

OLD GI PART 3, FIXED LADDERS — COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
This table compares the rescinded rules for fixed ladders from old GI Part 3 with the new rules for fixed ladders in GI Part 2, Walking-Working Surfaces. The first column contains the rescinded rule (struckthrough). The second column contains the corresponding, comparable new rule(s) that could be used to address the same hazard. In some cases there may be more than one applicable rule in the new regulations. Which new rule would be used, and whether it could be used, depends as always on the circumstances. Under the new regulations, broad performance-based standards replace old specification standards thus giving the employer more flexibility on how to meet a requirement but also expanding the situations under which the regulation would apply.	
R 408.10301 Purpose and scope. Rule 301. This part is intended to provide reasonable safety for life and limb by establishing minimum standards for the design and installation of fixed ladders and safe use by employees. A fixed ladder shall be designed to carry a designed minimum load under varying circumstances depending upon placement, length, method of fastening, and other requirements of the installation. Therefore, all parts and appurtenances necessary for a safe and efficient ladder shall necessarily be integral parts of that design. Utility poles and radio, television and transmission towers are excluded from this part.	1910.21 SCOPE AND DEFINITIONS (a) Scope. This subpart applies to all general industry workplaces. It covers all walking-working surfaces unless specifically excluded by an individual section of this subpart.
R 408.10305 Definitions; A to F. Rule 305.(1) "Allowable unit stress" means the maximum stress allowed to be applied as specified by recognized national codes and standards, such as the American national standards institute(ANSI), the American society of testing and materials(ASTM), and the national fire protection association(NFPA).	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Maximum intended load means the total load (weight and force) of all employees, equipment, vehicles, tools, materials, and other loads the employer reasonably anticipates to be applied to a walking-working surface at any one time.
(2) "Cage," "cage guard," or "basket guard" means an enclosure fastened to the side rails of a fixed ladder or to the structure to encircle the climbing space of the ladder for the safety of a climber.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Cage means an enclosure mounted on the side rails of a fixed ladder or fastened to a structure behind the fixed ladder that is designed to surround the climbing space of the ladder. A cage also is called a "cage guard" or "basket guard."
(3) "Cleats" means a ladder's crosspieces which are rectangular cross sections placed on edge and on which an employee may step.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Rung, step, or cleat means the cross-piece of a ladder on which an employee steps to climb up and down.
(4) "Design factor" means the ratio of the ultimate failure strength of a member or piece of material or equipment to the actual working stress or intended safe load.	
(5) "Fastenings" means a device including a fixed, hinged, bearing, or slide-type fastening, for attaching a ladder to a structure, building, or equipment.	
(6) "Fixed ladder" means a ladder, including individual rung ladders, that is permanently attached to a structure, building, or equipment. The term does not include a ship's stairs or manhole steps.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Fixed ladder means a ladder with rails or individual rungs that is permanently attached to a structure, building, or equipment. Fixed ladders include individual-rung ladders, but not ship stairs, step bolts, or manhole steps.
R 408.10306 Definitions; G to M. Rule 306. (1) "Grab bar" means a handhold placed adjacent to, or as an extension above, a ladder for the purpose of providing access beyond the limits of the ladder.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Grab bar means an individual horizontal or vertical handhold installed to provide access above the height of the ladder.
(2) "Individual rung ladder" means a fixed ladder that has each rung individually attached to a structure, building, or equipment.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Individual-rung ladder means a ladder that has rungs individually attached to a building or structure. An individual-rung ladder does not include manhole steps.
(3) "Ladder" means an appliance which usually consists of 2 side rails joined at regular intervals by crosspieces called steps, rungs, or cleats and on which a person may step.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Ladder means a device with rungs, steps, or cleats used to gain access to a different elevation.
(4) "Ladder height" means the distance from ground or	

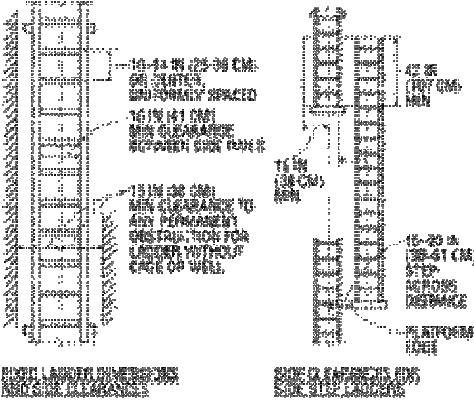
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floor level to the topmost landing or top of a ladder.	
(5) "Ladder safety device" means a device, other than a cage or well, designed to eliminate or reduce the possibility of accidental falls.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Ladder safety system means a system designed to eliminate or reduce the possibility of falling from a ladder. A ladder safety system usually consists of a carrier, safety sleeve, lanyard, connectors, and body harness. Cages and wells are not ladder safety systems.
(6) "Manhole" means an access through which an employee gains entry to a work area or to equipment below a surface or behind a vertical partition, such as a vessel wall.	
(7) "Manhole steps" means a series of steps individually attached or set into the walls of a manhole structure. Manhole steps are not considered to be an individual rung ladder.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Manhole steps means steps that are individually attached to, or set into, the wall of a manhole structure.
R 408.10307 Definitions; P to R.	
Rule 307. (1) "Personal fall protection" means a system which is worn by, or attached to, an employee and which is designed to prevent an employee from being injured if the employee falls while ascending or descending a ladder.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Personal fall protection system means a system (including all components) an employer uses to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems. Note: according to 1910.28(b)(9), for fixed ladders that extend more than 24 feet above a lower level, only personal fall arrest systems and ladder safety systems are allowed. Positioning systems and travel restraint systems cannot be used.
(2) "Pitch" means the included angle which is between the horizontal and the ladder and which is measured on the opposite side of the ladder from the climbing side.	
(3) "Platform" means a work surface that is elevated above the surrounding work area.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Platform means a walking-working surface that is elevated above the surrounding area.
(4) "Railings" means any combination of railings defined in the general industry safety standards commission standard, Part 2. Floor and Wall Openings, Stairways and Skylights, being R 408.10201 et seq. of the Michigan Administrative Code.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. 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.
(5) "Rail ladder" means a fixed ladder which consists of side rails joined at regular intervals by rungs or cleats and which is fastened for its full length or in sections to a building, structure, or equipment.	
(6) "Rungs" means crosspieces which are circular or oval cross sections and on which an employee may step.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Rung, step, or cleat means the cross-piece of a ladder on which an employee steps to climb up and down.
R 408.10308 Definitions; S to W.	
Rule 308. (1) "Side-step ladder" means a ladder that requires an employee who gets off at the top to step sideways from the ladder to reach the landing.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Side-step ladder means a type of fixed ladder that requires an employee to step sideways from it in order to reach a walking-working surface, such as a landing.
(2) "Step bolt" means a bolt or rung which is attached at intervals along a structural member and which is used for foot placement during climbing or standing. Step bolts are also referred to as "pole steps."	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Step bolt (pole step) means a bolt or rung attached at intervals along a structural member used for foot placement and as a handhold when climbing or standing.
(3) "Steps" means the flat crosspieces of a ladder on which an employee may step.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Rung, step, or cleat means the cross-piece of a ladder on which an employee steps to climb up and down.
(4) "Through ladder" means a ladder that requires an employee who gets off at the top to step through the ladder to reach the landing.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Through ladder means a type of fixed ladder that allows

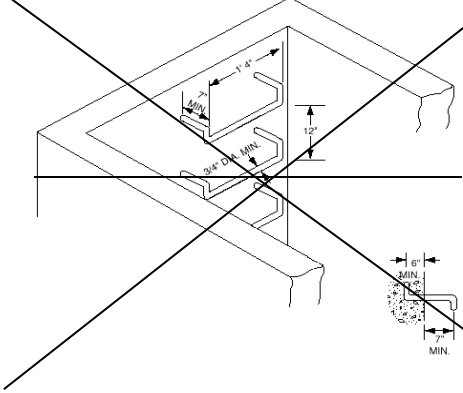
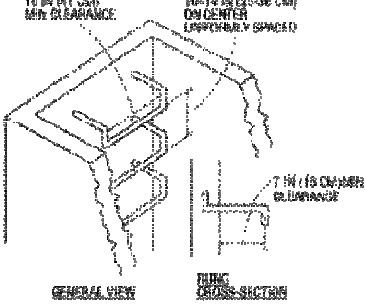
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	the employee to step through the side rails at the top of the ladder to reach a walking-working surface, such as a landing.
(5) "Tread" means the horizontal member of a step.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Tread means a horizontal member of a stair or stairway, but does not include landings or platforms.
(6) "Well" means a permanent complete enclosure around a fixed ladder that protects a climber. Proper clearance for a well will give the same protection as a cage.	1910.21 SCOPE AND DEFINITIONS (b) Definitions. Well means a permanent, complete enclosure around a fixed ladder.
R 408.10310 Surface conditions and clearances.	
Rule 310. (1) Fixed ladder surfaces shall be designed, constructed, and maintained to be free of recognized hazards that might result in death or serious injury to employees.	1910.22 GENERAL REQUIREMENTS (a) Surface conditions. The employer must ensure: (3) Walking-working surfaces are maintained free of hazards such as sharp or protruding objects, loose boards, corrosion, leaks, spills, snow, and ice. (d) Inspection, maintenance, and repair. The employer must ensure: (1) Walking-working surfaces are inspected, regularly and as necessary, and maintained in a safe condition. 1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (7) Ladder surfaces are free of puncture and laceration hazards.
(2) When fixed ladder surfaces cannot be maintained free of hazards such as snow, ice, or oil, employees shall be provided with a means to avoid or minimize their exposure to the hazards.	1910.22 GENERAL REQUIREMENTS (a) Surface conditions. The employer must ensure: (3) Walking working surfaces are maintained free of hazards such as sharp or protruding objects, loose boards, corrosion, leaks, spills, snow, and ice. (d) Inspection, maintenance, and repair. The employer must ensure: (2) Hazardous conditions on walking-working surfaces are corrected or repaired before an employee uses the walking-working surface again. If the correction or repair cannot be made immediately, the hazard must be guarded to prevent employees from using the walking-working surface until the hazard is corrected or repaired.
R 408.10311 Employee training; ladder use restriction.	
Rule 311.(1) An employer shall ensure that all employees who use ladders that have a working height of 6 feet(1.82 m) or more receive training on how to inspect ladders and how to properly use the ladders.	GI PART 1 GENERAL PROVISIONS R 408.10011 Employer responsibilities. Rule 11. An employer shall comply with all of the following: (a) Provide training to each newly assigned employee regarding the operating procedures, hazards, and safeguards of the job.
(2) Ladders shall be used only for the purposes for which they were designed.	1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (8) Ladders are used only for the purposes for which they were designed.
R 408.10321 Design.	
Rule 321. A fixed ladder, its appurtenances and fastenings shall be designed to meet the following load requirements:	1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (1) Fixed ladders are capable of supporting their maximum intended load.
(a) The minimum design live load shall be a single concentrated load of 300 pounds. A ladder installed before the effective date of this part may have a minimum design load of 200 pounds.	
(b) The number and position of additional concentrated live load units of 300 pounds each, or 200 pounds each if installed before the effective date of this part, as determined from anticipated usage of the ladder shall be considered in the design.	
(c) The live loads shall be considered to be concentrated at that point or points causing the maximum stress in the structural member.	
(d) The weight of the ladder and appurtenances together	

