

OSHA Regulations for Scaffolding—www.osha.gov (29 CFR PART 1910) 1910.28 Safety Requirements for Scaffolding – Walking/working surfaces

1910.28(a)

“General requirements for all scaffolds.”

1910.28(a)(4)

Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended load.

1910.28(a)(5)

Scaffolds and other devices mentioned or described in this section shall be maintained in safe condition. Scaffolds shall not be altered or moved horizontally while they are in use or occupied.

1910.28(a)(6)

Any scaffold damaged or weakened from any cause shall be immediately repaired and shall not be used until repairs have been completed.

1910.28(a)(7)

Scaffolds shall not be loaded in excess of the working load for which they are intended.

1910.28(a)(17)

Scaffolds shall be provided with a screen between the toeboard and the guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard Wire one-half-inch mesh or the equivalent, where persons are required to work or pass under the scaffolds.

1910.28(a)(18)

Employees shall not work on scaffolds during storms or high winds.

1910.28(a)(20)

Tools, materials, and debris shall not be allowed to accumulate in quantities to cause a hazard.

1910.28(a)(21)

Only treated or protected fiber rope shall be used for or near any work involving the use of corrosive substances or chemicals.

Wire or fiber rope used for scaffold suspension shall be capable of supporting at least six times the intended load.

1910.28(a)(23)

When acid solutions are used for cleaning buildings over 50 feet in height, wire rope supported scaffolds shall be used.

1910.28(a)(27)

Special precautions shall be taken to protect scaffold members, including any wire or fiber ropes, when using a heat-producing process.

1910.28(g)

“Two-point suspension scaffolds (swinging scaffolds).”

1910.28(g)(1)

Two-point suspension scaffold platforms shall be not less than 20 inches no more than 36 inches wide overall. The platform shall be securely fastened to the hangers by U-bolts or by other equivalent means.

1910.28(g)(2)

The hangers of two-point suspension scaffolds shall be made of wrought iron, mild steel, or other equivalent material having a cross-sectional area capable of sustaining four times the maximum intended load, and shall be designed with a support for guardrail, intermediate rail, and toeboard.

1910.28(g)(3)

When hoisting machines are used on two-point suspension scaffolds, such machines shall be of a design tested and approved by a nationally recognized testing laboratory. Refer to 1910.7 for definition of nationally recognized testing laboratory.

1910.28(g)(4)

The roof irons or hooks shall be of wrought iron, mild steel, or other equivalent material of proper size and design, securely installed and anchored. Tie-backs of three-fourth inch manila rope or the equivalent shall serve as a secondary means of anchorage, installed at right angles to the face of the building whenever possible and secured to a structurally sound portion of the building.

1910.28(g)(5)

Guardrails not less than 2 x 4 inches or the equivalent and not less than 36 inches or more than 42 inches high, with a mid-rail, when required, of 1- x 4-inch lumber or equivalent, and toeboards, shall be installed at all open sides on all scaffolds more than 10 feet above the ground or floor. Toeboards shall be a minimum of 4 inches in height. Wire mesh shall be installed in accordance with paragraph (a)(17) of this section.

1910.28(g)(6)

Two-point suspension scaffolds shall be suspended by wire or fiber ropes. Wire and fiber ropes shall conform to paragraph (a)(22) of this section.

1910.28(g)(7)

The blocks for fiber ropes shall be of standard 6-inch size, consisting of at least one double and one single block. The sheaves of all blocks shall fit the size of rope used.

1910.28(g)(8)

All wire ropes, fiber ropes, slings, hangers, platforms, and other supporting parts shall be inspected before every installation. Periodic inspections shall be made while the scaffold is in use.

1910.28(g)(9)

On suspension scaffolds designed for a working load of 500 pounds no more than two men shall be permitted to work at one time. On suspension scaffolds with a working load of 750 pounds, no more than three men shall be permitted to work at one time. Each workman shall be protected by a safety lifebelt attached to a lifeline. The lifeline shall be securely attached to substantial members of the structure (not scaffold), or to securely rigged lines, which will safely suspend the workman in case of a fall.

1910.28(g)(10)

Where acid solutions are used, fiber ropes are not permitted unless acid-proof.

1910.28(g)(11)

Two-point suspension scaffolds shall be securely lashed to the building or structure to prevent them from swaying. Window cleaners' anchors shall not be used for this purpose.

1910.28(g)(12)

The platform of every two-point suspension scaffold shall be one of the following types:

1910.28(g)(12)(i)

The side stringer of ladder-type platforms shall be clear straight-grained spruce or materials of equivalent strength and durability. The rungs shall be of straight-grained oak, ash, or hickory, at least 1 1/8 inch in diameter, with seven-eighth inch tenons mortised into the side stringers at least seven-eighth inch. The stringers shall be tied together with the tie rods not less than one-quarter inch in diameter, passing through the stringers and riveted up tight against washers on both ends. The flooring strips shall be spaced not more than five-eighth inch apart except at the side rails where the space may be 1 inch. Ladder-type platforms shall be constructed in accordance with table D-17.

1910.28(g)(12)(ii)

Plank-type platforms shall be composed of not less than nominal 2 x 8-inch unspliced planks, properly cleated together on the underside starting 6 inches from each end; intervals in between shall not exceed 4 feet. The plank-type platform shall not extend beyond the hangers more than 18 inches. A bar or other effective means shall be securely fastened to the platform at each end to prevent its slipping off the hanger. The span between hangers for plank-type platforms shall not exceed 10 feet.

