temporary barricade when used in passageways, doorways, or driveways.
Ladders are secured and stabilized if used on slippery surfaces.
Ladders are not moved, shifted, or extended while being used.

Fixed Ladders 29 CFR 1910.23(d)(1) -13(ii)
Ladders can support their maximum intended load.
The minimum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object behind the ladder is seven inches, except for elevator pit ladders, which have a minimum perpendicular distance of four and one-half inches..
Grab bars do not protrude on the climbing side beyond the rungs of the ladder that they serve.
The side rails of through or sidestep ladders extend 42 inches above the top of the access level or landing platform served by the ladder. For parapet ladders, the access level is the roof, if the parapet is cut to permit passage through the parapet; or the top of the parapet, if the parapet is continuous.
For through ladders, the steps or rungs are omitted from the extensions, and the side rails are flared to provide not less than 24 inches and not more than 30 inches of clearance (when a ladder safety system is provided, the maximum

Fixed Ladders

OSHA defines a fixed ladder as a ladder with rails or individual rungs that is permanently attached to a structure, building or equipment (29 CFR 1910.21(b)). These do not include ship stairs, step bolts, or manhole steps.

OSHA gets more granular with design requirements for specific types of fixed ladders above and beyond what's specified under the General Requirements. Employers must ensure that:

Fixed Ladders 29 CFR 1910.23(d)(1) -13(ii)
Ladders can support their maximum intended load.
The minimum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object behind the ladder is seven inches, except for elevator pit ladders, which have a minimum perpendicular distance of four and one-half inches..
Grab bars do not protrude on the climbing side beyond the rungs of the ladder that they serve.
The side rails of through or sidestep ladders extend 42 inches above the top of the access level or landing platform served by the ladder. For parapet ladders, the access level is the roof, if the parapet is cut to permit passage through the parapet; or the top of the parapet, if the parapet is continuous.
For through ladders, the steps or rungs are omitted from the extensions, and the side rails are flared to provide not less than 24 inches and not more than 30 inches of clearance (when a ladder safety system is provided, the maximum

clearance between side rails of the extension must not exceed 36 inches).
For side-step ladders, the side rails, rungs, and steps are continuous in the extension.
Grab bars extend 42 inches above the access level or landing platforms served by the ladder.
The minimum cross-section size of grab bars is the same size as the rungs of the ladder.
When a fixed ladder terminates at a hatch, the hatch cover opens with enough clearance to provide easy access to or from the ladder and opens at least 70° from horizontal if the hatch is counterbalanced..
Individual-rung ladders are constructed to prevent the employee's feet from sliding off the ends of the rungs.
Ladders having a pitch greater than 90° from the horizontal are not used.
The step-across distance from the centerline of the rungs or steps for through ladders, is not less than seven inches and not more than 12 inches to the nearest edge of the structure, building, or equipment accessed from the ladders.

The step-across distance from the centerline of the rungs or steps for side-step ladders is not less than 15 inches and not more than 20 inches to the access points of the platform edge.
Ladders that do not have cages or wells have a clear width of at least 15 inches on each side of the ladder centerline to the nearest permanent object and a minimum perpendicular distance of 30 inches from the centerline of the steps or rungs to the nearest object on the climbing side (when unavoidable obstructions are encountered, the minimum clearance at the obstruction may be reduced to 24 inches provided deflector plates are installed).

OSHA’s updated walking-working surfaces rule also addresses fixed ladders under 29 CFR 1910.28(b)(9), Duty to Have Fall Protection and Falling Object Protection. The rule phases in, over 20 years, a requirement to equip fixed ladders (that extend over 24 feet above a lower level) with ladder safety or personal fall arrest systems, and it prohibits the use of cages and wells as a means of fall protection after the phase-in deadlines. The rule grandfathers in cages and wells on existing ladders but requires that employers equip new ladders and replacement ladders/ladder sections with ladder safety or personal fall arrest systems during the phase-in period. Shown below are the established phase-in dates:

Fixed Ladders (Extending More Than 24 Feet Above a Lower Level) 29 CFR 1910.28(b)(9)(A-D)	
After January 17, 2018	Any section/portion of an existing fixed ladder that is replaced must be equipped with a ladder safety or personal fall arrest system - may also install new cages/wells along with the ladder safety or personal fall arrest system if there is no interference.
Erected before November 19, 2018	Employers have up to 20 years to install ladder safety or personal fall arrest systems.
Erected on/or after November 19, 2018	Employers must equip the ladder with a ladder safety or personal fall arrest system.
After November 18, 2036	All fixed ladders must be equipped with a ladder safety or personal fall arrest system.

