

What is a Ladder?



According to the American Ladder Institute, there are officially nine different types of ladders.

The following ladders are commonly used:

- **step ladder.** The step ladder is a self-supporting ladder that is not adjustable in length, with a hinged design for ease of storage;
- **extension ladder.** The extension ladder is a non-self-supporting ladder that is adjustable in length. It consists of two or more sections that travel in guides or brackets arranged so as to permit length adjustment; and
- **articulated ladder.** An articulated ladder has one or more pairs of locking articulated joints, which allow the ladder to be set up in several different configurations. It may be used as a step ladder or a single ladder.



Ladder Injury Statistics

Statistics Concerning Ladder Dangers

- According to the World Health Organization, the United States leads the world in ladder deaths.
- Each year, there are more than 164,000 emergency room-treated injuries and 300 deaths in the U.S. that are caused by falls from ladders.
- Additionally, about 50 construction workers are killed by falls from ladders every year.
- Falls from ladders are the leading cause of deaths on construction sites.
- Many workers sustain back injuries from carrying ladders improperly.
- Around twice as many falls occur while going down ladders.

- The main cause of falls from straight and extension ladders is sliding of the ladder base, where the ladder base slips out and moves away from the structure.
- For self-supported ladders or step ladders, the main cause of falls is tipping sideways.
- Most ladder deaths occur from falls of 10 feet or less.

Protecting Yourself

Always remember to protect yourself. Your life and safety are the most important things in your work.

Follow these basic guidelines when evaluating, purchasing, setting up and using ladders:

- Choose the right equipment. Properly rated ladders are an important start.
- Ladders should be checked to ensure that they are in good condition prior to every use.
- Choose ladders that are the right height for the job you are performing. Ladders that are too long or too short can be hazardous.
- A sticker on a commercial ladder tells you its maximum weight capacity. Use only Type I, IA or IAA ladders, which can support 250, 300 and 375 pounds, respectively.
- Ladder rungs, cleats and steps must be parallel, level and evenly spaced (10 to 14 inches for most ladders).
- The rungs and steps of metal ladders must be grooved or roughened to minimize slipping.
- Never tie ladders together.
- If you use two or more ladders to reach one spot, they should have a platform or landing between them.
- Ladders must not be painted with a coating that can hide defects.



Safety Tips

Proper use of ladders is essential in preventing accidents. Even a good ladder can be a serious safety hazard when used by workers in a dangerous manner.

Never:

- leave a raised ladder unattended. Ladders that are not in use should be laid on the ground or put away. A client may be tempted to climb the contractor's raised ladder if it is left unattended, which is never a good idea. Similarly, the contractor should never use the client's ladder;
- place a ladder in front of a door that is not locked, blocked or guarded;
- use a ladder for any purpose other than the one for which it was designed;
- tie or fasten ladders together to provide longer sections, unless they are specifically designed for that purpose;
- use a ladder in windy conditions;

- exceed the maximum load rating. The maximum load rating, which should be found on a highly visible label on the ladder, is the maximum intended load that the ladder is designed to carry. Duty ratings are Type III, II, I, IA and 1B, which correspond to maximum load capacities of 220, 225, 250, 300 and 350 pounds, respectively. You should know the duty rating of the ladder you are using, as well as the combined weight of yourself and your tools;
- use a step ladder in the closed position;
- sit on any rung, including the top;
- climb past the fourth rung from the top on leaning ladders, or the second rung from the top on step ladders; and
- pull, lean, stretch, or make any sudden moves. Over-reaching is the most common and dangerous form of ladder misuse.

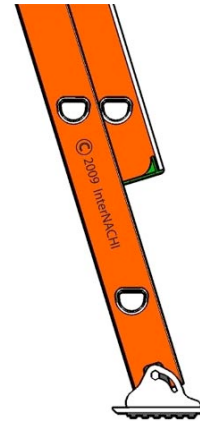
Tie-offs:

Professionals using ladders to inspect the exterior of a home should bring with them ladder tie-offs, which are straps that attach their ladders to the roof or other parts of a structure. This tie-off will help prevent the ladder from being blown away by a strong wind. Also, it will secure the ladder from potentially slipping away from the building beneath the weight of the climber.