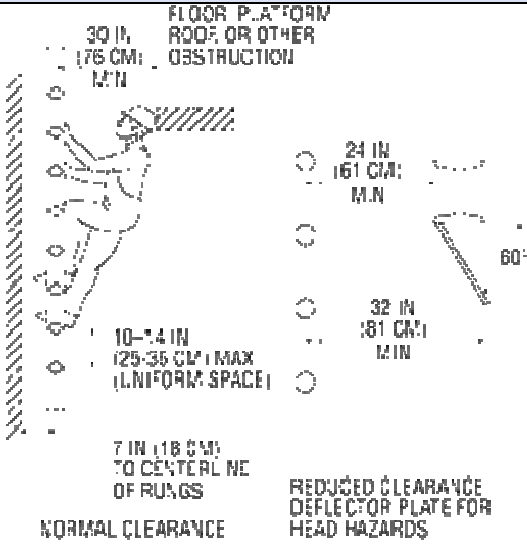
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with the live load shall be considered in the design of rails and fastenings.	
R 408.10323 Rungs, cleats, and steps; spacing; maintenance; load requirement.	
Rule 323.(1) The distance between rungs, cleats, and steps shall not be more than 12 inches from the top of one rung, cleat, or step to the top of the next rung, cleat, or step above and shall be uniformly spaced throughout the length of the ladder.	1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (1) Ladder rungs, steps, and cleats are parallel, level, and uniformly spaced when the ladder is in position for use. (2) Ladder rungs, steps, and cleats are spaced not less than 10 inches (25 cm) and not more than 14 inches (36 cm) apart, as measured between the centerlines of the rungs, cleats, and steps, except that: (i) Ladder rungs and steps in elevator shafts must be spaced not less than 6 inches (15 cm) apart and not more than 16.5 inches (42 cm) apart, as measured along the ladder side rails. (ii) Fixed ladder rungs and steps on telecommunication towers must be spaced not more than 18 inches (46 cm) apart, measured between the centerlines of the rungs or steps. Note: see Figure D-2 for rung spacing. 
(2) Rungs, cleats, and steps shall be free of splinters, sharp edges, burrs, and hazardous projections.	1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (7) Ladder surfaces are free of puncture and laceration hazards.
(3) Each step or rung shall be capable of supporting, without deflection, at least a single concentrated load of 300 pounds (1,362 kg) applied in the middle of the step or rung.	1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (1) Fixed ladders are capable of supporting their maximum intended load.
R 408.10324 Rungs and cleats; length; design; diameter of metal rungs; construction of metal cleats; adoption by reference of standards for wood cleats and other wood components.	
Rule 324. (1) The clear length of rungs and cleats shall be not less than 16 inches.	1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (4) Ladder rungs, steps, and cleats have a minimum clear width of 11.5 inches (29 cm) on portable ladders and 16 inches (41 cm) (measured before installation of ladder safety systems) for fixed ladders, except that: (i) The minimum clear width does not apply to ladders with narrow rungs that are not designed to be stepped on, such as those located on the tapered end of orchard ladders and similar ladders. (ii) Rungs and steps of manhole entry ladders that are supported by the manhole opening must have a minimum clear width of 9 inches (23 cm). (iii) Rungs and steps on rolling ladders used in telecommunication centers must have a minimum clear

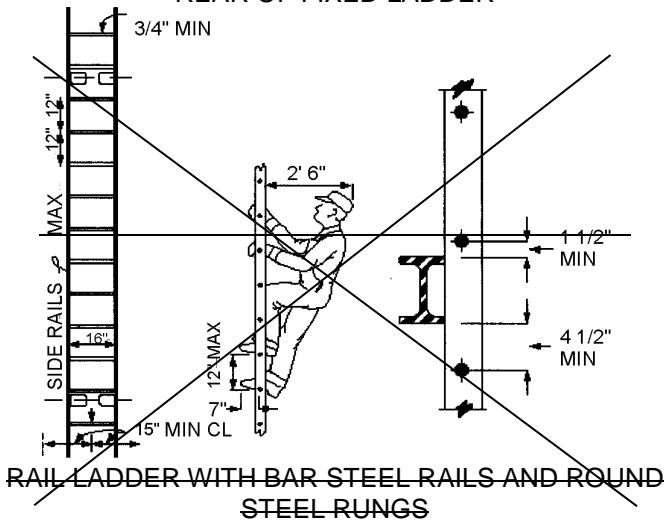
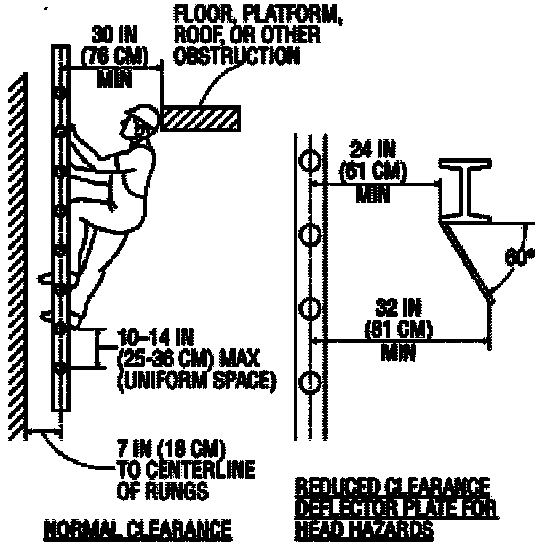
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	width of 8 inches (20 cm). (iv) Step-stools have a minimum clear width of 10.5 inches (26.7 cm).
(2) The rungs of an individual rung ladder shall be designed so that an employee's foot cannot slide off the end. See figure 1.	1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (10) Individual-rung ladders are constructed to prevent the employee's feet from sliding off the ends of the rungs (see Figure D-4 of this section).
<p>FIGURE 1 SUGGESTED DESIGN FOR RUNGS ON INDIVIDUAL RUNG LADDER</p> 	 <p>Figure D-4 -- Individual Rung Ladder</p>
(3) Metal rungs installed after November 15, 1971, shall have a diameter of not less than 3/4 of an inch and be constructed of steel rod or material of equivalent strength, except as provided in R 408.10341(1).	Note: the federal rule for diameter was eliminated with the 2017 revisions to the federal standards. The diameter requirement is now covered by the performance standard for load. 1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (1) Fixed ladders are capable of supporting their maximum intended load.
(4) Metal cleats shall be made of steel or a material of equal strength and have a bearing surface that is not less than 1/2 of an inch.	Note: the new federal rules have no requirement for size of bearing surface.
(5) Wood cleats and other wood components of a fixed ladder shall be as prescribed in ANSI standard A14.3-1984, fixed ladders, which is adopted by reference in these rules. The standard is available for inspection at the Lansing office of the department of labor. The standard may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036, or from the Michigan Department of Labor, Safety Standards Division, 7150 Harris Drive, Box 30015, Lansing, Michigan 48909, at a cost as of the time of adoption of this rule of \$13.00.	1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (1) Fixed ladders are capable of supporting their maximum intended load.
R 408.10325 Side rails.	
Rule 325. A side rail which might be used as a climbing aid shall be of such cross section as to afford a gripping surface without sharp edges, splinters, or burrs.	1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (7) Ladder surfaces are free of puncture and laceration hazards.
R 408.10326 Fastenings.	
Rule 326. Fastenings shall be as strong as the rails and shall be of sufficient length to allow a minimum distance, as required by R 408.10335, between a permanent structure and the rungs of a ladder. Fastenings shall be attached to the permanent structure either by being built into it or by through bolts, rivets, or expansion bolts grouted, leaded, or the equivalent.	1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (13) Fixed ladders that do not have cages or wells have: (ii) A minimum perpendicular distance of 30 inches (76 cm) 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 (61 cm), provided deflector plates are installed (see Figure D 5 of this section).

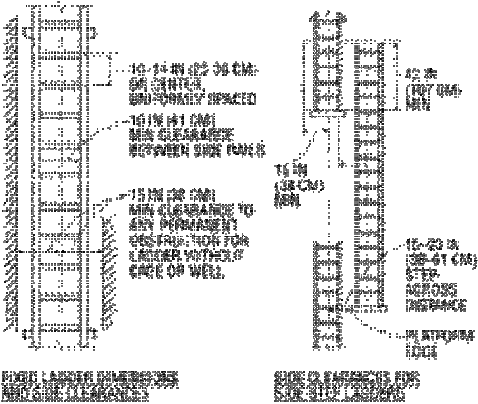
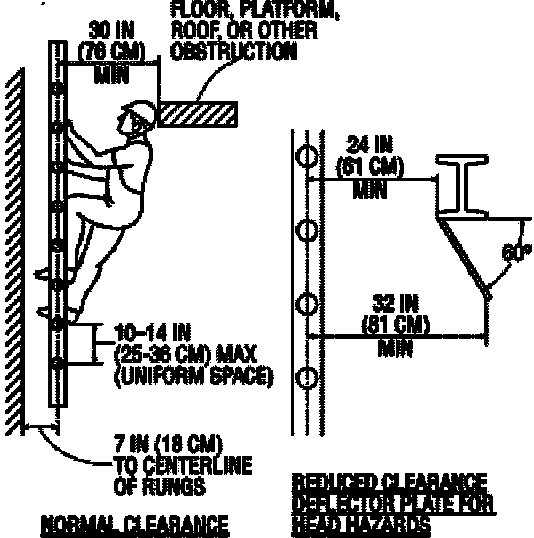
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	 <p>The diagram illustrates the required clearances for a fixed ladder. Key dimensions include: 30 IN (76 CM) MIN clearance from the floor, platform, roof, or other obstruction; 24 IN (61 CM) MIN clearance for the side of the ladder; 10-14 IN (25-35 CM) MAX (UNIFORM SPACE) for the rungs; 7 IN (18 CM) TO CENTRAL LINE OF RUNGS for normal clearance; 32 IN (81 CM) MIN clearance for the side of the ladder; and a 60° angle for the deflector plate for head hazards. Labels include 'FLOOR, PLATFORM, ROOF, OR OTHER OBSTRUCTION', 'NORMAL CLEARANCE', and 'REDUCED CLEARANCE DEFLECTOR PLATE FOR HEAD HAZARDS'.</p> <p>Figure D-5 -- Fixed Ladder Clearances</p>
<p>R 408.10328 Splices.</p> <p>Rule 328. A splice shall meet the design requirements specified in R 408.10321. A splice or connection shall have a smooth transition with the original members and shall not have sharp or extensive projections.</p>	<p>Design requirement:</p> <p>1910.22 GENERAL REQUIREMENTS (d) Inspection, maintenance, and repair. The employer must ensure: (3) When any correction or repair involves the structural integrity of the walking-working surface, a qualified person performs or supervises the correction or repair.</p> <p>1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (1) Fixed ladders are capable of supporting their maximum intended load.</p> <p>Smooth transition:</p> <p>1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (7) Ladder surfaces are free of puncture and laceration hazards.</p>
<p>R 408.10331 Protection from deterioration.</p> <p>Rule 331. (1) Dissimilar metals shall be protected from electrolytic action when they are joined.</p> <p>(2) A metal ladder and appurtenances installed in a corrosive environment shall be coated or otherwise treated to resist corrosion.</p> <p>(3) A wood ladder subject to deterioration shall be treated with a transparent preservative. Paint shall not be used as a preservative. The design and construction shall prevent or minimize the accumulation of water on or between wood parts.</p>	<p>1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (6) Metal ladders are made with corrosion-resistant material or protected against corrosion.</p> <p>Transparent preservative:</p> <p>1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (5) Wooden ladders are not coated with any material that may obscure structural defects.</p> <p>Water accumulation:</p> <p>1910.22 GENERAL REQUIREMENTS (a) Surface conditions. The employer must ensure: (3) Walking-working surfaces are maintained free of hazards such as sharp or protruding objects, loose boards, corrosion, leaks, spills, snow, and ice.</p>
<p>R 408.10333 Maintenance.</p> <p>Rule 333. (1) A fixed ladder and any attached safety devices shall be inspected regularly. The inspection intervals shall be determined according to the use of the ladder and its exposure to deteriorating elements.</p>	<p>1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (9) Ladders are inspected before initial use in each work shift, and more frequently as necessary, to identify any</p>