Mobile Ladder Stands and Mobile Ladder Stand Platforms

OSHA defines a mobile ladder stand as a mobile, fixed-height, self-supporting ladder that usually consists of wheels or casters on a rigid base and steps leading to a top step (29 CFR 1910.21(b)). A mobile ladder stand may also have handrails and is designed for use by one employee at a time. OSHA defines a mobile ladder stand platform as a mobile, fixed-height, self-supporting unit having one or more standing platforms that are provided with means of access or egress. Employers must ensure that:

Mobile Ladder Stands and Platforms 29 CFR 1910.23(e)(1) - 3)(iv)
Have a step width of at least 16 inches.
Have slip resistant steps and platforms.
Can support at least four times their maximum intended load.
Wheels or casters under load can support their proportional share of four times the maximum intended load, plus their proportional share of the unit's weight.
With a top step height of four feet or above have handrails with a vertical height of 29.5 to 37 inches, measured from the front edge of a step - removable gates or non-rigid members, such as chains, may be used instead of handrails in special-use applications.
Maximum work-surface height does not exceed four times the shortest base dimension, without additional support - stabilizing outriggers, counterweights, or comparable means to prevent overturning must be used for greater heights.

Have wheels or casters equipped with a system to impede horizontal movement when an employee is on it.
Does not move when an employee is on it.
Stand and platform steps are uniformly spaced and arranged, with a rise of not more than 10 inches and a depth of not less than seven inches, and the slope of the step stringer is less than 60 degrees, measured from the horizontal.
When the step spacing and arrangement is not feasible for platforms, units must be stabilized (to prevent overturning) with steeper slopes or vertical rung ladders are used.
Stands with a top step height above 10 feet, have the top step protected on three sides by a handrail with a vertical height of at least 36 inches and top steps that are 20 inches or more, front to back, have a midrail and toeboard. Removable gates or non-rigid members, such as chains, may be used instead of handrails in special-use applications..
Stands standing area is within the base frame.
Platforms with a platform height of four to 10 feet have, in the platform area, handrails with a vertical height of at least 36 inches and midrails – removable gates or non-rigid

members, such as chains, may be used instead of handrails in special-use applications.
Platforms with a platform height above 10 feet have guardrails and toeboards on the exposed sides and ends of the platform - removable gates or non-rigid members, such as chains, may be used instead of guardrails in special-use applications.
Removable gates or non-rigid members, such as chains, may be used on mobile ladder stand platforms instead of handrails and guardrails in special-use applications.

ANSI-ASC Ladder Standards

ANSI – ASC consensus standards for ladders detail the materials, safe construction, design, testing, care and use, and labeling/marking for various types and styles of ladders, and include:

- ANSI-ASC A14.1-2017 – American National Standard for Ladders – Wood Safety Requirements
- ANSI-ASC A14.2-2017 American National Standard for Ladders – Portable Metal – Safety Requirements
- ANSI-ASC A14.3-2018 American National Standard for Ladders – Fixed – Safety Requirements
- ANSI-ASC A14.4-2018 American National Standard for Ladders Safety Requirements for Job-Made Wooden Ladders
- ANSI-ASC A14.5-2017 American National Standard for Ladders – Portable Reinforced Plastic – Safety Requirements
- ANSI-ASC A14.7-2011 American National Standard for Mobile Ladder Stands and Mobile Ladder Stand Platforms
- ANSI-ASC A14.8-2020 American National Standard Safety Requirements for Ladder Accessories
- ANSI-ASC A14.9-2019 American National Standard Safety Requirements for Disappearing Attic Stairways ANSI-ASC A14.11-2018 American National Standard Safety Requirements for Stepstools

Portable Ladder Styles and Types

Portable ladder styles include stepstools, stepladders, extension ladders, trestle ladders, combination ladders which may also be used separately as single ladders, mobile ladder stand ladders, and mobile ladder stand platform ladders,.

The duty rating of a ladder is an indication of the maximum weight capacity the ladder can safely carry. There is no relationship between ladder length and weight capacity. There are five categories of ladder duty ratings:

Duty Rating	Ladder Type	Working Load (Pounds)
Special Duty	IAA	375
Extra Heavy Duty	IA	300
Heavy Duty	I	250
Medium Duty	II	225
Light Duty	III	200

Portable Ladder Material Guidelines

The environment the finished ladder will encounter (electrical hazards, temperature extremes, corrosion, outdoor weathering, etc.) should determine the material.