As a further precaution, contractors may need to attach themselves to the roof using a personal tie-off.

A few notes about this procedure:

- Some roofs do not allow for the implementation of such a safety measure. The roof must have a protruding, sturdy and accessible place as a connection point.
- The strap used for the personal tie-off must have as little slack as possible. Rolling down 15 feet of steep roof and then plunging another 10 feet before being halted in mid-air is still going to hurt. Plus, the dangling contractor will need to somehow climb back up.
- You must attach the strap to a harness designed for the purpose, rather than use a toolbelt or limb.



OSHA standards require the following safety precautions for ladder use:

- Ladders shall be placed with secure footing on a level surface when possible, or they shall be tied off at the top, middle and bottom to prevent slipping.
- Ladders used to gain access to the roof or other area shall extend at least 3 feet above the roof. This provides a point of support when stepping onto the roof.
- The base of the ladder should be placed so that it is 1 foot away from the building for every 4 feet of



height to where the ladder rests against the building. This is known as the "4-to-1 Rule."

- The foot of a ladder shall have a horizontal distance from the top support to the foot of the ladder of one-quarter of the working length of the ladder. To accurately determine this distance, divide the length of the building from the ground to the top support by 4.
- If the top of the ladder is at 16 feet, and the ladder extends to 20 feet, the base should be 4 feet from the building.

Ladder Sizing and Ratings

Use a ladder of proper length to reach the working height required. Use a ladder according to use and working load, which is the combined weight of the climber and the load being carried.

TYPE	DUTY RATING	WORKING LOAD
IA	Industrial	Extra-heavy: 300 lbs. maximum
I	Industrial	Heavy: 250 lbs. maximum
II	Commercial	Medium: 225 lbs. maximum
III	Household	Light: 200 lbs. maximum

Overall Length	Maximum Working Height
16-foot ladder	13 feet
24-foot ladder	21 feet
28-foot ladder	24 feet
32-foot ladder	29 feet
36-foot ladder	32 feet

Inspecting a Ladder

Ladders should be inspected before each use. Your safety depends on it.

Ladder Inspected	_____
	(Date)
Next Inspection	_____
	(Date)
Ladder Inspected By	_____
	(Name)



If you work at a multi-contractor firm, it is advisable to have routine ladder evaluations performed by one person who is knowledgeable and competent. Maintain records of such inspections.

The worker should check the ladder for damage before each use. If a ladder is damaged, label it. Do not use it until it has been repaired or replaced.

OSHA says that a ladder must be inspected regularly by a competent person for visible defects and after any incident that could affect its safe use.



For portable ladders, here are some guidelines:

- All ladders shall be inspected at least twice yearly, and prior to each use.
- If a ladder tips over, inspect it immediately for side-rail dents or bends, or excessively dented rungs; check all rung-to-side-rail connections; check hardware connections; check rivets for shear.
- Metal ladders should be inspected for dents that would compromise the structural integrity of the ladder.
- All ropes and pulleys shall be in good condition and absent of wear, burrs, splinters and fraying.
- Joints between the rungs and the side-rails should be tight. Rungs should not move when twisted by hand.
- All hardware and fittings should be securely attached.
- All moveable parts should operate freely without binding or undue play. Lubricate, if necessary.
- Safety feet at the base should be sound and unbroken.
- Rungs/steps should be free of grease, oil and any other substance that would make them slippery. Under no circumstances should corrosive or alkali materials be used to remove grease or oil, as these may compromise the structural integrity of the ladder. Rungs/steps on metal ladders must be corrugated, knurled or coated with a slip-resistant material.
- No rungs/steps may be missing.
- No ladder should be painted or coated with any material that may cover up obvious defects.