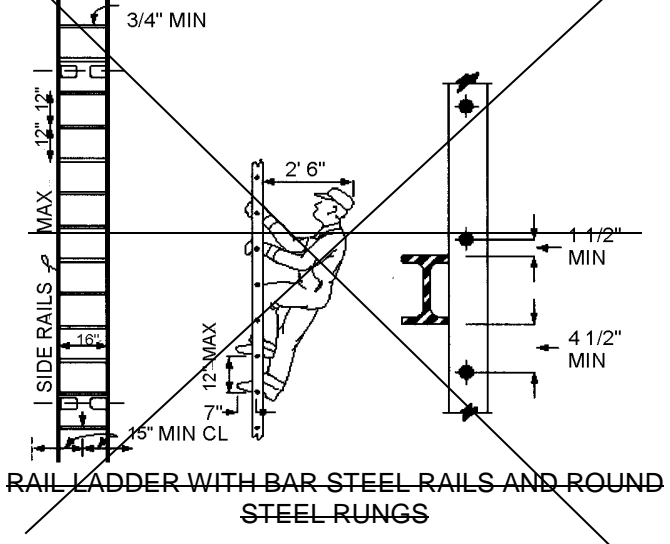
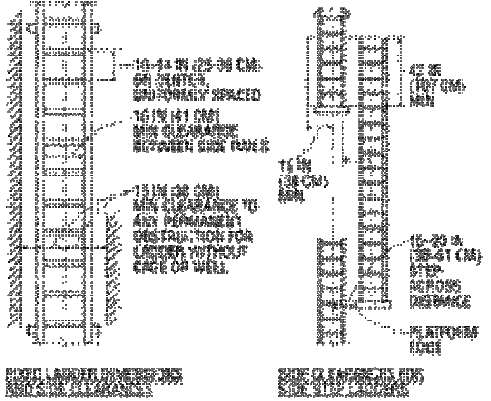
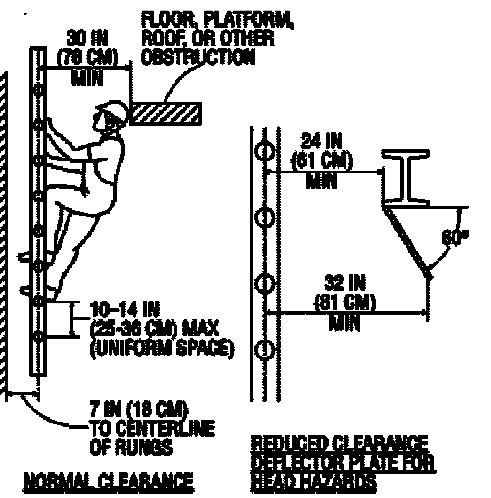
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	visible defects that could cause employee injury.
(2) Rungs, cleats, side rails, and other appurtenances shall be maintained to withstand the minimum loads established by this part.	1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (1) Fixed ladders are capable of supporting their maximum intended load.
(3) A fixed ladder and any attached safety devices that are not in compliance with the requirements of this part shall be repaired or removed from service.	1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (10) Any ladder with structural or other defects is immediately tagged “Dangerous: Do Not Use” or with similar language in accordance with §1910.145 and removed from service until repaired in accordance with §1910.22(d), or replaced.
(4) Rungs, cleats, rails, and fasteners shall be maintained free of broken, worn, loose, or damaged parts that would create a falling hazard. Materials that are used to repair a rung, cleat, rail, or fastener shall be in compliance with the design strength of the rung, cleat, rail, or fastener.	1910.22 GENERAL REQUIREMENTS (d) Inspection, maintenance, and repair. The employer must ensure: (3) When any correction or repair involves the structural integrity of the walking-working surface, a qualified person performs or supervises the correction or repair. 1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (10) Any ladder with structural or other defects is immediately tagged “Dangerous: Do Not Use” or with similar language in accordance with §1910.145 and removed from service until repaired in accordance with §1910.22(d), or replaced. (d) Fixed ladders. The employer must ensure: (1) Fixed ladders are capable of supporting their maximum intended load.
R 408.10335 Clearance. Rule 335.(1) The perpendicular distance from the center line of the rungs on the climbing side of a fixed ladder shall be not less than 36 inches for a pitch of 76 degrees, and not less than 30 inches for a pitch of 90 degrees to the nearest permanent object, except with respect to a cage or well installation. The minimum clearance for intermediate pitches between these 2 limits shall be in proportion to the slope. (See figure 2.)	1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (13) Fixed ladders that do not have cages or wells have: (ii) A minimum perpendicular distance of 30 inches (76 cm) 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 (61 cm), provided deflector plates are installed (see Figure D-5 of this section).
<p>FIGURE 2 CLEARANCE FOR UNAVOIDABLE OBSTRUCTION AT REAR OF FIXED LADDER</p> 	 <p>Figure D-5 -- Fixed Ladder Clearances</p>

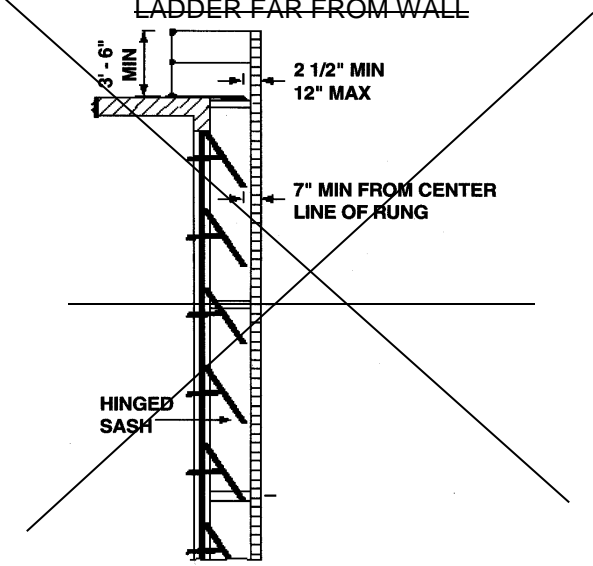
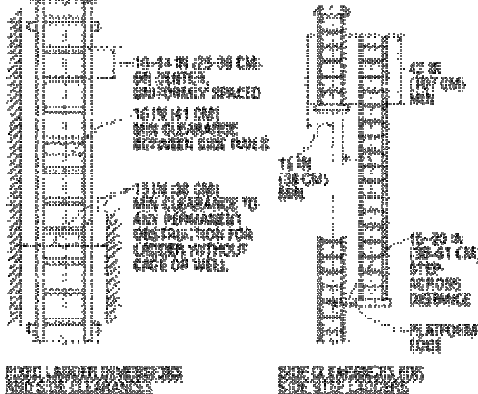
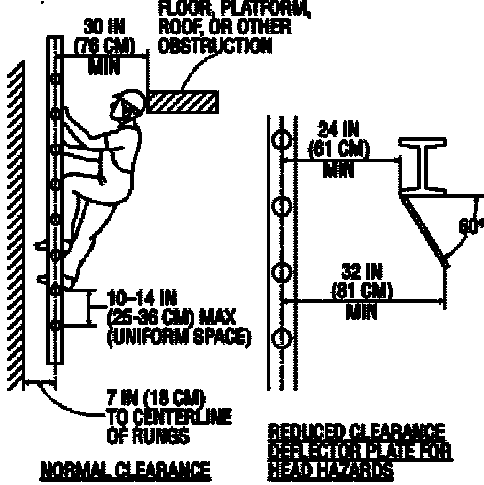
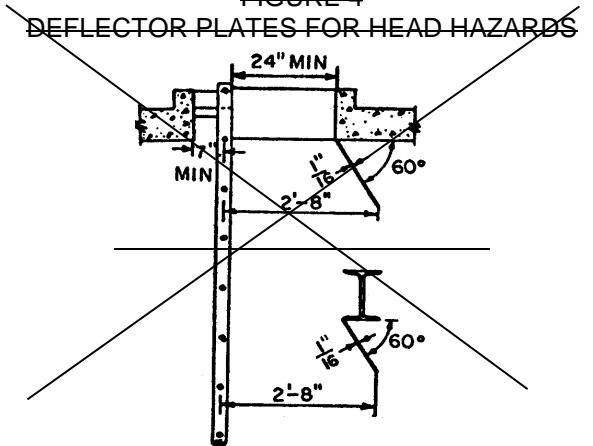
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<p>(2) A clear width of not less than 15 inches shall be provided each way from the center line of the fixed ladder to the nearest permanent object, except with respect to a cage or well installation.</p>	<p>1910.23 LADDERS</p> <p>(d) Fixed ladders. The employer must ensure:</p> <p>(13) Fixed ladders that do not have cages or wells have:</p> <p>(i) A clear width of at least 15 inches (38 cm) on each side of the ladder centerline to the nearest permanent object.</p>  <p>Figure D-2 -- Side-Step Fixed Ladder Sections</p>
<p>(3) The perpendicular distance from the center line of the rung on the back side of a fixed ladder to the nearest permanent object shall be not less than 7 inches, except that when an unavoidable object is encountered, the minimum clearances shown in figure 2 shall be followed.</p>	<p>1910.23 LADDERS</p> <p>(d) Fixed ladders. The employer must ensure:</p> <p>(2) The minimum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object in back of the ladder is 7 inches (18 cm), except for elevator pit ladders, which have a minimum perpendicular distance of 4.5 inches (11 cm).</p>  <p>Figure D-5 -- Fixed Ladder Clearances</p>

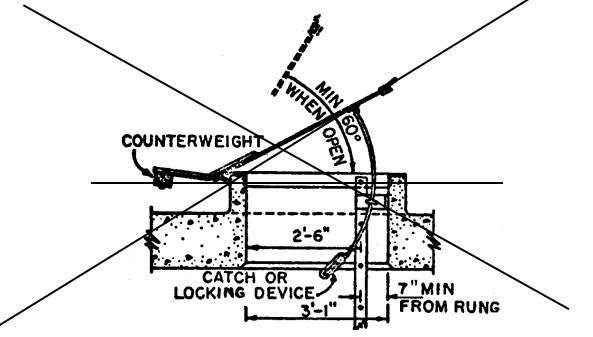
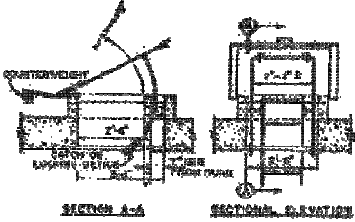
OLD GI PART 3, FIXED LADDERS — COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
<p data-bbox="121 352 787 411">CLEARANCE FOR UNAVOIDABLE OBSTRUCTION AT REAR OF FIXED LADDER</p>  <p data-bbox="121 881 787 940">RAIL LADDER WITH BAR STEEL RAILS AND ROUND STEEL RUNGS</p>	 <p data-bbox="950 792 1437 819">Figure D-2 -- Side-Step Fixed Ladder Sections</p>  <p data-bbox="950 1411 1437 1438">Figure D-5 -- Fixed Ladder Clearances</p>
<p data-bbox="110 1494 787 1607">(4) The distance from the center line of a grab bar to the nearest permanent object in back of the grab bar shall be not less than 4 inches. A grab bar shall not protrude on the climbing side.</p>	<p data-bbox="824 1494 1518 1760">1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (2) The minimum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object in back of the ladder is 7 inches (18 cm), except for elevator pit ladders, which have a minimum perpendicular distance of 4.5 inches (11 cm). (3) Grab bars do not protrude on the climbing side beyond the rungs of the ladder that they serve.</p>
<p data-bbox="110 1768 787 1854">(5) The step-across distance from the nearest edge of a fixed ladder to equipment or a structure shall be not less than 2 1/2 inches nor more than 12 inches. (See figure 3.)</p>	<p data-bbox="824 1768 1518 2104">1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (12) The step-across distance from the centerline of the rungs or steps is: (i) For through ladders, not less than 7 inches (18 cm) and not more than 12 inches (30 cm) to the nearest edge of the structure, building, or equipment accessed from the ladders. (ii) For side-step ladders, not less than 15 inches (38 cm) and not more than 20 inches (51 cm) to the access points of the platform edge.</p>

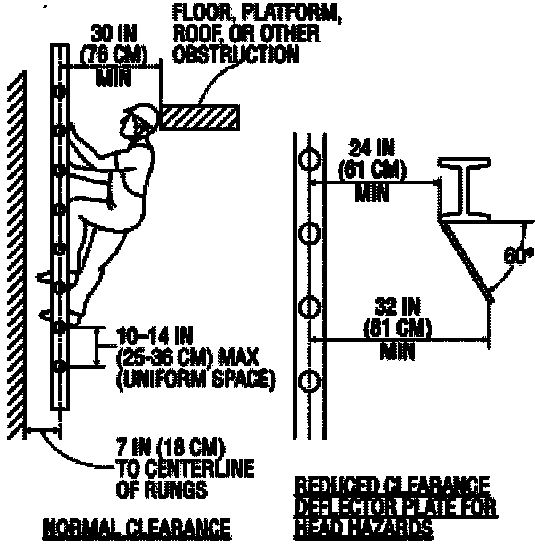
OLD GI PART 3, FIXED LADDERS
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OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
<p data-bbox="284 379 618 438">FIGURE 3 LADDER FAR FROM WALL</p> 	 <p data-bbox="943 795 1417 822">Figure D-2 -- Side-Step Fixed Ladder Sections</p>  <p data-bbox="911 1392 1425 1419">Figure D-5 -- Fixed Ladder Clearances</p>
<p data-bbox="110 1432 794 1795">(6) Where used, a counterweighted hatch cover shall open not less than 60 degrees from the horizontal. The distance from the center line of the rungs or cleats to the edge of the hatch opening on the climbing side shall be not less than 24 inches for offset walls or 30 inches for straight walls. Protruding potential hazards shall not be permitted within 24 inches of the center line of the rungs or cleats. Such hazards within 30 inches of the center line of the rungs or cleats shall be fitted with deflector plates placed at an angle of 60 degrees to the horizontal. (See figure 4.) The relationship of a fixed ladder to a counterweighted hatch cover shall be as prescribed in figure 5.</p>	<p data-bbox="824 1432 1000 1459">Hatch covers:</p> <p data-bbox="824 1491 1057 1518">1910.23 LADDERS</p> <p data-bbox="824 1524 1500 1733">(d) Fixed ladders. The employer must ensure: (9) When a fixed ladder terminates at a hatch (see Figure D-3 of this section), the hatch cover: (i) Opens with sufficient clearance to provide easy access to or from the ladder. (ii) Opens at least 70 degrees from horizontal if the hatch is counterbalanced.</p> <p data-bbox="824 1766 1133 1792">Safe access and egress:</p> <p data-bbox="824 1825 1279 1852">1910.22 GENERAL REQUIREMENTS</p> <p data-bbox="824 1857 1500 1948">(c) Access and egress. The employer must provide, and ensure each employee uses, a safe means of access and egress to and from walking-working surfaces.</p>
<p data-bbox="175 1956 727 2016">FIGURE 4 DEFLECTOR PLATES FOR HEAD HAZARDS</p> 	