ANSI-ASC recommends various species of wood that are suitable for ladders. Physical characteristics such as grain, knot, pitch, and compression must be controlled when constructing wood ladders.

Specific design and construction requirements for metal ladders are minimized because of the wide variety of materials and design possibilities. However, the designs must produce ladders of enough strength and stiffness to meet the performance requirements and must not have any structural defects or hazards such as sharp edges, burrs, etc.

Reinforced plastic ladders must use fully cured, commercial-grade, thermosetting polyester resin with glass-fiber reinforcement.

Test Requirements for Portable Ladders

Test requirements for the ladder materials vary. However, ladders generally are evaluated on their resistance to bending, strength in various positions, and the quality of the individual components that make up the ladder.

Portable Ladders Usage Guidelines

Usage guidelines for portable ladders encompass selecting the proper ladder for the job being performed; inspecting before use to verify proper operation and cleanliness; evaluating ladder placement so that footing and top supports are secure and not creating a traffic hazard for pedestrians; utilizing proper climbing technique; and caring for and storing ladders properly.

Before working with a ladder, read the manufacturer’s instructions. Do not use a ladder if sleepy or ill, if you are taking medication, or if there’s bad weather. Do not use ladders in doorways or other high-traffic areas. If a ladder must be used near a door, make sure the door is locked and it is marked with warning signs and/or cones. If the door must be open or the ladder is in a raised position, ask a coworker to stay with the ladder to make sure an incident does not occur. Use fiberglass or wood ladders, rather than metal, near power lines or other sources of electricity to avoid electrical shock hazards. Inspect your ladder for damage before using. During your inspection, if you find it is damaged remove the defective ladder from service

and identify it with a “Do Not Use” tag.

Choose the right portable ladder for the job. When deciding which ladder to use – four key choices must be made:

- Choose the material – wood, metal (aluminum) or fiberglass – the environment of the work site dictates the material
- Choose the kind – several kinds for a variety of uses
- Select the proper length – it is unsafe to use a ladder that is too long or too short
- Consider the duty rating – indication of the maximum weight capacity the ladder can support

The Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health (NIOSH) has developed a Ladder Safety App_for mobile devices that features a multimodal indicator and a graphic-oriented guide for ladder selection, inspection, positioning, accessorizing and safe use. The app is available in English and Spanish and can be downloaded for both iOS and Android users.

Marking Requirements

Ladders must be marked with ladder size, type and/or duty rating, maximum working length (if extension ladder), highest standing level, total length of sections (if extension ladder), model number or name, manufacturer’s or distributor’s name, manufacturer’s plant location (if multiple plants may be coded), month and year of manufacture, and ANSI compliance and warranty (if applicable). Usage guidelines and other warning statements must also be placed on the ladders in specific locations depending on ladder type.

Sources
29 CFR 1910.21 Scope and definitions
29 CFR 1910.22 General requirements
29 CFR 1910.23, Ladders
29 CFR 1910.28, Duty to have fall protection and falling object protection
29 CFR 1910.29 Fall protection systems and falling object protection-criteria and practices
29 CFR 1910.145 Specifications for accident prevention signs and tags
ANSI-ASC A14.1-2017 – American National Standard for Ladders – Wood Safety Requirements
ANSI-ASC A14.2-2017 American National Standard for Ladders – Portable Metal – Safety Requirements
ANSI-ASC A14.3-2018 American National Standard for Ladders – Fixed – Safety Requirements
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ANSI-ASC A14.9-2019 American National Standard Safety Requirements for Disappearing Attic Stairways ANSI-ASC A14.11-2018 American National Standard Safety Requirements for Stepstools
Centers for Disease Control and Prevention / NIOSH Ladder Safety

Commonly Asked Questions

Question: How should I handle objects safely while on a ladder?

Answer: According to the U.S. Bureau of Labor Statistics, 50% of all ladder related

accidents were due to individuals carrying items as they climbed. Keeping tools in a tool belt will keep them handy and free up your hands for climbing. The use of accessories such as tool lanyards to keep tools tethered to the worker can prevent them from falling while working on a ladder. Any heavy or bulky items should be brought up only after you have reached the top. Signs or barricades can be used to warn others that work is proceeding above them, and that they should be aware of possible falling objects.

Source: Grainger Know How – https://www.grainger.com/know-how