Before mounting a ladder, always check the following:

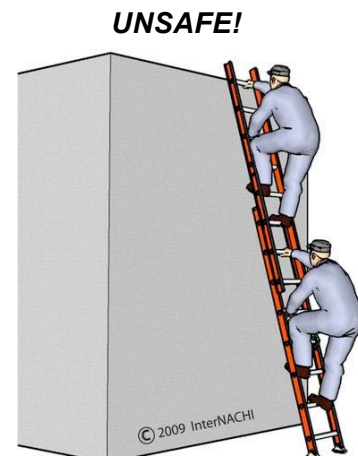
- that the ladder is free of oil, grease, wet paint, and other slipping hazards;
- that the feet work properly and have slip-resistant pads. These pads become worn over time and may need to be replaced. On extension ladders, the rubber pads can be turned around to reveal metal spurs, which can be used to secure the ladder in soft surfaces, such as grass or dirt;
- check that rung locks and spreader braces are working;
- all bolts and rivets are secure;
- check that the ground under the ladder is level and firm. Large, flat, wooden boards braced under the ladder can level a ladder on uneven or soft ground. Also, some companies make leveling devices so that ladders can be used on uneven and hilly terrain;
- check that ladder rungs, cleats, or steps are parallel, level, and uniformly spaced when the ladder is in position for use;
- check that the ladder is anchored. The base can be tied to a nearby sturdy object, such as a pole or a building. If no anchor is available, a stake can be driven into the ground. Workers should beware not to anchor their ladders to something that can impale them if they were to fall on it, such as a grounding rod. A 10-inch nail, hammered so as to leave only 1 or 2 inches exposed, is usually safe and effective;
- check that the area around the ladder is roped off or barricaded. Some inspectors will use a stop sign that can be placed on the ladder to warn others to stay clear;
- check the location of nearby power lines. If setting up a ladder near them or other types of electrical equipment is unavoidable, use a wooden or fiberglass ladder. Do not let a ladder made from any material contact live electrical wires;
- check that the ladder is the proper length for the job. Ladders should extend a minimum of 3 feet over the roofline or working surface; and
- be sure that someone knows where you are. Accidents can and do happen in remote areas where cell phones are ineffective and no one is home. If you are injured under these conditions, no one will know you are hurt and need help.



Setting Up and Using a Ladder

Here are some basic rules regarding ladder placement:

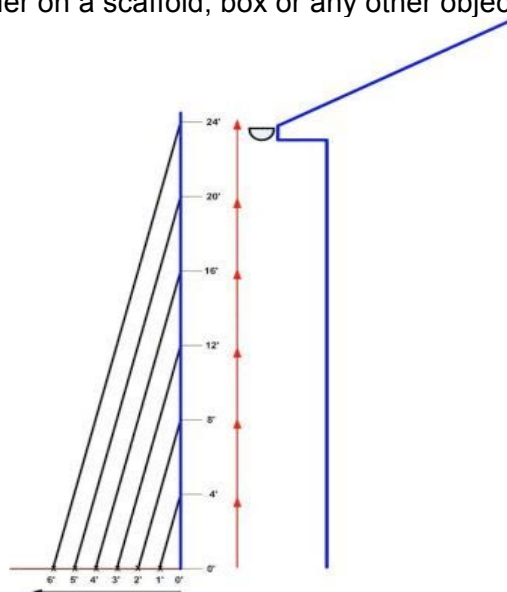
- Make sure the ladder is dry before using it.
- Place the ladder on level ground and open it completely, making sure all locks are engaged.
- Remember to use the 4-to-1 Rule for extension ladders. That is, for each 4 feet of distance between the ground and the upper point of contact (such as the wall or roof), move the base of the ladder out 1 foot. Counting rungs will give you a good estimate of the ladder's length; rungs are approximately 1 foot apart.
- Always face the ladder when climbing, and wear slip-resistant shoes, such as those with rubber soles.