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OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
<p data-bbox="159 352 748 438">FIGURE 5 RELATIONSHIP OF FIXED LADDER TO A SAFE ACCESS HATCH</p>  <p data-bbox="386 782 553 801">Cross Section View</p>	 <p data-bbox="849 701 1487 725">Figure D-3 – Example of Counterbalanced Hatch Cover at Roof</p>
<p data-bbox="110 838 740 897">R 408.10341 Special rules for utility manhole fixed ladders.</p>	
<p data-bbox="110 905 743 930">Rule 341. (1) A utility manhole fixed ladder shall have:</p> <p data-bbox="110 938 768 1115">(a) Rungs of not less than 3/4-inch diameter steel rod or material capable of supporting 300 pounds with not less than 10-inch clear length. Rungs existing before the effective date of this part may be 5/8-inch diameter steel rod or material of equal strength capable of supporting 200 pounds.</p>	<p data-bbox="824 932 1511 1174">Note: for this comparison, a “utility manhole fixed ladder” under the old rules is considered a “manhole step” under the new federal rules, assuming the steps are individually attached to or set into the wall of the manhole structure. If instead the ladder meets the new definition of a fixed ladder, the rules in 1910.23 for a ladder would apply rather than those listed below.</p> <p data-bbox="824 1209 898 1233">Load:</p> <p data-bbox="824 1268 1398 1292">1910.24 STEP BOLTS AND MANHOLE STEPS</p> <p data-bbox="824 1300 1057 1325">(b) Manhole steps.</p> <p data-bbox="824 1333 1490 1392">(1) The employer must ensure that each manhole step is capable of supporting its maximum intended load.</p> <p data-bbox="824 1427 1495 1481">Note: there is no equivalent rule for width of rungs in 1910.24.</p>
<p data-bbox="110 1489 797 1607">(b) Rungs not less than 4 inches from the center of the rungs to the wall on the side opposite the climbing side. The rungs shall be embedded not less than 3 inches in the wall and aligned one above another.</p>	<p data-bbox="824 1489 1495 1542">Distance from rung to wall on side opposite climbing side:</p> <p data-bbox="824 1577 1398 1602">1910.24 STEP BOLTS AND MANHOLE STEPS</p> <p data-bbox="824 1610 1057 1634">(b) Manhole steps.</p> <p data-bbox="824 1642 1463 1701">(2) The employer must ensure that each manhole step installed on or after January 17, 1017:</p> <p data-bbox="824 1709 1487 1790">(v) Has a minimum perpendicular distance between the centerline of the manhole step to the nearest permanent object in back of the step of at least 4.5 inches (11 cm).</p> <p data-bbox="824 1825 1049 1849">Embedded depth:</p> <p data-bbox="824 1884 1398 1908">1910.24 STEP BOLTS AND MANHOLE STEPS</p> <p data-bbox="824 1916 1057 1940">(b) Manhole steps.</p> <p data-bbox="824 1948 1490 2007">(1) The employer must ensure that each manhole step is capable of supporting its maximum intended load.</p> <p data-bbox="824 2042 963 2067">Alignment:</p> <p data-bbox="824 2102 1495 2220">Note: the new federal standards do not specifically cover alignment; however, if the situation arises, and it is hazardous, 1910.22(d)(2) is a catchall provision that can be used to address it.</p> <p data-bbox="824 2255 1279 2279">1910.22 GENERAL REQUIREMENTS</p> <p data-bbox="824 2287 1495 2346">(d) Inspection, maintenance, and repair. The employer must ensure:</p> <p data-bbox="824 2354 1511 2526">(2) Hazardous conditions on walking working surfaces are corrected or repaired before an employee uses the walking working surface again. If the correction or repair cannot be made immediately, the hazard must be guarded to prevent employees from using the walking working surface until the hazard is corrected or repaired.</p>

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OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
<p>(c) Rungs not less than 27 inches from the center of the rungs to the wall or projections on the climbing side.</p>	<p>For manhole steps:</p> <p>1910.22 GENERAL REQUIREMENTS (c) Access and egress. The employer must provide, and ensure each employee uses, a safe means of access and egress to and from walking-working surfaces.</p> <p>For fixed ladders:</p> <p>1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (13) Fixed ladders that do not have cages or wells have: (ii) A minimum perpendicular distance of 30 inches (76 cm) 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 (61 cm), provided deflector plates are installed (see Figure D 5 of this section).</p>  <p>Figure D-5 -- Fixed Ladder Clearances</p>
<p>(d) After November 15, 1971, rung configuration shall be so designed that an employee's foot cannot slide off the end. (See figure 1.)</p>	<p>1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (vi) Is designed, constructed, and maintained to prevent the employee's foot from slipping or sliding off the end.</p>
<p>(e) Spacing between rungs of not more than 16 inches on center and uniformly spaced throughout the entire length</p>	<p>1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (iv) Is uniformly spaced at a vertical distance not more than 16 inches (41 cm) apart, measured center to center between steps. The spacing from the entry and exit surface to the first manhole step may differ from the spacing between the other steps.</p>
<p>(2) A utility manhole with a conical shape shall not be provided with a fixed ladder. Access shall be by a portable ladder only.</p>	<p>Note: the new federal standards do not specifically cover this situation; however, if the situation arises, and it is hazardous, 1910.22(c) is a catchall provision that can be used to address it.</p> <p>1910.22 GENERAL REQUIREMENTS (c) Access and egress. The employer must provide, and ensure each employee uses, a safe means of access and egress to and from walking-working surfaces.</p>
<p>R 408.10342 Step bolts and manhole steps; specifications.</p>	
<p>Rule 342. (1) This rule applies to step bolts and manhole steps used on structures such as towers, stacks, conical manhole sections, and vaults. This rule does not apply to</p>	

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OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
individual rung ladders.	
(2) Step bolts and manhole steps shall be continuous and spaced uniformly not less than 6 inches (15 cm) and not more than 18 inches (46 cm) apart.	<p>Step bolts:</p> <p>1910.24 STEP BOLTS AND MANHOLE STEPS (a) Step bolts. The employer must ensure: (3) Step bolts are uniformly spaced at a vertical distance of not less than 12 inches (30 cm) and not more than 18 inches (46 cm) apart, measured center to center (see Figure D-6 of this section). The spacing from the entry and exit surface to the first step bolt may differ from the spacing between the other step bolts.</p> <p>Manhole steps:</p> <p>1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (iv) Is uniformly spaced at a vertical distance not more than 16 inches (41 cm) apart, measured center to center between steps. The spacing from the entry and exit surface to the first manhole step may differ from the spacing between the other steps.</p>
(3) The minimum clear step width of step bolts shall be 4 1/2 inches (11.4 cm). The minimum clear step width of manhole steps shall be 10 inches (25.4 cm).	<p>Step bolts:</p> <p>1910.24 STEP BOLTS AND MANHOLE STEPS (a) Step bolts. The employer must ensure: (4) Each step bolt has a minimum clear width of 4.5 inches (11 cm).</p> <p>Manhole steps:</p> <p>1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (iii) Has a minimum clear step width of 10 inches (25 cm).</p>
(4) The minimum toe clearance for manhole steps shall be 4 inches (11.1 cm) from the point of embedment on the wall to the outside face of the step. The toe clearance in the center of the manhole step shall be a minimum of 4 1/2 inches (11.4 cm) measured to the outside face of the step.	<p>Manhole steps:</p> <p>1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (v) Has a minimum perpendicular distance between the centerline of the manhole step to the nearest permanent object in back of the step of at least 4.5 inches (11 cm).</p>
(5) The minimum toe clearance for step bolts shall be 7 inches (17.8 cm). Where obstructions cannot be avoided, toe clearances may be reduced to 4 1/2 inches (11.4 cm).	<p>Step bolts:</p> <p>1910.24 STEP BOLTS AND MANHOLE STEPS (a) Step bolts. The employer must ensure: (5) The minimum perpendicular distance between the centerline of each step bolt to the nearest permanent object in back of the step bolt is 7 inches (18 cm). When the employer demonstrates that an obstruction cannot be avoided, the distance must be at least 4.5 inches (11 cm).</p>
(6) Step bolts and manhole steps shall be designed to prevent an employee's foot from slipping or sliding off the end of the step bolt or manhole step.	<p>Step bolts:</p> <p>1910.24 STEP BOLTS AND MANHOLE STEPS (a) Step bolts. The employer must ensure: (2) Each step bolt is designed, constructed, and maintained to prevent the employee's foot from slipping off the end of the step bolt.</p> <p>Manhole steps:</p> <p>1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (vi) Is designed, constructed, and maintained to prevent the employee's foot from slipping or sliding off the end.</p>
(7) Manhole steps and step bolts which are installed after	<p>Step bolts:</p>

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the effective date of this rule and which are used in corrosive environments shall be constructed of, or coated with, a material that will retard corrosion of the step or bolt	1910.24 STEP BOLTS AND MANHOLE STEPS (a) Step bolts. The employer must ensure: (1) Each step bolt installed on or after January 17, 1017 in an environment where corrosion may occur is constructed of, or coated with, material that protects against corrosion. Manhole steps: 1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (ii) Is constructed of, or coated with, material that protects against corrosion if the manhole step is located in an environment where corrosion may occur.
(8) All manhole steps installed on or after the effective date of this rule shall be provided with slip-resistant surfaces, such as corrugated, knurled, or dimpled surfaces.	Manhole steps: 1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (i) Has a corrugated, knurled, dimpled, or other surface that minimizes the possibility of an employee slipping.
(9) Each step bolt shall be capable of withstanding, without failure, not less than 4 times the intended load to be applied to the bolt.	Step bolts: 1910.24 STEP BOLTS AND MANHOLE STEPS (a) Step bolts. The employer must ensure: (6) Each step bolt installed before January 17, 1017 is capable of supporting its maximum intended load. (7) Each step bolt installed on or after January 17, 1017 is capable of supporting at least four times its maximum intended load.
(10) Manhole steps installed before the effective date of this rule shall be capable of supporting their maximum intended load.	Manhole steps: 1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (1) The employer must ensure that each manhole step is capable of supporting its maximum intended load.
R 408.10345 Design of manhole steps.	
Rule 345. (1) An employer shall ensure that manhole steps installed on or after the effective date of this rule are in compliance with all of the following requirements:	
(a) The manhole steps shall be capable of withstanding, and remaining solidly secured after being subjected to, a separate application of a horizontal pull-out load of 400 pounds(1,780 n), and a vertical load of 800 pounds(3,650 n).	1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (1) The employer must ensure that each manhole step is capable of supporting its maximum intended load.
(b) The manhole steps shall be capable of sustaining the vertical test load without developing a permanent set of more than 1/2 of an inch (12.7 mm).	
(c) The loads shall be applied over a width of 3 1/2 inches (8.9 cm) centered on the step and be applied at a uniform rate until the required load is reached.	
(d) There shall not be visible cracking or fracturing of the step or spalling of the concrete.	
(2) Step bolts and manhole steps shall be maintained in a safe condition and be visually inspected before each use.	Step bolts: 1910.24 STEP BOLTS AND MANHOLE STEPS (a) Step bolts. The employer must ensure: (8) Each step bolt is inspected at the start of the workshift and maintained in accordance with §1910.22. Manhole steps: 1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (3) The employer must ensure that each manhole step is