1910.28(g)(12)(iii)

Beam platforms shall have side stringers of lumber not less than 2 x 6 inches set on edge. The span between hangers shall not exceed 12 feet when beam platforms are used. The flooring shall be supported on 2- and 6-inch crossbeams, laid flat and set into the upper edge of the stringers with a snug fit, at intervals of not more than 4 feet, securely nailed in place. The flooring shall be of 1- x 6-inch material properly nailed. Floorboards shall not be spaced more than one-half inch apart.

TABLE D-17 - SCHEDULE FOR LADDER-TYPE PLATFORMS

	Length of platform (feet)		
	12	14 & 16	18 & 20
Side stringers, minimum cross section (finished sizes):			
At ends (in.).....	1 3/4 x 2 3/4	1 3/4 x 2 3/4	1 3/4 x 3
At middle (in.)....	1 3/4 x 3 3/4	1 3/4 x 3 3/4	1 1/4 x 4
Reinforcing strip (minimum) (1).....			
Rungs (2).....			
Tie rods:			
Number (minimum)...	3	4	4
Diameter (minimum)...	1/4 in	1/4 in	1/4 in
Flooring, minimum finished size (in.)..	1/2 x 2 3/4	1/2 x 2 3/4	1/2 x 2 3/4

TABLE D-17 - SCHEDULE FOR LADDER-TYPE PLATFORMS

[CONTINUED]

	Length of platform (feet)	
	22 & 24	28 & 30
Side stringers, minimum cross section (finished sizes):		
At ends (in.).....	1 3/4 x 3	1 3/4 x 3 1/2
At middle (in.)....	1 3/4 x 4 1/4	1 3/4 x 5
Reinforcing strip (minimum) (1).....		
Rungs (2).....		
Tie rods:		
Number (minimum)...	5	6
Diameter (minimum)...	1/4 in	1/4 in
Flooring, minimum finished size (in.)..	1/2 x 3/4	1/2 x 2 3/4

Footnote(1) A 1/8 x 7/8-in, steel reinforcing strip or its equivalent shall be attached to the side or underside full length.

Footnote(2) Rungs shall be 1 1/8-in. minimum, diameter with at least 7/8-in. diameter tenons, and the maximum spacing shall be 12 in. center to center.

1910.28(i)

“Single-point adjustable suspension scaffolds.”

1910.28(i)(1)

The scaffolding, including power units or manually operated winches, shall be a type tested and listed by a nationally recognized testing laboratory. Refer to 1910.399(a)(77) for definition of listed, and 1910.7 for nationally recognized testing laboratory.

1910.28(i)(2)

[Reserved]

1910.28(i)(3)

All power-operated gears and brakes shall be enclosed.

1910.28(i)(4)

In addition to the normal operating brake, all-power driven units must have an emergency brake which engages automatically when the normal speed of descent is exceeded.

1910.28(i)(5)

Guards, mid-rails, and toeboards shall completely enclose the cage or basket. Guardrails shall be no less than 2 by 4 inches or the equivalent installed no less than 36 inches nor more than 42 inches above the platform. Mid-rails shall be 1 by 6 inches or the equivalent; installed equidistant between the guardrail and the platform. Toeboards shall be a minimum of 4 inches in height.

1910.28(i)(6)

The hoisting machines, cables, and equipment shall be regularly serviced and inspected after each installation and every 30 days thereafter.

1910.28(i)(7)

The units may be combined to form a two-point suspension scaffold. Such scaffold shall comply with paragraph (g) of this section.

1910.28(i)(8)

The supporting cable shall be straight for its entire length, and the operator shall not sway the basket and fix the cable to any intermediate points to change his original path of travel.

1910.28(i)(9)

Equipment shall be maintained and used in accordance with the manufacturers' instructions.

1910.28(i)(10)

Suspension methods shall conform to applicable provisions of paragraphs (f) and (g) of this section.

1910.28(j)

"Boatswain's chairs."

1910.28(j)(1)

The chair seat shall be not less than 12 by 24 inches, and of 1-inch thickness. The seat shall be reinforced on the underside to prevent the board from splitting.

1910.28(j)(2)

The two fiber rope seat slings shall be of 5/8-inch diameter, reeved through the four seat holes so as to cross each other on the underside of the seat.

1910.28(j)(3)

Seat slings shall be of at least 3/8-inch wire rope when a workman is conducting a heat producing process such as gas or arc welding.

1910.28(j)(4)

The workman shall be protected by a safety life belt attached to a lifeline. The lifeline shall be securely attached to substantial members of the structure (not scaffold), or to securely rigged lines, which will safely suspend the worker in case of a fall.

1910.28(j)(5)

The tackle shall consist of correct size ball bearing or bushed blocks and properly spliced 5/8-inch diameter first-grade manila rope.

1910.28(j)(6)

The roof irons, hooks, or the object to which the tackle is anchored shall be securely installed. Tiebacks when used shall be installed at right angles to the face of the building and securely fastened to a chimney.

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(29 CFR PART 1926)

Subpart L – This subpart applies to all scaffolds used in workplaces covered by this part. It does not apply to crane or derrick suspended personnel platforms, which are covered by 1926.550(g). The criteria for aerial lifts are set out exclusively in 1926.453.

This section does not apply to aerial lifts, the criteria for which are set out exclusively in 1926.453.