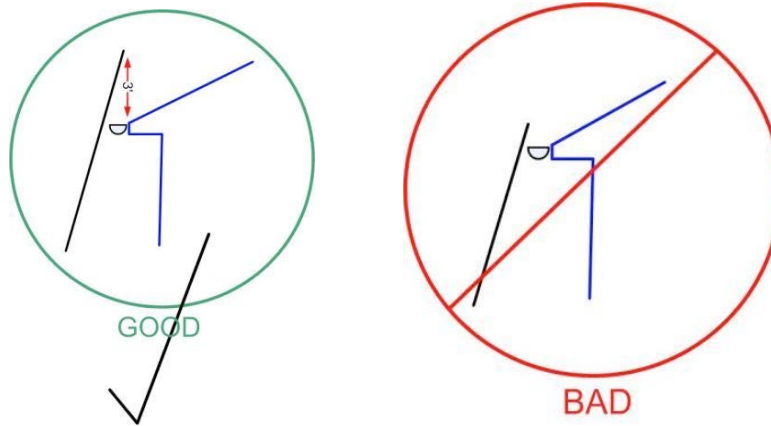
- Keep your body centered on the ladder, and gauge your safety by your belt buckle, if you wear one. If your buckle passes beyond either ladder rail, you are over-reaching and at risk for falling.
- Stand at or below the highest safe rung on a ladder. For a step ladder, the safest rung to stand on is the second from the top. For an extension ladder, it's the fourth rung from the top.

Remember these guidelines for safe ladder set-up and use:

- Whenever possible, it's best to use two people to carry and set up a ladder. Since many inspection jobs are one-person operations, this may not be practical. Then it becomes especially important to ensure that the ladder chosen for use is not too heavy or difficult to move, that it's properly rated, in good condition, and is easy to set up.
- Keep all types of ladders (and tools) at least 10 feet away from live power lines, connections, cables and equipment.
- Set the ladder on firm, level ground. Use ladder levelers on uneven ground.
- When setting it up, be sure to secure the ladder by tying it down, using slip-resistant feet, and/or by having someone hold it in place for you.
- Keep the area around the top and bottom of a ladder clear.
- Do not set a ladder on a scaffold, box or any other object.



- When a ladder is used to get on and off a roof, be sure to secure the ladder by tying it off. The side-rails should extend at least 3 feet above the roof to be safe.



- If you have to step around a ladder because of rungs, there should be a grab-rail attached to the building to help you. (OSHA requires both the grab-rail and tie-off if a ladder doesn't extend at least 3 feet above the roof.)

While on the ladder, always:

- face the ladder;
- anchor the top of the ladder with a bungee cord. Perhaps the most feared move an inspector must make is stepping back onto the ladder from the roof. They must step around the section of the ladder that extends above the roofline, placing lateral pressure on the rung as they make contact with the ladder. A bungee cord is a convenient tool that can be used to reduce any movement that could otherwise result in a serious accident. Also, a bungee cord may prevent the ladder from being blown over in the wind while the inspector is on the roof;
- be conscious of the ladder's location, especially while walking on the roof. In an emergency, the inspector may need to leave the roof quickly. Ladders become much more dangerous when an inspector becomes covered in a swarm of stinging bees and must get down in a hurry, for instance;
- keep your body centered between the rails at all times. Do not lean too far to the side while working; and
- utilize three points of contact because this minimizes the chances of slipping and falling. At all times during ascent and descent, the climber must face the ladder and have two hands and one foot, or two feet and one hand, in contact with the ladder cleats and/or side rails. In this way, the climber is unlikely to become unstable if one limb slips during the climb. It is important to note that the climber must not carry any objects in either hand that can interfere with his firm grip on the ladder.



Ladders and Electricity

Sometimes, people fail to recognize inherent hazards outdoors, such as getting too close to or coming into actual contact with electrical power lines.

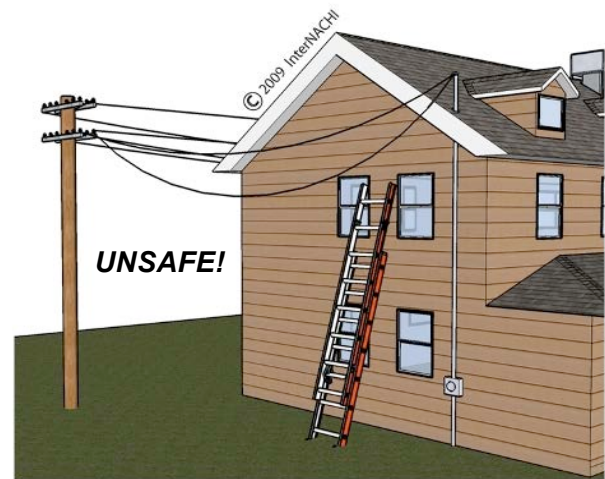
We use ladders at buildings so regularly that we often overlook basic safety procedures. We become so comfortable with what we are doing that we often work in an unsafe manner, never thinking of the consequences.