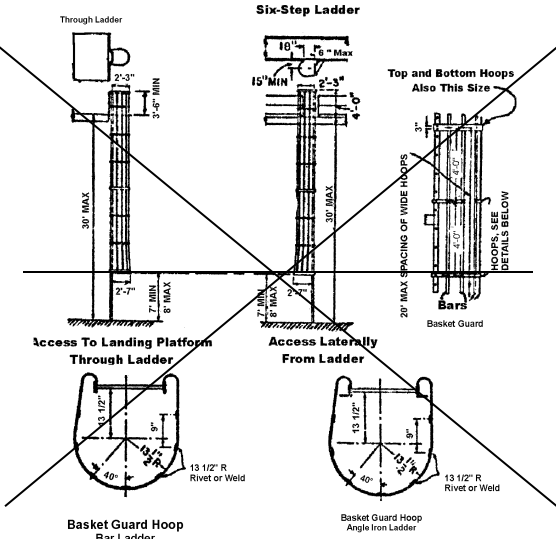
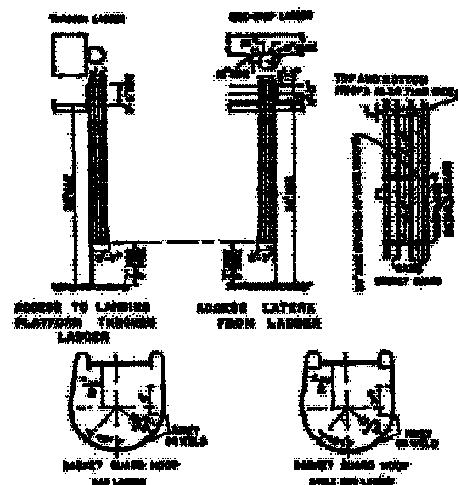
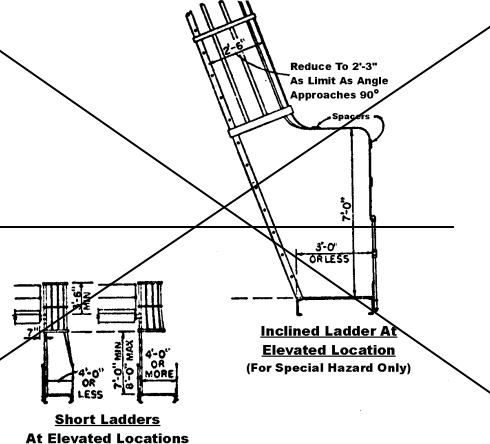
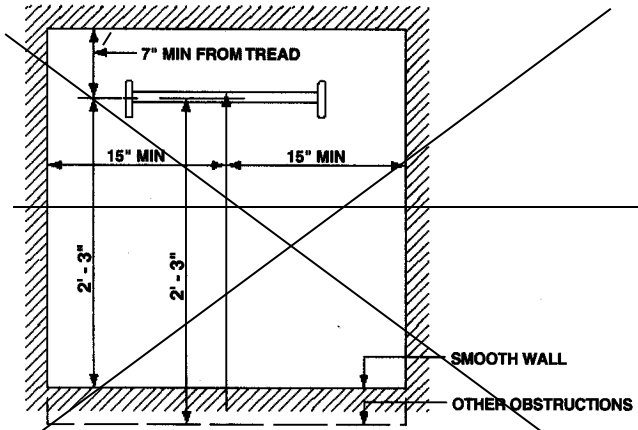
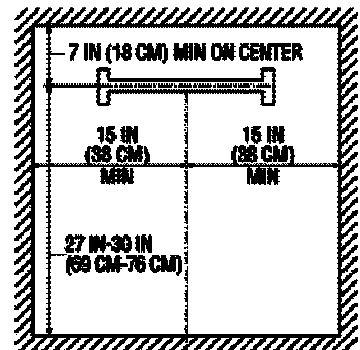
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	inspected at the start of the work shift and maintained in accordance with §1910.22.
(3) Step bolts that are bent more than 15 degrees below the horizontal shall be removed and replaced with bolts that are in compliance with the requirements of these rules. A manhole step that is bent to an extent that reduces the step's projection from the wall to less than 4 inches (1.1 cm) shall be removed and replaced with a step that is in compliance with the requirements of these rules or replaced with a climbing device that is in compliance with the requirements of this rule.	Step bolts: 1910.24 STEP BOLTS AND MANHOLE STEPS (a) Step bolts. The employer must ensure: (9) Any step bolt that is bent more than 15 degrees from the perpendicular in any direction is removed and replaced with a step bolt that meets the requirements of this section before an employee uses it. Manhole steps: 1910.24 STEP BOLTS AND MANHOLE STEPS (b) Manhole steps. (2) The employer must ensure that each manhole step installed on or after January 17, 1017: (v) Has a minimum perpendicular distance between the centerline of the manhole step to the nearest permanent object in back of the step of at least 4.5 inches (11 cm). (3) The employer must ensure that each manhole step is inspected at the start of the work shift and maintained in accordance with §1910.22.
R 408.10351 Safety devices. Rule 351.(1) A cage, well, or ladder safety device shall be provided on a ladder that is more than 20 feet (6.1m) long and that rises to an unbroken length of not more than 30 feet (9.1m).	1910.28 DUTY TO HAVE FALL PROTECTION AND FALLING OBJECT PROTECTION (b) Protection from fall hazards. (9) Fixed ladders (that extend more than 24 feet (7.3 m) above a lower level). (i) For fixed ladders that extend more than 24 feet (7.3 m) above a lower level, the employer must ensure: (A) Existing fixed ladders. Each fixed ladder installed before November 19, 2018 is equipped with a personal fall arrest system, ladder safety system, cage, or well. (B) New fixed ladders. Each fixed ladder installed on and after November 19, 2018, is equipped with a personal fall arrest system or a ladder safety system. (C) Replacement. When a fixed ladder, cage, or well, or any portion of a section thereof, is replaced, a personal fall arrest system or ladder safety system is installed in at least that section of the fixed ladder, cage, or well where the replacement is located. (D) Final deadline. On and after November 18, 2036, all fixed ladders are equipped with a personal fall arrest system or a ladder safety system.
(2) A ladder safety device may be used on towers, water tanks, and chimney ladders that are more than 20 feet in unbroken length. The ladder safety device takes the place of cage protection. A landing is not required on a tower, water tank, or chimney ladder if a ladder safety device is used.	
(3) A ladder safety device, such as one that incorporates a left belt, friction brake, or sliding attachment, shall be in compliance with the design requirements of the ladder it serves.	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (i) Ladder safety systems. The employer must ensure: (5) The design and installation of mountings and cable guides does not reduce the design strength of the ladder.
(4) Cages and wells that are provided for fixed ladders shall be designed to permit easy access to or egress from the ladders that they enclose. The cages and wells shall be continuous throughout the length of the fixed ladders, except for access, egress, and other transfer points. Cages and wells shall be designed and constructed to contain employees in the event of a fall and to direct them to a lower landing.	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (g) Cages, wells, and platforms used with fixed ladders. The employer must ensure: (1) Cages and wells installed on fixed ladders are designed, constructed, and maintained to permit easy access to, and egress from, the ladder that they enclose (see Figures D-14 and D- 15 of this section). (2) Cages and wells are continuous throughout the length of the fixed ladder, except for access, egress, and other transfer points. (3) Cages and wells are designed, constructed, and maintained to contain employees in the event of a fall, and to direct them to a lower landing.
(5) Ladder surfaces shall be free of puncture or laceration hazards.	1910.23 LADDERS (b) General requirements for all ladders. The employer must ensure: (7) Ladder surfaces are free of puncture and laceration hazards.
R 408.10352 Cages.	

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<p>Rule 352. (1) A cage shall extend not less than 42 inches above the top of a landing, unless other approved protection is provided. (See figure 6.)</p>	<p>1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (g) Cages, wells, and platforms used with fixed ladders. The employer must ensure:</p> <p>(1) Cages and wells installed on fixed ladders are designed, constructed, and maintained to permit easy access to, and egress from, the ladder that they enclose (see Figures D-14 and D- 15 of this section).</p> <p>Notes: in Figure D-15, see upper middle picture for 4’0” requirement for cage extension above top of landing for side-step ladder. In Figure D-15, see upper left picture for 3’6” requirement for cage extension above top of landing for through ladder.</p>
<p>(2) A cage shall extend down a ladder to a point not less than 7 feet nor more than 8 feet above the ground, floor or platform. The bottom shall be flared not less than 4 inches or the part of the cage opposite the ladder shall be carried to the base.</p>	<p>1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (g) Cages, wells, and platforms used with fixed ladders. The employer must ensure:</p> <p>(1) Cages and wells installed on fixed ladders are designed, constructed, and maintained to permit easy access to, and egress from, the ladder that they enclose (see Figures D-14 and D- 15 of this section).</p> <p>Notes: in Figure D-15, see upper left and middle pictures for 7’ minimum and 8’ maximum for requirement for height of bottom of cage. In Figure D-15, see upper left and middle pictures for 2’7” requirement for flaring of bottom of cage for through ladder. In Figure D-15, see middle picture for 2’3” requirement in flaring of bottom of cage for side-step ladder.</p>
<p>(3) A cage shall extend not less than 27 nor more than 28 inches from the center line of the rungs of a ladder. A cage shall be not less than 27 inches in width. The inside shall be clear of projections.</p>	<p>1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (g) Cages, wells, and platforms used with fixed ladders. The employer must ensure:</p> <p>(1) Cages and wells installed on fixed ladders are designed, constructed, and maintained to permit easy access to, and egress from, the ladder that they enclose (see Figures D-14 and D- 15 of this section).</p> <p>Note: in Figure D-15, see upper left and middle pictures for 2’3” requirement for width of cage.</p> <p>Clear of projections:</p> <p>1910.22 GENERAL REQUIREMENTS (c) Access and egress. The employer must provide, and ensure each employee uses, a safe means of access and egress to and from walking-working surfaces.</p>
<p>Vertical bars shall be located at a spacing of not more than 40 degrees around the circumference of the cage, allowing a spacing of not more than approximately 9 1/2 inches from center to center.</p>	<p>1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (g) Cages, wells, and platforms used with fixed ladders. The employer must ensure:</p> <p>(1) Cages and wells installed on fixed ladders are designed, constructed, and maintained to permit easy access to, and egress from, the ladder that they enclose (see Figures D-14 and D- 15 of this section).</p> <p>Note: in Figure D-15, see bottom two pictures for 40° requirement for spacing of vertical bars from rivet on weld to next rivet on weld around circumference of cage and 9” requirement for spacing of vertical bars from rivet on weld to next rivet on weld.</p>

OLD GI PART 3, FIXED LADDERS
— COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
<p data-bbox="131 352 773 405">FIGURE 6 CAGES FOR LADDERS MORE THAN 20 FEET HIGH</p> 	
<p data-bbox="233 989 672 1016">CAGES—SPECIAL APPLICATIONS</p> 	
<p data-bbox="110 1513 435 1540">R 408.10353 Ladder wells.</p> <p data-bbox="110 1548 795 1790">Rule 353. A ladder well shall have a clear width of not less than 15 inches, measured each way from the center line of the ladder. On the climbing side of the ladder, not less than 30 inches of clearance shall be provided from the center line of the rungs to any obstruction, except not less than 27 inches from the center line of the rungs on the climbing side shall be provided for a smooth-walled well. (See figure 7.)</p>	<p data-bbox="824 1548 1500 1602">1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES</p> <p data-bbox="824 1610 1416 1663">(g) Cages, wells, and platforms used with fixed ladders. The employer must ensure:</p> <p data-bbox="824 1671 1487 1790">(1) Cages and wells installed on fixed ladders are designed, constructed, and maintained to permit easy access to, and egress from, the ladder that they enclose (see Figures D-14 and D- 15 of this section).</p> <p data-bbox="824 1825 1513 2032">Note: see Figure D-14 for requirement of clear width of 15", measured each way from center line of ladder; requirement on climbing side of ladder of 27" – 30" of clearance from center line of rungs to any obstruction; and requirement of 7" toe clearance from back of ladder to well wall (side opposite of climbing side).</p>
<p data-bbox="118 2042 789 2096">FIGURE 7 CLEARANCE DIAGRAM FOR FIXED LADDER IN WELL</p> 	