1926.451(a)

“Capacity”

1926.451(a)(1)

Except as provided in paragraphs (a)(2), (a)(3), (a)(4), (a)(5) and (g) of this section, each scaffold and scaffold component shall be capable of supporting, without failure, its own weight and at least 4 times the maximum intended load applied or transmitted to it.

1926.451(a)(2)

Direct connections to roofs and floors, and counterweights used to balance adjustable suspension scaffolds, shall be capable of resisting at least 4 times the tipping moment imposed by the scaffold operating at the rated load of the hoist, or 1.5 (minimum) times the tipping moment imposed by the scaffold operating at the stall load of the hoist, whichever is greater.

1926.451(a)(3)

Each suspension rope, including connecting hardware, used on non-adjustable suspension scaffolds shall be capable of supporting, without failure, at least 6 times the maximum intended load applied or transmitted to that rope.

1926.451(a)(4)

Each suspension rope, including connecting hardware, used on adjustable suspension scaffolds shall be capable of supporting, without failure, at least 6 times the maximum intended load applied or transmitted to that rope with the scaffold operating at either the rated load of the hoist, or 2 (minimum) times the stall load of the hoist, whichever is greater.

1926.451(a)(5)

The stall load of any scaffold hoist shall not exceed 3 times its rated load.

1926.451(a)(6)

Scaffolds shall be designed by a qualified person and shall be constructed and loaded in accordance with that design. Non-mandatory Appendix A to this subpart contains examples of criteria that will enable an employer to comply with paragraph (a) of this section.

1926.451(d)

“Criteria for suspension scaffolds.”

1926.451(d)(1)

All suspension scaffold support devices, such as outrigger beams, cornice hooks, parapet clamps, and similar devices, shall rest on surfaces capable of supporting at least 4 times the load imposed on them by the scaffold operating at the rated load of the hoist (or at least 1.5 times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater).

1926.451(d)(2)

Suspension scaffold outrigger beams, when used, shall be made of structural metal or equivalent strength material, and shall be restrained to prevent movement.

1926.451(d)(3)

The inboard ends of suspension scaffold outrigger beams shall be stabilized by bolts or other direct connections to the floor or roof deck, or they shall have their inboard ends stabilized by counterweights, except masons’ multi-point adjustable suspension scaffold outrigger beams shall not be stabilized by counterweights.

1926.451(d)(3)(i)

Before the scaffold is used, direct connections shall be evaluated by a competent person who shall confirm, based on the evaluation, that the supporting surfaces are capable of supporting the loads to be imposed. In addition, masons’ multi-point adjustable suspension scaffold connections shall be designed by an engineer experienced in such scaffold design.

1926.451(d)(3)(ii)

Counterweights shall be made of non-flowable material. Sand, gravel and similar materials that can be easily dislocated shall not be used as counterweights.

1926.451(d)(3)(iii)

Only those items specifically designed as counterweights shall be used to counterweight scaffold systems. Construction materials such as, but not limited to, masonry units and rolls of roofing felt, shall not be used as counterweights.

1926.451(d)(3)(iv)

Counterweights shall be secured by mechanical means to the outrigger beams to prevent accidental displacement.

1926.451(d)(3)(v)

Counterweights shall not be removed from an outrigger beam until the scaffold is disassembled.

1926.451(d)(3)(vi)

Outrigger beams which are not stabilized by bolts or other direct connections to the floor or roof deck shall be secured by tiebacks.

1926.451(d)(3)(vii)

Tiebacks shall be equivalent in strength to the suspension ropes.

1926.451(d)(3)(viii)

Outrigger beams shall be placed perpendicular to its bearing support (usually the face of the building or structure). However, where the employer can demonstrate that it is not possible to place an outrigger beam perpendicular to the face of the building or structure because of obstructions that cannot be moved, the outrigger beam may be placed at some other angle, provided opposing angle tiebacks are used.

1926.451(d)(3)(ix)

Tiebacks shall be secured to a structurally sound anchorage on the building or structure. Sound anchorages include structural members, but do not include standpipes, vents, other piping systems, or electrical conduit.

1926.451(d)(3)(x)

Tiebacks shall be installed perpendicular to the face of the building or structure, or opposing angle tiebacks shall be installed. Single tiebacks installed at an angle are prohibited.

1926.451(d)(4)

Suspension scaffold outrigger beams shall be:

1926.451(d)(4)(i)

Provided with stop bolts or shackles at both ends;

1926.451(d)(4)(ii)

Securely fastened together with the flanges turned out when channel iron beams are used in place of I-beams;

1926.451(d)(4)(iii)

Installed with all bearing supports perpendicular to the beam center line;

1926.451(d)(4)(iv)

Set and maintained with the web in a vertical position; and

1926.451(d)(4)(v)

When an outrigger beam is used, the shackle or clevis with which the rope is attached to the outrigger beam shall be placed directly over the center line of the stirrup.

1926.451(d)(5)

Suspension scaffold support devices such as cornice hooks, roof hooks, roof irons, parapet clamps, or similar devices shall be:

1926.451(d)(5)(i)

Made of steel, wrought iron, or materials of equivalent strength;

1926.451(d)(5)(ii)

Supported by bearing blocks; and

1926.451(d)(5)(iii)

Secured against movement by tiebacks installed at right angles to the face of the building or structure, or opposing angle tiebacks shall be installed and secured to a structurally sound point of anchorage on the building or structure. Sound points of anchorage include structural members, but do not include standpipes, vents, other piping systems, or electrical conduit.