Here are some simple rules to remember when working in proximity to electrical lines:

- Keep all ladders and other tools in a "safe zone," at least 10 feet away from any power lines.
- Never use metallic ladders around power lines.
- Never count on a power line to be insulated, no matter what it looks like. Some utility power lines may be partially damaged or not completely insulated.
- Don't count on a wooden or fiberglass ladder to protect you from electrical shock. Wet and even dirty ladders can conduct electricity.
- Before you move a ladder, check the area carefully for power lines or other electrical equipment. Pick a safe route to carry the ladder to the work area, and then carry it horizontally--never upright. Put it up only where you have to work. Always make sure that if the ladder were to fall, it would not come into contact with any power lines or other electrical equipment.
- When you're on a ladder, your balance and control may be compromised for various reasons. Be careful with every movement you make. Remember that distances can be deceiving from the top of a ladder.

Review these tips for safe ladder use:

- Always check the ladder for moisture and damage before using it.
- Always face the ladder when climbing it.
- Wear shoes with slip-resistant soles.
- Always have a 3-point contact, such as one hand and two feet.
- Keep your body centered between the side-rails of the ladder so you don't tip over.
- Never work from the top step of a step ladder, or from any of the top three steps of a straight or extension ladder.
- If you must work from an extension ladder, consider using a fall-protection system attached to a secure anchor point on the building, especially if pushing, pulling or prying. Remember to keep both feet on the same rung.
- Do not hold objects in your hand when moving up or down or stepping on or off a ladder to an upper level. Attach objects to your tool belt, or pull them up on a line after you get to your work spot. Since most inspectors rely on tools, such as a camera, screwdriver, awl, moisture probe, etc., it is important to remember to keep both hands free while climbing a ladder.
- Do not use a ladder outdoors when it is windy.
- Ensure that the base of the ladder is on a firm and level surface.
- Lower the top section of an extension ladder before you move it.

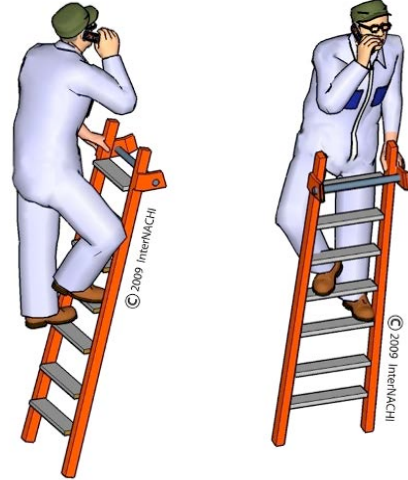


- One of the more obvious hazards is setting up a ladder too close to power lines. Before using a ladder outdoors, choose a location that is well away from all power lines, including service heads, aerial cables and drop wires. No metal ladders should be used around live electrical cables.

UNSAFE!

More Do's and Don'ts When Using a Ladder

- The soles of your shoes should be clean so they don't slip off the ladder rungs. Make sure that shoelaces are tied. Ensure that pant legs are not so long that they extend under your heels, potentially causing you to slip.
- Grip both rails securely while climbing.
- Don't over-reach; it's safer to move the ladder to a new location when needed. Climb down and re-position the ladder.
- Don't overload a ladder; it is meant to be used by only one person at a time.
- Do not use any ladder if you tire easily, are subject to fainting spells, or are using medication that makes you dizzy or drowsy. Of course, never use alcohol if you're going to use a ladder.



Ladder Inspections

Remember that OSHA says a ladder must be inspected regularly for visible defects by a competent person, as well as after any incident that could affect its safe use. If you're the only person at the job site, you should inspect the ladder before using it. In the case of multi-contractor firms, it is advisable to have routine ladder evaluations performed by one who is knowledgeable and competent. The worker should check the ladder for damage before each use. If the ladder is damaged, label it as such. Do not use it until it has been repaired or replaced.

For a trained professional, ladder safety should become routine and a standard practice.



UNSAFE!