OLD GI PART 3, FIXED LADDERS — COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
R 408.10354 Personal fall protection systems.	
Rule 354.(1) If a personal fall protection system for climbing activities is used, it shall permit the employee who uses the system to ascend or descend without continually having to hold, push, or pull any part of the system, leaving both hands free for climbing.	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (i) Ladder safety systems. The employer must ensure: (1) Each ladder safety system allows the employee to climb up and down using both hands and does not require that the employee continuously hold, push, or pull any part of the system while climbing.
(2) The connection between a carrier or lifeline and the point of attachment to a body belt or harness shall not be more than 9 inches (23 cm) in length.	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (i) Ladder safety systems. The employer must ensure: (2) The connection between the carrier or lifeline and the point of attachment to the body harness or belt does not exceed 9 inches (23 cm).
(3) A personal fall protection system for climbing activities shall be activated within 2 feet (.61 m) after a fall occurs in order to limit the descending velocity of an employee to 7 feet/sec (2.1 m/sec) or less.	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (j) Personal fall protection systems. Body belts, harnesses, and other components used in personal fall arrest systems, work positioning systems, and travel restraint systems must meet the requirements of § 1910.140. GI PART 2 WALKING-WORKING SURFACES R 408.10202 Adoption of a federal standard. (5) A reference to §1910.140 “Personal fall protection systems,” means General Industry Safety and Health Standard Part 33 “Personal Protective Equipment.” GI PART 33 PERSONAL PROTECTIVE EQUIPMENT R 408.13395b System performance criteria for personal fall arrest systems. Rule 3395b. (2) An employer shall ensure that personal fall arrest systems comply with all of the following: (b) Bring the employee to a complete stop and limit the maximum deceleration distance the employee travels to 3.5 feet (1.1 m). GI PART 33 PERSONAL PROTECTIVE EQUIPMENT R 408.13395c System use criteria for personal fall arrest systems. (2) An employer shall ensure that the personal fall arrest systems are rigged in such a manner that the employee cannot free fall more than 6 feet (1.8 m) or contact a lower level. A free fall may be more than 6 feet (1.8 m) provided the employer can demonstrate the manufacturer designed the system to allow a free fall of more than 6 feet and tested the system to ensure a maximum arresting force of 1,800 pounds (8 kN) is not exceeded.
(4) Mountings for rigid carriers shall be attached to each end of the carrier and shall have intermediate mountings, as necessary, spaced along the entire length of the carrier to provide the strength necessary to stop employee falls.	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (i) Ladder safety systems. The employer must ensure: (3) Mountings for rigid carriers are attached at each end of the carrier, with intermediate mountings spaced, as necessary, along the entire length of the carrier so the system has the strength to stop employee falls.
(5) Mountings for flexible carriers shall be attached at each end of the carrier. When the system is exposed to wind, cable guides that utilize a flexible carrier shall be installed at a minimum spacing of 25 feet (7.6 m) and a maximum spacing of 40 feet (12.2 m) along the entire length of the carrier to prevent wind damage to the system.	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (i) Ladder safety systems. The employer must ensure: (4) Mountings for flexible carriers are attached at each end of the carrier and cable guides for flexible carriers are installed at least 25 feet (7.6 m) apart but not more than 40 feet (12.2 m) apart along the entire length of the carrier.
(6) The design and installation of mountings and cable guides shall not reduce the design strength of the ladder.	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (i) Ladder safety systems. The employer must ensure: (5) The design and installation of mountings and cable guides does not reduce the design strength of the ladder.
(7) Ladder safety devices and their support systems shall be capable of withstanding, without failure, a drop test that	1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES

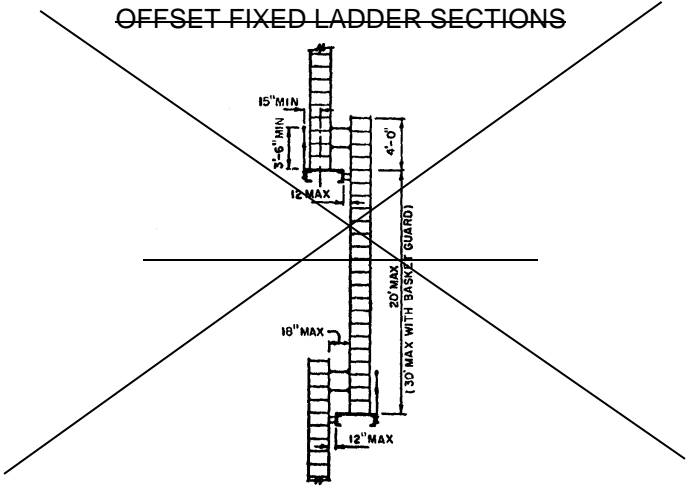
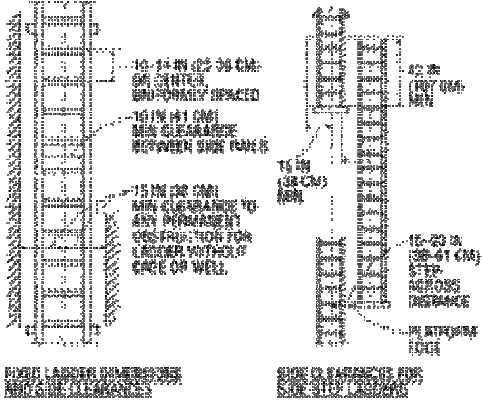
OLD GI PART 3, FIXED LADDERS — COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
consists of an 18-inch (.41 m) drop of a 500-pound (226 kg) weight.	<p>(i) Ladder safety systems. The employer must ensure:</p> <p>(6) Ladder safety systems and their support systems are capable of withstanding, without failure, a drop test consisting of an 18-inch (41-cm) drop of a 500-pound (227-kg) weight.</p>
<p>(8) All other personal fall protection systems for climbing activities shall be capable of withstanding, without failure, a drop test that consists of a 4-foot (1.2 m) drop of a 250-pound (113 kg) weight.</p>	<p>1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES</p> <p>(j) Personal fall protection systems. Body belts, harnesses, and other components used in personal fall arrest systems, work positioning systems, and travel restraint systems must meet the requirements of § 1910.140.</p> <p>GI PART 2 WALKING-WORKING SURFACES R 408.10202 Adoption of a federal standard. (5) A reference to §1910.140 “Personal fall protection systems,” means General Industry Safety and Health Standard Part 33 “Personal Protective Equipment.”</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT R 408.13395b System performance criteria for personal fall arrest systems. Rule 3395b. (2) An employer shall ensure that personal fall arrest systems comply with all of the following: (e) When the personal fall arrest system meets the criteria and protocols in Appendix D “Personal Fall Protection Systems,” Non-Mandatory Guidelines, and is being used by an employee having a combined body and tool weight of less than 310 pounds (140 kg), the system is considered to be in compliance with the provisions of subrule (2)(a) to (c) of this rule. (f) When the system is used by an employee having a combined body and tool weight of 310 pounds (140 kg) or more and the employer has appropriately modified the criteria and protocols in Appendix D “Personal Fall Protection Systems,” Non-Mandatory Guidelines, then the system is deemed to be in compliance with the requirements of subrule (2)(a) to (c) of this rule.</p> <p>Note: Appendix D contains the test methods for a strength test and force test.</p>
R 408.10355 Landing platforms.	
<p>Rule 355. (1) A ladder used to ascend to a height of more than 20 feet, except on a chimney, without a ladder safety device shall have a landing platform for each 30 feet of ladder height; provided, however, that where a cage or well is not employed, a landing platform shall be provided for every 20 feet of height or fraction thereof. The requirements for a landing platform pursuant to this subrule and subrule (3) of this rule may be satisfied by complying with the provisions of R 408.10351(2).</p>	<p>1910.28 DUTY TO HAVE FALL PROTECTION AND FALLING OBJECT PROTECTION</p> <p>(b) Protection from fall hazards.</p> <p>(9) Fixed ladders (that extend more than 24 feet (7.3 m) above a lower level).</p> <p>(ii) When a one-section fixed ladder is equipped with a personal fall protection or a ladder safety system or a fixed ladder is equipped with a personal fall arrest or ladder safety system on more than one section, the employer must ensure:</p> <p>(B) The ladder has rest platforms provided at maximum intervals of 150 feet (45.7 m).</p> <p>(iii) The employer must ensure ladder sections having a cage or well:</p> <p>(B) Have landing platforms provided at maximum intervals of 50 feet (15.2 m).</p>

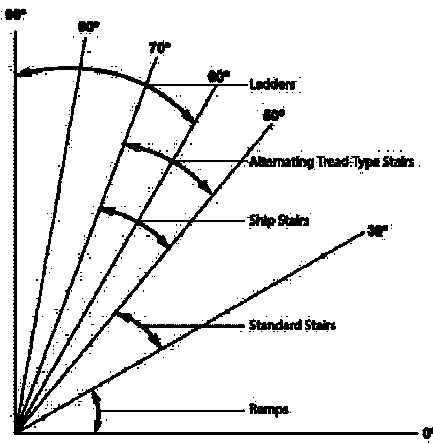
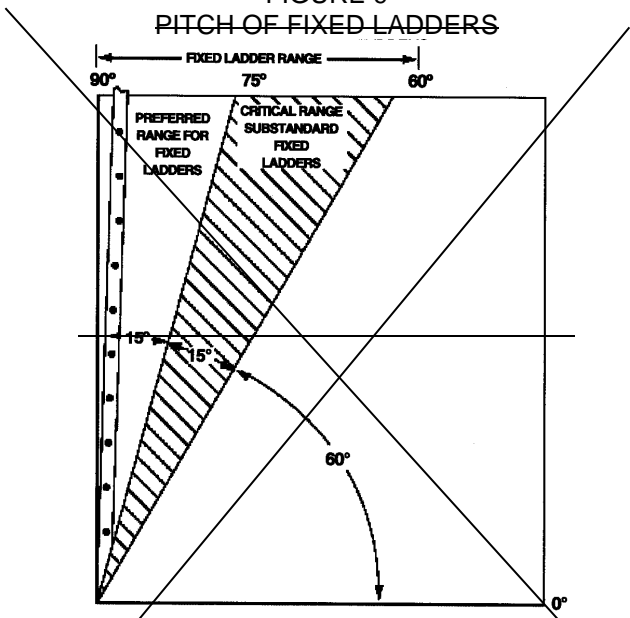
OLD GI PART 3, FIXED LADDERS — COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
<p>(2) A ladder section shall be offset from adjacent sections with a landing platform provided at each offset, except where the climbing space opening in the platform is closed with a hinged part of the platform. A landing platform shall be as specified in this rule, and be not less than 24 inches by 30 inches (61 cm by 76 cm), and have at least the same strength as the ladder.</p>	<p>Offset:</p> <p>1910.28 DUTY TO HAVE FALL PROTECTION AND FALLING OBJECT PROTECTION (b) Protection from fall hazards. (9) Fixed ladders (that extend more than 24 feet (7.3 m) above a lower level). (iii) The employer must ensure ladder sections having a cage or well: (A) Are offset from adjacent sections. (B) Have landing platforms provided at maximum intervals of 50 feet (15.2 m).</p> <p>Platform size:</p> <p>1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (g) Cages, wells, and platforms used with fixed ladders. The employer must ensure: (4) Platforms used with fixed ladders provide a horizontal surface of at least 24 inches by 30 inches (61 cm by 76 cm).</p> <p>Platform strength:</p> <p>1910.22 GENERAL REQUIREMENTS (b) Loads. The employer must ensure that each walking-working surface can support the maximum intended load for that surface.</p>
<p>(3) Where an employee has to step a distance of more than 12 inches from the center line of the rung of a ladder to the nearest edge of a structure or equipment, a landing platform shall be provided. The step-across distance shall be not less than 2 1/2 inches.</p>	<p>1910.23 LADDERS (d) Fixed ladders. The employer must ensure: (12) The step-across distance from the centerline of the rungs or steps is: (i) For through ladders, not less than 7 inches (18 cm) and not more than 12 inches (30 cm) to the nearest edge of the structure, building, or equipment accessed from the ladders. (ii) For side-step ladders, not less than 15 inches (38 cm) and not more than 20 inches (51 cm) to the access points of the platform edge.</p>
<p>(4) The side step from a fixed ladder to a platform shall be not less than 7 inches and not more than 12 inches measured from the side rail to the platform edge.</p>	
<p>(5) The side rail of an adjacent ladder shall be offset not less than 5 inches from the edge of a platform.</p>	
<p>(6) A landing platform shall be equipped with standard railings as specified in the general industry safety standards commission standard, Part 2, Floor and Wall Openings, Stairways and Skylights, being R 408.10201 to R 408.10241 of the Michigan Administrative Code arranged to give safe access to the ladder. A platform shall be not less than 24 inches in width and not less than 30 inches in length.</p>	<p>Standard railings:</p> <p>1910.28 DUTY TO HAVE FALL PROTECTION AND FALLING OBJECT PROTECTION (b) Protection from fall hazards. (1) Unprotected sides and edges. (i) Except as provided elsewhere in this section, the employer must ensure that each employee on a walking-working surface with an unprotected side or edge that is 4 feet (1.2 m) or more above a lower level is protected from falling by one or more of the following: (A) Guardrail systems. (B) Safety net systems. (C) Personal fall protection systems, such as personal fall arrest, travel restraint, or positioning systems.</p> <p>Platform size:</p> <p>1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (g) Cages, wells, and platforms used with fixed ladders. The employer must ensure: (4) Platforms used with fixed ladders provide a horizontal surface of at least 24 inches by 30 inches (61 cm by 76 cm).</p>