1926.451(d)(5)(iv)

Tiebacks shall be equivalent in strength to the hoisting rope.

1926.451(d)(6)

When winding drum hoists are used on a suspension scaffold, they shall contain not less than four wraps of the suspension rope at the lowest point of scaffold travel. When other types of hoists are used, the suspension ropes shall be long enough to allow the scaffold to be lowered to the level below without the rope end passing through the hoist, or the rope end shall be configured or provided with means to prevent the end from passing through the hoist.

1926.451(d)(7)

The use of repaired wire rope as suspension rope is prohibited.

1926.451(d)(8)

Wire suspension ropes shall not be joined together except through the use of eye splice thimbles connected with shackles or coverplates and bolts.

1926.451(d)(9)

The load end of wire suspension ropes shall be equipped with proper size thimbles and secured by eyesplicing or equivalent means.

1926.451(d)(10)

Ropes shall be inspected for defects by a competent person prior to each workshift and after every occurrence which could affect a rope's integrity. Ropes shall be replaced if any of the following conditions exist:

1926.451(d)(10)(i)

Any physical damage which impairs the function and strength of the rope.

1926.451(d)(10)(ii)

Kinks that might impair the tracking or wrapping of rope around the drum(s) or sheave(s).

1926.451(d)(10)(iii)

Six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay.

1926.451(d)(10)(iv)

Abrasion, corrosion, scrubbing, flattening or peening causing loss of more than one-third of the original diameter of the outside wires.

1926.451(d)(10)(v)

Heat damage caused by a torch or any damage caused by contact with electrical wires.

1926.451(d)(10)(vi)

Evidence that the secondary brake has been activated during an overspeed condition and has engaged the suspension rope.

1926.451(d)(11)

Swaged attachments or spliced eyes on wire suspension ropes shall not be used unless they are made by the wire rope manufacturer or a qualified person.

1926.451(d)(12)

When wire rope clips are used on suspension scaffolds:

1926.451(d)(12)(i)

There shall be a minimum of 3 wire rope clips installed, with the clips a minimum of 6 rope diameters apart;

1926.451(d)(12)(ii)

Clips shall be installed according to the manufacturer's recommendations;

1926.451(d)(12)(iii)

Clips shall be retightened to the manufacturer's recommendations after the initial loading;

1926.451(d)(12)(iv)

Clips shall be inspected and retightened to the manufacturer's recommendations at the start of each workshift thereafter;

1926.451(d)(12)(v)

U-bolt clips shall not be used at the point of suspension for any scaffold hoist;

1926.451(d)(12)(vi)

When U-bolt clips are used, the U-bolt shall be placed over the dead end of the rope, and the saddle shall be placed over the live end of the rope.

1926.451(d)(13)

Suspension scaffold power-operated hoists and manual hoists shall be tested by a qualified testing laboratory.

1926.451(d)(14)

Gasoline-powered equipment and hoists shall not be used on suspension scaffolds.

1926.451(d)(15)

Gears and brakes of power-operated hoists used on suspension scaffolds shall be enclosed.

1926.451(d)(16)

In addition to the normal operating brake, suspension scaffold power-operated hoists and manually operated hoists shall have a braking device or locking pawl which engages automatically when a hoist makes either of the following uncontrolled movements: an instantaneous change in momentum or an accelerated overspeed.

1926.451(d)(17)

Manually operated hoists shall require a positive crank force to descend.

1926.451(d)(18)

Two-point and multi-point suspension scaffolds shall be tied or otherwise secured to prevent them from swaying, as determined to be necessary based on an evaluation by a competent person. Window cleaners' anchors shall not be used for this purpose.

1926.451(d)(19)

Devices whose sole function is to provide emergency escape and rescue shall not be used as working platforms. This provision does not preclude the use of systems which are designed to function both as suspension scaffolds and emergency systems.

1926.451(f)

"Use."

1926.451(f)(1)

Scaffolds and scaffold components shall not be loaded in excess of their maximum intended loads or rated capacities, whichever is less.

1926.451(f)(2)

The use of shore or lean-to scaffolds is prohibited.

1926.451(f)(3)

Scaffolds and scaffold components shall be inspected for visible defects by a competent person before each work shift, and after any occurrence which could affect a scaffold's structural integrity.

1926.451(f)(4)

Any part of a scaffold damaged or weakened such that its strength is less than that required by paragraph (a) of this section shall be immediately repaired or replaced, braced to meet those provisions, or removed from service until repaired.

1926.451(f)(5)

Scaffolds shall not be moved horizontally while employees are on them, unless they have been designed by a registered professional engineer specifically for such movement or, for mobile scaffolds, where the provisions of 1926.452(w) are followed.

1926.451(f)(6)

The clearance between scaffolds and power lines shall be as follows: Scaffolds shall not be erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come closer to exposed and energized power lines than as follows:

*Insulated Lines

Voltage	Minimum distance	Alternatives
Less than 300 volts.	3 feet (0.9 m)	
300 volts to 50 kv.	10 feet (3.1 m)	
More than 50 kv....	10 feet (3.1 m) plus 0.4 inches (1.0 cm) for each 1 kv over 50 kv.	2 times the length of the line insulator, but never less than 10 feet (3.1 m).

*Uninsulated lines

Voltage	Minimum distance	Alternatives
Less than 50 kv....	10 feet (3.1 m).	
More than 50 kv....	10 feet (3.1 m) plus 0.4 inches (1.0 cm) for each 1 kv over 50 kv.	2 times the length of the line insulator, but never less than 10 feet (3.1 m).

Exception to paragraph (f)(6): Scaffolds and materials may be closer to power lines than specified above where such clearance is necessary for performance of work, and only after the utility company, or electrical system operator, has been notified of the need to work closer and the utility company, or electrical system operator, has deenergized the lines, relocated the lines, or installed protective coverings to prevent accidental contact with the lines.

1926.451(f)(7)

Scaffolds shall be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling or alteration. Such activities shall be performed only by experienced and trained employees selected for such work by the competent person.

1926.451(f)(8)

Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

1926.451(f)(9)

Where swinging loads are being hoisted onto or near scaffolds such that the loads might contact the scaffold, tag lines or equivalent measures to control the loads shall be used.

1926.451(f)(10)

Suspension ropes supporting adjustable suspension scaffolds shall be of a diameter large enough to provide sufficient surface area for the functioning of brake and hoist mechanisms.

1926.451(f)(11)

Suspension ropes shall be shielded from heat-producing processes. When acids or other corrosive substances are used on a scaffold, the ropes shall be shielded, treated to protect against the corrosive substances, or shall be of a material that will not be damaged by the substance being used.

1926.451(f)(12)

Work on or from scaffolds is prohibited during storms or high winds unless a competent person has determined that it is safe for employees to be on the scaffold and those employees are protected by a personal fall arrest system or wind screens. Wind screens shall not be used unless the scaffold is secured against the anticipated wind forces imposed.

1926.451(f)(13)

Debris shall not be allowed to accumulate on platforms.

1926.451(f)(14)

Makeshift devices, such as but not limited to boxes and barrels, shall not be used on top of scaffold platforms to increase the working level height of employees.

1926.451(f)(15)

Ladders shall not be used on scaffolds to increase the working level height of employees, except on large area scaffolds where employers have satisfied the following criteria:

1926.451(f)(15)(i)

When the ladder is placed against a structure which is not a part of the scaffold, the scaffold shall be secured against the sideways thrust exerted by the ladder;

1926.451(f)(15)(ii)

The platform units shall be secured to the scaffold to prevent their movement;

1926.451(f)(15)(iii)

The ladder legs shall be on the same platform or other means shall be provided to stabilize the ladder against unequal platform deflection, and

1926.451(f)(15)(iv)

The ladder legs shall be secured to prevent them from slipping or being pushed off the platform.

1926.451(f)(16)

Platforms shall not deflect more than 1/60 of the span when loaded.

1926.451(f)(17)

To reduce the possibility of welding current arcing through the suspension wire rope when performing welding from suspended scaffolds, the following precautions shall be taken, as applicable:

1926.451(f)(17)(i)

An insulated thimble shall be used to attach each suspension wire rope to its hanging support (such as cornice hook or outrigger). Excess suspension wire rope and any additional independent lines from grounding shall be insulated;

1926.451(f)(17)(ii)

The suspension wire rope shall be covered with insulating material extending at least 4 feet (1.2 m) above the hoist. If there is a tail line below the hoist, it shall be insulated to prevent contact with the platform. The portion of the tail line that hangs free below the scaffold shall be guided or retained, or both, so that it does not become grounded;

1926.451(f)(17)(iii)

Each hoist shall be covered with insulated protective covers;

1926.451(f)(17)(iv)

In addition to a work lead attachment required by the welding process, a grounding conductor shall be connected from the scaffold to the structure. The size of this conductor shall be at least the size of the welding process work lead, and this conductor shall not be in series with the welding process or the work piece;

1926.451(f)(17)(v)

If the scaffold grounding lead is disconnected at any time, the welding machine shall be shut off; and

1926.451(f)(17)(vi)

An active welding rod or uninsulated welding lead shall not be allowed to contact the scaffold or its suspension system.

1926.451(g)

“Fall protection.”

1926.451(g)(1)

Each employee on a scaffold more than 10 feet (3.1 m) above a lower level shall be protected from falling to that lower level. Paragraphs (g)(1)(i) through (vii) of this section establish the types of fall protection to be provided to the employees on each type of scaffold. Paragraph (g)(2) of this section addresses fall protection for scaffold erectors and dismantlers.

Note to paragraph (g)(1): The fall protection requirements for employees installing suspension scaffold support systems on floors, roofs, and other elevated surfaces are set forth in subpart M of this part.

1926.451(g)(1)(i)

Each employee on a boatswains' chair, catenary scaffold, float scaffold, needle beam scaffold, or ladder jack scaffold shall be protected by a personal fall arrest system;

1926.451(g)(1)(ii)

Each employee on a single-point or two-point adjustable suspension scaffold shall be protected by both a personal fall arrest system and guardrail system;

1926.451(g)(1)(iii)

Each employee on a crawling board (chicken ladder) shall be protected by a personal fall arrest system, a guardrail system (with minimum 200 pound toprail capacity), or by a three-fourth inch (1.9 cm) diameter grabline or equivalent handhold securely fastened beside each crawling board;

1926.451(g)(1)(iv)

Each employee on a self-contained adjustable scaffold shall be protected by a guardrail system (with minimum 200 pound toprail capacity) when the platform is supported by the frame structure, and by both a personal fall arrest system and a guardrail system (with minimum 200 pound toprail capacity) when the platform is supported by ropes;

1926.451(g)(1)(v)

Each employee on a walkway located within a scaffold shall be protected by a guardrail system (with minimum 200 pound toprail capacity) installed within 9 1/2 inches (24.1 cm) of and along at least one side of the walkway.