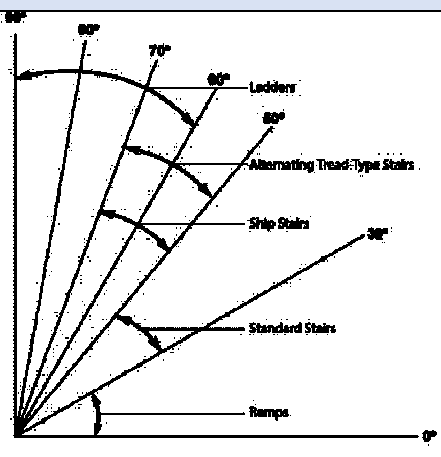
OLD GI PART 3, FIXED LADDERS
— COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
<p>(7) One rung of any section of a ladder shall be located at the level of the landing laterally served by the ladder. Where access to the landing is through the ladder, the same rung spacing as used on the ladder shall be used from the landing platform to the first rung below the landing.</p>	<p>Note: these federal rules for the level of the ladder rung and rung spacing were eliminated with the 2017 revisions to the federal standard.</p>
<p>R 408.10357 Ladder extensions.</p> <p>Rule 357. (1) The side rails of a through or side-step ladder extension shall extend 3 1/2 feet above parapets and landings. On a through ladder extension, the rungs shall be omitted from the extension and shall have not less than 18 nor more than 24 inches clearance between rails.</p> <p>For side-step or offset fixed ladder sections, at landings, the side rails and rungs shall be carried to the next regular rung beyond or above the 3 1/2 feet minimum. (See figure 8.)</p> <p>(2) This rule does not apply to a fixed ladder at a hatch cover.</p>	<p>1910.23 LADDERS</p> <p>(d) Fixed ladders. The employer must ensure:</p> <p>(4) The side rails of through or side-step ladders extend 42 inches (1.1 m) above the top of the access level or landing platform served by the ladder. For parapet ladders, the access level is:</p> <p>(i) The roof, if the parapet is cut to permit passage through the parapet.</p> <p>(ii) The top of the parapet, if the parapet is continuous.</p> <p>(5) 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 (61 cm) and not more than 30 inches (76 cm) of clearance. When a ladder safety system is provided, the maximum clearance between side rails of the extension must not exceed 36 inches (91 cm).</p> <p>(6) For side-step ladders, the side rails, rungs, and steps must be continuous in the extension (see Figure D-2 of this section).</p> <p>(7) Grab bars extend 42 inches (1.1 m) above the access level or landing platforms served by the ladder.</p> <p>Note: in Figure D-2, see right picture for requirement for side-step ladders that side rails and rungs shall be carried a minimum of 42 inches beyond and above the platform for the next side-step ladder.</p>
<p>FIGURE 8 OFFSET FIXED LADDER SECTIONS</p> 	
<p>R 408.10361 Grab bars.</p> <p>Rule 361. Grab bars shall be spaced by a continuation of the rung spacing when they are placed horizontally. Vertical grab bars shall have the same spacing as the ladder side rails. Grab bar diameters shall be the equivalent of the round rung diameters. This rule does not apply to a fixed ladder covered with a manhole cover to allow for traffic.</p>	<p>Grab bar spacing:</p> <p>Note: the federal rules for grab bar spacing were eliminated with the 2017 revisions to the federal standards.</p> <p>Grab bar diameter:</p> <p>1910.23 LADDERS</p> <p>(d) Fixed ladders. The employer must ensure:</p> <p>(8) The minimum size (cross-section) of grab bars is the same size as the rungs of the ladder.</p>

OLD GI PART 3, FIXED LADDERS
— COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)												
<p>R 408.10365 Pitch.</p> <p>Rule 365. (1) The preferred pitch of a fixed ladder shall be between 75 degrees and 90 degrees with the horizontal. (See figure 9.) However, a ladder with a pitch of less than 60 degrees shall have steps and raised hand rails, as specified in the general industry safety standards commission standard, Part 2. Floor and Wall Openings, Stairways, and Skylights, being R 408.10201 to R 408.10239 of the Michigan Administrative Code.</p>	<p>1910.23 LADDERS</p> <p>(d) Fixed ladders. The employer must ensure:</p> <p>(11) Fixed ladders having a pitch greater than 90 degrees from the horizontal are not used.</p> <p>Note: the federal rule for minimum preferred pitch of 75 degrees for a fixed ladder and the federal rule for steps and raised hand rails for ladders with the pitch less than 60 degrees were eliminated with the 2017 revisions to the federal standards.</p> <div><table><thead><tr><th>Angle</th><th>Type</th></tr></thead><tbody><tr><td>≤30°</td><td>Ramp</td></tr><tr><td>30° – 60°</td><td>Standard Stairs</td></tr><tr><td>60° – 70°</td><td>Ship Stairs</td></tr><tr><td>60° – 70°</td><td>Alternating Tread-Type Stairs</td></tr><tr><td>60° – 90°</td><td>Ladders</td></tr></tbody></table></div>	Angle	Type	≤30°	Ramp	30° – 60°	Standard Stairs	60° – 70°	Ship Stairs	60° – 70°	Alternating Tread-Type Stairs	60° – 90°	Ladders
Angle	Type												
≤30°	Ramp												
30° – 60°	Standard Stairs												
60° – 70°	Ship Stairs												
60° – 70°	Alternating Tread-Type Stairs												
60° – 90°	Ladders												
<p>(2) A fixed ladder is substandard if it is installed within the substandard pitch range of 60 and 75 degrees with the horizontal. A substandard fixed ladder is permitted only where necessary to meet conditions of installation. (See figure 9.) This substandard pitch range shall be avoided, if possible.</p>	<p>Note: the federal rules for substandard pitch were eliminated with the 2017 revisions to the federal standards.</p>												
<p>(3) A ladder shall not have a pitch of more than 90 degrees with the horizontal.</p>	<p>1910.23 LADDERS</p> <p>(d) Fixed ladders. The employer must ensure:</p> <p>(11) Fixed ladders having a pitch greater than 90 degrees from the horizontal are not used.</p>												
<p>FIGURE 9 PITCH OF FIXED LADDERS</p> 													

OLD GI PART 3, FIXED LADDERS — COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)												
	<div><table><tr><th>Angle</th><th>Type</th></tr><tr><td>≤30°</td><td>Ramp</td></tr><tr><td>30° – 50°</td><td>Standard Stairs</td></tr><tr><td>50° – 70°</td><td>Ship Stairs</td></tr><tr><td>60° – 70°</td><td>Alternating Tread-Type Stairs</td></tr><tr><td>60° – 90°</td><td>Ladders</td></tr></table></div> <p>Figure D-10 – Angles for Stairs, Ramps, and Ladders</p>	Angle	Type	≤30°	Ramp	30° – 50°	Standard Stairs	50° – 70°	Ship Stairs	60° – 70°	Alternating Tread-Type Stairs	60° – 90°	Ladders
Angle	Type												
≤30°	Ramp												
30° – 50°	Standard Stairs												
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OLD GI PART 3, FIXED LADDERS
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OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
R 408.10371 Test methods for personal fall arrest systems.	
Rule 371. The following sets forth test procedures for personal fall arrest systems as defined in the provisions of 29 C.F.R. §1910.129:	Note: the following rules apply to subrules (a) through (u) in Rule 371: 1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (j) Personal fall protection systems. Body belts, harnesses, and other components used in personal fall arrest systems, work positioning systems, and travel restraint systems must meet the requirements of § 1910.140. GI PART 2 WALKING-WORKING SURFACES R 408.10202 Adoption of a federal standard. (5) A reference to §1910.140 “Personal fall protection systems,” means General Industry Safety and Health Standard Part 33 “Personal Protective Equipment.” GI PART 33 PERSONAL PROTECTIVE EQUIPMENT R 408.13395b System performance criteria for personal fall arrest systems. Rule 3395b. (2) An employer shall ensure personal fall arrest systems comply with all of the following: (a) Limit the maximum arresting force on the employee to 1,800 pounds (8 kN). (b) Bring the employee to a complete stop and limit the maximum deceleration distance the employee travels to 3.5 feet (1.1 m). (c) Have sufficient strength to withstand twice the potential impact energy of the employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system. (d) Sustain the employee within the system and strap configuration without making contact with the employee’s neck and chin area. (e) When the personal fall arrest system meets the criteria and protocols in Appendix D “Personal Fall Protection Systems,” Non Mandatory Guidelines, and is being used by an employee having a combined body and tool weight of less than 310 pounds (140 kg), the system is considered to be in compliance with the provisions of subrule (2)(a) through (c) of this rule. (f) When the system is used by an employee having a combined body and tool weight of 310 pounds (140 kg) or more and the employer has appropriately modified the criteria and protocols in Appendix D “Personal Fall Protection Systems,” Non Mandatory Guidelines, then the system will be deemed to be in compliance with the requirements of subrule (2)(a) through (c) of this rule.
(a) Lifelines, lanyards, and deceleration devices shall be attached to an anchorage and connected to the body belt or body harness in the same manner as they would be when used to protect employees.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (b) General test conditions. (1) Lifelines, lanyards and deceleration devices should be attached to an anchorage and connected to the body harness in the same manner as they would be when used to protect employees.
(b) The anchorage shall be rigid and shall not have a deflection or more than .04 inches (1 mm) when a force of 2,250 pounds (10 kn) is applied.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (b) General test conditions. (2) The fixed anchorage should be rigid, and should not have a deflection greater than 0.04 inches (1 mm) when a

OLD GI PART 3, FIXED LADDERS — COMPARISON TO NEW RULES

OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
	force of 2,250 pounds (10 kN) is applied.
(c) The frequency response of the load measuring instrumentation shall be 120 hz.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (b) General test conditions. (3) The frequency response of the load measuring instrumentation should be 120 Hz.
(d) The test weight used in the strength and force tests shall be a rigid, metal cylindrical or torso-shaped object that has a girth of 38 inches, plus or minus 4 inches (96 cm, plus or minus 10 cm).	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (b) General test conditions. (4) The test weight used in the strength and force tests should be a rigid, metal cylindrical or torso-shaped object with a girth of 38 inches plus or minus 4 inches (96 cm plus or minus 10 cm).
(e) The lanyard or lifeline used to create the free-fall distance shall be supplied with the system or, in its absence, the least elastic lanyard or lifeline available shall be used with the system.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (b) General test conditions. (5) The lanyard or lifeline used to create the free fall distance should be supplied with the system, or in its absence, the least elastic lanyard or lifeline available should be used with the system.
(f) The test weight for each test shall be hoisted to the required level and shall be quickly released without having any appreciable motion imparted to it.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (b) General test conditions. (6) The test weight for each test should be hoisted to the required level and should be quickly released without having any appreciable motion imparted to it.
(g) The system's performance shall be evaluated, taking into account the range of environmental conditions for which it is designed to be used.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (b) General test conditions. (7) The system's performance should be evaluated, taking into account the range of environmental conditions for which it is designed to be used.
(h) After the test, the system need not be capable of further operation.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (b) General test conditions. (8) Following the test, the system need not be capable of further operation.