1926.451(g)(1)(vi)

Each employee performing overhand bricklaying operations from a supported scaffold shall be protected from falling from all open sides and ends of the scaffold (except at the side next to the wall being laid) by the use of a personal fall arrest system or guardrail system (with minimum 200 pound toprail capacity).

1926.451(g)(1)(vii)

For all scaffolds not otherwise specified in paragraphs (g)(1)(i) through (g)(1)(vi) of this section, each employee shall be protected by the use of personal fall arrest systems or guardrail systems meeting the requirements of paragraph (g)(4) of this section.

1926.451(g)(2)

Effective September 2, 1997, the employer shall have a competent person determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. Employers are required to provide fall protection for employees erecting or dismantling supported scaffolds where the installation and use of such protection is feasible and does not create a greater hazard.

1926.451(g)(3)

In addition to meeting the requirements of 1926.502(d), personal fall arrest systems used on scaffolds shall be attached by lanyard to a vertical lifeline, horizontal lifeline, or scaffold structural member. Vertical lifelines shall not be used when overhead components, such as overhead protection or additional platform levels, are part of a single-point or two-point adjustable suspension scaffold.

1926.451(g)(3)(i)

When vertical lifelines are used, they shall be fastened to a fixed safe point of anchorage, shall be independent of the scaffold, and shall be protected from sharp edges and abrasion. Safe points of anchorage include structural members of buildings, but do not include standpipes, vents, other piping systems, electrical conduit, outrigger beams, or counterweights.

1926.451(g)(3)(ii)

When horizontal lifelines are used, they shall be secured to two or more structural members of the scaffold, or they may be looped around both suspension and independent suspension lines (on scaffolds so equipped) above the hoist and brake attached to the end of the scaffold. Horizontal lifelines shall not be attached only to the suspension ropes.

1926.451(g)(3)(iii)

When lanyards are connected to horizontal lifelines or structural members on a single-point or two-point adjustable suspension scaffold, the scaffold shall be equipped with additional independent support lines and automatic locking devices capable of stopping the fall of the scaffold in the event one or both of the suspension ropes fail. The independent support lines shall be equal in number and strength to the suspension ropes.

1926.451(g)(3)(iv)

Vertical lifelines, independent support lines, and suspension ropes shall not be attached to each other, nor shall they be attached to or use the same point of anchorage, nor shall they be attached to the same point on the scaffold or personal fall arrest system.

1926.451(g)(4)

Guardrail systems installed to meet the requirements of this section shall comply with the following provisions (guardrail systems built in accordance with Appendix A to this subpart will be deemed to meet the requirements of paragraphs (g)(4)(vii), (viii), and (ix) of this section):

1926.451(g)(4)(i)

Guardrail systems shall be installed along all open sides and ends of platforms. Guardrail systems shall be installed before the scaffold is released for use by employees other than erection/dismantling crews.

1926.451(g)(4)(ii)

The top edge height of toprails or equivalent member on supported scaffolds manufactured or placed in service after January 1, 2000 shall be installed between 38 inches (0.97 m) and 45 inches (1.2 m) above the platform surface. The top edge height on supported scaffolds manufactured and placed in service before January 1, 2000, and on all suspended scaffolds where both a guardrail and a personal fall arrest system are required shall be between 36 inches (0.9 m) and 45 inches (1.2 m). When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of paragraph (g)(4).

1926.451(g)(4)(iii)

When midrails, screens, mesh, intermediate vertical members, solid panels, or equivalent structural members are used, they shall be installed between the top edge of the guardrail system and the scaffold platform.

1926.451(g)(4)(iv)

When midrails are used, they shall be installed at a height approximately midway between the top edge of the guardrail system and the platform surface.

1926.451(g)(4)(v)

When screens and mesh are used, they shall extend from the top edge of the guardrail system to the scaffold platform, and along the entire opening between the supports.

1926.451(g)(4)(vi)

When intermediate members (such as balusters or additional rails) are used, they shall not be more than 19 inches (48 cm) apart.

1926.451(g)(4)(vii)

Each toprail or equivalent member of a guardrail system shall be capable of withstanding, without failure, a force applied in any downward or horizontal direction at any point along its top edge of at least 100 pounds (445 n) for guardrail systems installed on single-point adjustable suspension scaffolds or two-point adjustable suspension scaffolds, and at least 200 pounds (890 n) for guardrail systems installed on all other scaffolds.

1926.451(g)(4)(viii)

When the loads specified in paragraph (g)(4)(vii) of this section are applied in a downward direction, the top edge shall not drop below the height above the platform surface that is prescribed in paragraph (g)(4)(ii) of this section.

1926.451(g)(4)(ix)

Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members of a guardrail system shall be capable of withstanding, without failure, a force applied in any downward or horizontal direction at any point along the midrail or other member of at least 75 pounds (333 n) for guardrail systems with a minimum 100 pound top rail capacity, and at least 150 pounds (666 n) for guardrail systems with a minimum 200 pound top rail capacity.

1926.451(g)(4)(x)

Suspension scaffold hoists and non-walk-through stirrups may be used as end guardrails, if the space between the hoist or stirrup and the side guardrail or structure does not allow passage of an employee to the end of the scaffold.

1926.451(g)(4)(xi)

Guardrails shall be surfaced to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.

1926.451(g)(4)(xii)

The ends of all rails shall not overhang the terminal posts except when such overhang does not constitute a projection hazard to employees.

1926.451(g)(4)(xiii)

Steel or plastic banding shall not be used as a top rail or mid rail.

1926.451(g)(4)(xiv)

Manila or plastic (or other synthetic) rope being used for top rails or mid rails shall be inspected by a competent person as frequently as necessary to ensure that it continues to meet the strength requirements of paragraph (g) of this section.

1926.451(g)(4)(xv)

Crossbracing is acceptable in place of a mid rail when the crossing point of two braces is between 20 inches (0.5 m) and 30 inches (0.8 m) above the work platform or as a top rail when the crossing point of two braces is between 38 inches (0.97 m) and 48 inches (1.3 m) above the work platform.

The end points at each upright shall be no more than 48 inches (1.3 m) apart.

1926.451(h)

“Falling object protection.”

1926.451(h)(1)

In addition to wearing hard hats each employee on a scaffold shall be provided with additional protection from falling hand tools, debris, and other small objects through the installation of toeboards, screens, or guardrail systems, or through the erection of debris nets, catch platforms, or canopy structures that contain or deflect the falling objects. When the falling objects are too large, heavy or massive to be contained or deflected by any of the above-listed measures, the employer shall place such potential falling objects away from the edge of the surface from which they could fall and shall secure those materials as necessary to prevent their falling.

1926.451(h)(2)

Where there is a danger of tools, materials, or equipment falling from a scaffold and striking employees below, the following provisions apply:

1926.451(h)(2)(i)

The area below the scaffold to which objects can fall shall be barricaded, and employees shall not be permitted to enter the hazard area; or

1926.451(h)(2)(ii)

A toeboard shall be erected along the edge of platforms more than 10 feet (3.1 m) above lower levels for a distance sufficient to protect employees below, except on float (ship) scaffolds where an edging of 3/4 x 1 1/2 inch (2 x 4 cm) wood or equivalent may be used in lieu of toeboards;

1926.451(h)(2)(iii)

Where tools, materials, or equipment are piled to a height higher than the top edge of the toeboard, paneling or screening extending from the toeboard or platform to the top of the guardrail shall be erected for a distance sufficient to protect employees below; or

1926.451(h)(2)(iv)

A guardrail system shall be installed with openings small enough to prevent passage of potential falling objects; or

1926.451(h)(2)(v)

A canopy structure, debris net, or catch platform strong enough to withstand the impact forces of the potential falling objects shall be erected over the employees below.

1926.451(h)(3)

Canopies, when used for falling object protection, shall comply with the following criteria:

1926.451(h)(3)(i)

Canopies shall be installed between the falling object hazard and the employees.

1926.451(h)(3)(ii)

When canopies are used on suspension scaffolds for falling object protection, the scaffold shall be equipped with additional independent support lines equal in number to the number of points supported, and equivalent in strength to the strength of the suspension ropes.

1926.451(h)(3)(iii)

Independent support lines and suspension ropes shall not be attached to the same points of anchorage.

1926.451(h)(4)

Where used, toeboards shall be:

1926.451(h)(4)(i)

Capable of withstanding, without failure, a force of at least 50 pounds (222 n) applied in any downward or horizontal direction at any point along the toeboard (toeboards built in accordance with Appendix A to this subpart will be deemed to meet this requirement); and

1926.451(h)(4)(ii)

At least three and one-half inches (9 cm) high from the top edge of the toeboard to the level of the walking/working surface. Toeboards shall be securely fastened in place at the outermost edge of the platform and have not more than 1/4 inch (0.7 cm) clearance above the walking/working surface. Toeboards shall be solid or with openings not over one inch (2.5 cm) in the greatest dimension.

In addition to the applicable requirements of 1926.451, the following requirements apply to the specific types of scaffolds indicated. Scaffolds not specifically addressed by 1926.452, such as but not limited to systems scaffolds, must meet the requirements of 1926.451.

1926.452(o)

“Single-point adjustable suspension scaffolds.”

1926.452(o)(1)

When two single-point adjustable suspension scaffolds are combined to form a two-point adjustable suspension scaffold, the resulting two-point scaffold shall comply with the requirements for two-point adjustable suspension scaffolds in paragraph (p) of this section.

1926.452(o)(2)

The supporting rope between the scaffold and the suspension device shall be kept vertical unless all of the following conditions are met:

1926.452(o)(2)(i)

The rigging has been designed by a qualified person, and

1926.452(o)(2)(ii)

The scaffold is accessible to rescuers, and

1926.452(o)(2)(iii)

The supporting rope is protected to ensure that it will not chafe at any point where a change in direction occurs, and

1926.452(o)(2)(iv)

The scaffold is positioned so that swinging cannot bring the scaffold into contact with another surface.

1926.452(o)(3)

Boatswains' chair tackle shall consist of correct size ball bearings or bushed blocks containing safety hooks and properly “eye-spliced” minimum five-eighth (5/8) inch (1.6 cm) diameter first-grade manila rope, or other rope which will satisfy the criteria (e.g., strength and durability) of manila rope.