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OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
(i) During the testing of all systems, a test weight of 300 pounds, plus or minus 5 pounds(135 kg, plus or minus 2.5 kg), shall be used.(See subdivision(d) of this rule).	<p>See note at beginning of Rule 371.</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (c) Strength test. (1) During the testing of all systems, a test weight of 300 pounds plus or minus 3 pounds (136.4 kg plus or minus 1.4 kg) should be used. (See paragraph (b)(4) of this appendix.)</p>
(j) The test consists of dropping the test weight once. A new unused system shall be used for each test.	<p>See note at beginning of Rule 371.</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (c) Strength test. (2) The test consists of dropping the test weight once. A new unused system should be used for each test.</p>
(k) For a lanyard system, the lanyard length shall be 6 feet, plus or minus 2 inches (1.83 m, plus or minus 5 cm), as measured from the fixed anchorage to the attachment on the body belt or body harness.	<p>See note at beginning of Rule 371.</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (c) Strength test. (3) For lanyard systems, the lanyard length should be 6 feet plus or minus 2 inches (1.83 m plus or minus 5 cm) as measured from the fixed anchorage to the attachment on the body harness.</p>
(l) For a rope grab type deceleration system, the length of the lifeline above the centerline of the grabbing mechanism to the lifeline's anchorage point shall not be more than 2 feet (0.61 m).	<p>See note at beginning of Rule 371.</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (c) Strength test. (4) For rope-grab-type deceleration systems, the length of the lifeline above the centerline of the grabbing mechanism to the lifeline's anchorage point should not exceed 2 feet (0.61 m).</p>
(m) For a lanyard system, for a system that has a deceleration device which does not automatically limit the free fall distance to 2 feet(0.61 m) or less, and for a system that has a deceleration device that has a connection distance of more than 1 foot(0.3 m), measured between the centerline of the lifeline and the attachment point to the body belt or harness, the test weight shall be rigged to free fall a distance of 7.5 feet(2.3 m) from a point that is 1.5 feet(46 cm) above the anchorage point to its hanging location(6 feet below the anchorage). The test weight shall fall without interference, obstruction, or hitting the floor or ground during the test. In some cases, a nonelastic wire lanyard of sufficient length may need to be added to the system, for test purposes, to create the necessary free fall distance.	<p>See note at beginning of Rule 371.</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (c) Strength test. (5) For lanyard systems, for systems with deceleration devices which do not automatically limit free fall distance to 2 feet (0.61 m) or less, and for systems with deceleration devices which have a connection distance in excess of 1 foot (0.3 m) (measured between the centerline of the lifeline and the attachment point to the body harness), the test weight should be rigged to free fall a distance of 7.5 feet (2.3 m) from a point that is 1.5 feet (46 cm) above the anchorage point, to its hanging location (6 feet (1.83 m) below the anchorage). The test weight should fall without interference, obstruction, or hitting the floor or ground during the test. In some cases a non-elastic wire lanyard of sufficient length may need to be added to the system (for test purposes) to create the necessary free fall distance.</p>
(n) For a deceleration device system that has an integral lifeline or lanyard that automatically limits the free-fall distance to 2 feet (0.61 m) or less, the test weight shall be	<p>See note at beginning of Rule 371.</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT</p>

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OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
rigged to free-fall a distance of 4 feet (1.22 m).	APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (c) Strength test. (6) For deceleration device systems with integral lifelines or lanyards that automatically limit free fall distance to 2 feet (0.61 m) or less, the test weight should be rigged to free fall a distance of 4 feet (1.22 m).
(e) Any weight that detaches from the belt or harness constitutes a failure of the strength test.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (c) Strength test. (7) Any weight that detaches from the harness should constitute failure for the strength test.
(p) A force test consists of dropping the respective test weight specified in subdivision (q)(i) or (r)(i) of this rule once. A new, unused system shall be used for each test.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (1) General. The test consists of dropping the respective test weight specified in paragraph (d)(2)(i) or (d)(3)(i) of this appendix once. A new, unused system should be used for each test.
(q) All of the following provisions apply to force tests for a lanyard system:	
(i) A test weight of 220 pounds, plus or minus 3 pounds (100 kg, plus or minus 1.6 kg), shall be used. (See subdivision (d) of this rule).	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (2) For lanyard systems. (i) A test weight of 220 pounds plus or minus three pounds (100 kg plus or minus 1.6 kg) should be used. (See paragraph (b)(4) of this appendix.)
(ii) Lanyard length shall be 6 feet, plus or minus 2 inches (1.83 m, plus or minus 5 cm), as measured from the fixed anchorage to the attachment on the body belt or body harness.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (2) For lanyard systems. (ii) Lanyard length should be 6 feet plus or minus 2 inches (1.83 m plus or minus 5 cm) as measured from the fixed anchorage to the attachment on the body harness.
(iii) The test weight shall fall free from the anchorage level to its hanging location, a total of 6 feet (1.83 m) free fall distance, without interference, obstruction, or hitting the floor or ground during the test.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (2) For lanyard systems. (iii) The test weight should fall free from the anchorage level to its hanging location (a total of 6 feet (1.83 m) free fall distance) without interference, obstruction, or hitting the floor or ground during the test.
(r) Both of the following provisions apply to force tests for all systems other than a lanyard system:	

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OLD GI PART 3, FIXED LADDERS (RESCINDED)	NEW GI PART 2, WALKING-WORKING SURFACES (EFFECTIVE FEBRUARY 2, 2018)
(i) A test weight of 220 pounds, plus or minus 3 pounds (100 kg, plus or minus 1.6 kg), shall be used. (See subdivision (d) of this rule).	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (3) For all other systems. (i) A test weight of 220 pounds plus or minus 2 pounds (100 kg plus or minus 1.0 kg) should be used. (See paragraph (b)(4) of this appendix.)
(ii) The free-fall distance to be used in the test shall be the maximum fall distance physically permitted by the system during normal use conditions, up to a maximum free-fall distance for the test weight of 6 feet(1.83 m), except as follows:	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (3) For all other systems. (ii) The free fall distance to be used in the test should be the maximum fall distance physically permitted by the system during normal use conditions, up to a maximum free fall distance for the test weight of 6 feet (1.83 m), except as follows:
(a) For a deceleration system that has a connection link or lanyard, the test weight shall free-fall a distance equal to the connection distance, which is the distance measured between the centerline of the lifeline and the attachment point to the body belt or harness.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (3) For all other systems. (ii) The free fall distance to be used in the test should be the maximum fall distance physically permitted by the system during normal use conditions, up to a maximum free fall distance for the test weight of 6 feet (1.83 m), except as follows: (A) For deceleration systems having a connection link or lanyard, the test weight should free fall a distance equal to the connection distance (measured between the centerline of the lifeline and the attachment point to the body harness).
(b) For a deceleration device system that has an integral lifeline or lanyard that automatically limits the free-fall distance to 2 feet (0.61 m) or less, the test weight shall free-fall a distance equal to that permitted by the system in normal use. For example, to test a system that has a self-retracting lifeline or lanyard, the test weight shall be supported and the system allowed to retract the lifeline or lanyard as it would in normal use. The test weight would then be released and the force and deceleration distance measured.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (3) For all other systems. (ii) The free fall distance to be used in the test should be the maximum fall distance physically permitted by the system during normal use conditions, up to a maximum free fall distance for the test weight of 6 feet (1.83 m), except as follows: (B) For deceleration device systems with integral lifelines or lanyards that automatically limit free fall distance to 2 feet (0.61 m) or less, the test weight should free fall a distance equal to that permitted by the system in normal use. (For example, to test a system with a self-retracting lifeline or lanyard, the test weight should be supported and the system allowed to retract the lifeline or lanyard as it would in normal use. The test weight would then be released and the force and deceleration distance measured).
(c) A system fails the force test if the recorded maximum arresting force is more than 1,260 pounds(15.6 kn) when using a body belt, or is more than 2,520 pounds(11.2 kn)	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT

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when using a body harness.	APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (4) Failure. A system fails the force test when the recorded maximum arresting force exceeds 2,520 pounds (11.2 kN) when using a body harness.
(t) The maximum elongation and deceleration distance shall be recorded during the force test.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (d) Force test. (5) Distances. The maximum elongation and deceleration distance should be recorded during the force test.
(u) All of the following provisions apply to deceleration device tests:	
(i) A deceleration device shall be evaluated or tested under the environmental conditions, such as rain, ice, grease, dirt, or type of lifeline, for which the device is designed.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline (e) Deceleration device tests. (1) General. The device should be evaluated or tested under the environmental conditions (such as rain, ice, grease, dirt, and type of lifeline) for which the device is designed.
(ii) A rope grab-type deceleration device shall be moved on a lifeline 1,000 times over the same length or line distance of not less than 1 foot (30.5 cm), and the mechanism shall lock each time unless the device is permanently marked to indicate the type of lifelines that must be used, several types of lifelines that have different diameters and different materials shall be used to test the device.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for personal fall arrest systems. (e) Deceleration device tests. (2) Rope-grab-type deceleration devices. (i) Devices should be moved on a lifeline 1,000 times over the same length of line a distance of not less than 1 foot (30.5 cm), and the mechanism should lock each time. (ii) Unless the device is permanently marked to indicate the type of lifelines that must be used, several types (different diameters and different materials), of lifelines should be used to test the device.
(iii) The locking mechanism of self-activating-type deceleration devices that is designed for more than 1 arrest shall lock each of 1,000 times as it would in normal service.	See note at beginning of Rule 371. GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D Test methods for personal fall arrest systems. (e) Deceleration device tests. (3) Other self-activating-type deceleration devices. The locking mechanisms of other self-activating-type deceleration devices designed for more than one arrest should lock each of 1,000 times as they would in normal service.

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<p>R 408.10372 Test methods for positioning device systems.</p> <p>Rule 372. The following provisions set forth test procedures for positioning device systems as defined in the provisions of 29 C.F.R. §1910.130:</p>	<p>Note: the following rules apply to subrules (a) and (b) in Rule 372:</p> <p>1910.29 FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION—CRITERIA AND PRACTICES (j) Personal fall protection systems. Body belts, harnesses, and other components used in personal fall arrest systems, work positioning systems, and travel restraint systems must meet the requirements of § 1910.140.</p> <p>GI PART 2 WALKING-WORKING SURFACES R 408.10202 Adoption of a federal standard. (5) A reference to §1910.140 “Personal fall protection systems,” means General Industry Safety and Health Standard Part 33 “Personal Protective Equipment.”</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT R 408.13395d Positioning systems for personal fall protection systems. Rule 3395d. An employer shall ensure that all positioning systems, except window cleaners’ positioning systems, are capable of withstanding, without failure, a drop test consisting of a 4 foot (1.2 m) drop of a 250 pound (113 kg) weight. R 408.13395e Window cleaners’ positioning systems. Rule 3395e. (1) An employer shall ensure that all window cleaners’ positioning systems are capable of withstanding, without failure, a drop test consisting of a 6 foot (1.8 m) drop of a 250 pound (113 kg) weight. (2) An employer shall ensure that all window cleaners’ positioning systems shall limit the initial arresting force on the falling employee to not more than 2,000 pounds (8.9 kN), with a duration not exceeding 2 milliseconds and any subsequent arresting forces to not more than 1,000 pounds (4.5 kN). (3) An employer shall ensure positioning systems, including window cleaners’ positioning systems, shall meet the test methods and procedures in Appendix D “Personal Fall Protection Systems,” Non Mandatory Guidelines, are considered to be in compliance R 408.13395d and R 408.13395e.</p> <p>Note: according to 1910.28(b)(9), for fixed ladders that extend more than 24 feet above a lower level, only personal fall arrest systems and ladder safety systems are allowed. Positioning systems and travel restraint systems cannot be used.</p>
<p>(a) The fixed anchorage shall be rigid and shall not have a deflection of more than .04 inches (1 mm) when a force of 2,250 pounds (10 kn) is applied.</p>	<p>See note at beginning of Rule 372.</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for positioning systems. (b) Test conditions. (1) The fixed anchorage should be rigid and should not have a deflection greater than 0.04 inches (1 mm) when a force of 2,250 pounds (10 kN) is applied.</p>
<p>(b) For lineman's body belts and pole straps, the body belt shall be secured to a 250-pound (113 kg) bag of sand at a point that simulates the waist of an employee. One end of the pole strap shall be attached to the rigid anchorage and the other end to the body belt. The sand bag shall be allowed to free fall a distance of 4 feet (1.2 m). The pole strap and body belt fail testing if there is any breakage or slippage that permits the bag to fall free to the ground.</p>	<p>See note at beginning of Rule 372.</p> <p>GI PART 33 PERSONAL PROTECTIVE EQUIPMENT APPENDIX D—Test Methods and Procedures for Personal Fall Protection Systems Non-Mandatory Guideline Test methods for positioning systems. (b) Test conditions. (3) All other positioning systems (except for restraint line systems) should withstand a drop test consisting of a 250 pound (113 kg) weight free falling a distance of 4 feet (1.2</p>

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	m). The weight must be a rigid object with a girth of 38 inches plus or minus 4 inches (96 cm plus or minus 10 cm). The body belt or harness should be affixed to the test weight as it would be to an employee. The system should be connected to the rigid anchor in the manner that the system would be connected in normal use. The weight should be lifted exactly 4 feet (1.2 m) above its “at rest” position and released so as to permit a vertical free fall of 4 feet (1.2 m). Failure of the system should be indicated by any breakage or slippage sufficient to permit the weight to fall free to the ground.