1926.452(o)(4)

Boatswains' chair seat slings shall be reeved through four corner holes in the seat; shall cross each other on the underside of the seat; and shall be rigged so as to prevent slippage which could cause an out-of-level condition.

1926.452(o)(5)

Boatswains' chair seat slings shall be a minimum of five-eighth (5/8) inch (1.6 cm) diameter fiber, synthetic, or other rope which will satisfy the criteria (e.g., strength, slip resistance, durability, etc.) of first grade manila rope.

1926.452(o)(6)

When a heat-producing process such as gas or arc welding is being conducted, boatswains' chair seat slings shall be a minimum of three-eighth (3/8) inch (1.0 cm) wire rope.

1926.452(o)(7)

Non-cross-laminated wood boatswains' chairs shall be reinforced on their underside by cleats securely fastened to prevent the board from splitting.

1926.452(p)

"Two-point adjustable suspension scaffolds (swing stages)."

The following requirements do not apply to two-point adjustable suspension scaffolds used as masons' or stonemasons' scaffolds. Such scaffolds are covered by paragraph (q) of this section.

1926.452(p)(1)

Platforms shall not be more than 36 inches (0.9 m) wide unless designed by a qualified person to prevent unstable conditions.

1926.452(p)(2)

The platform shall be securely fastened to hangers (stirrups) by U-bolts or by other means which satisfy the requirements of 1926.451(a).

1926.452(p)(3)

The blocks for fiber or synthetic ropes shall consist of at least one double and one single block. The sheaves of all blocks shall fit the size of the rope used.

1926.452(p)(4)

Platforms shall be of the ladder-type, plank-type, beam-type, or light-metal type. Light metal-type platforms having a rated capacity of 750 pounds or less and platforms 40 feet (12.2 m) or less in length shall be tested and listed by a nationally recognized testing laboratory.

1926.452(p)(5)

Two-point scaffolds shall not be bridged or otherwise connected one to another during raising and lowering operations unless the bridge connections are articulated (attached), and the hoists properly sized.

1926.452(p)(6)

Passage may be made from one platform to another only when the platforms are at the same height, are abutting, and walk-through stirrups specifically designed for this purpose are used.

1926.452(q)

"Multi-point adjustable suspension scaffolds, stonemasons' multi-point adjustable suspension scaffolds, and masons' multi-point adjustable suspension scaffolds."

1926.452(q)(1)

When two or more scaffolds are used they shall not be bridged one to another unless they are designed to be bridged, the bridge connections are articulated, and the hoists are properly sized.

1926.452(q)(2)

If bridges are not used, passage may be made from one platform to another only when the platforms are at the same height and are abutting.

1926.452(q)(3)

Scaffolds shall be suspended from metal outriggers, brackets, wire rope slings, hooks, or means that meet equivalent criteria (e.g., strength, durability).

1926.452(t)

"Interior hung scaffolds."

1926.452(t)(1)

Scaffolds shall be suspended only from the roof structure or other structural member such as ceiling beams.

1926.452(t)(2)

Overhead supporting members (roof structure, ceiling beams, or other structural members) shall be inspected and checked for strength before the scaffold is erected.

1926.452(t)(3)

Suspension ropes and cables shall be connected to the overhead supporting members by shackles, clips, thimbles, or other means that meet equivalent criteria (e.g., strength, durability).

1926.452(v)

"Multi-level suspended scaffolds."

1926.452(v)(1)

Scaffolds shall be equipped with additional independent support lines, equal in number to the number of points supported, and of equivalent strength to the suspension ropes, and rigged to support the scaffold in the event the suspension rope(s) fail.

1926.452(v)(2)

Independent support lines and suspension ropes shall not be attached to the same points of anchorage.

1926.452(v)(3)

Supports for platforms shall be attached directly to the support stirrup and not to any other platform.

This section supplements and clarifies the requirements of 1926.21(b)(2) as these relate to the hazards of work on scaffolds.

1926.454(a)

The employer shall have each employee who performs work while on a scaffold trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. The training shall include the following areas, as applicable:

1926.454(a)(1)

The nature of any electrical hazards, fall hazards and falling object hazards in the work area;

1926.454(a)(2)

The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used;

1926.454(a)(3)

The proper use of the scaffold, and the proper handling of materials on the scaffold;

1926.454(a)(4)

The maximum intended load and the load-carrying capacities of the scaffolds used;

1926.454(a)(5)

Any other pertinent requirements of this subpart.

1926.454(b)

The employer shall have each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold trained by a competent person to recognize any hazards associated with the work in question. The training shall include the following topics, as applicable:

1926.454(b)(1)

The nature of scaffold hazards;

1926.454(b)(2)

The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold in question;

1926.454(b)(3)

The design criteria, maximum intended load-carrying capacity and intended use of the scaffold;

1926.454(b)(4)

Any other pertinent requirements of this subpart.

1926.454(c)

When the employer has reason to believe that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of scaffolds, the employer shall retrain each such employee so that the requisite proficiency is regained. Retraining is required in at least the following situations:

1926.454(c)(1) construction workplaces covered under 29 CFR part 1926. Exception: The provisions of this subpart do not apply when employees are making an inspection, investigation, or assessment of workplace conditions prior to the actual start of construction work or after all construction work has been completed.

1926.500(a)(2)(i)

Requirements relating to fall protection for employees working on scaffolds are provided in subpart L of this part.