



Department of the Air Force  
HQ AEDC (AFMC)  
Arnold AFB, TN 37389

## Safety, Health, and Environmental Standard

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**Title:** FIXED AND PORTABLE LADDERS  
**Standard No.:** D9  
**Effective Date:** 06/30/2014  
**Releasability:** There are no releasability restrictions on this publication.

The provisions and requirements of this standard are mandatory for use by all AEDC personnel engaged in work tasks necessary to fulfill the AEDC mission. Please contact your safety, industrial health and/or environmental representative for clarification or questions regarding this standard.

Approved:

Contractor/ATA Director  
Safety, Health, and Environmental

Air Force Functional Chief

**SHE Standard D9, Fixed and Portable Ladders**

**Record of Review/Revision**

(Current revisions are highlighted in yellow and marked with a vertical line in the right margin.)

Date/POC	Description
06/20/14	Scheduled review: No change required.
01/25/13	Added NFAC supplement; no other change.
07/16/12 J. Glover	Incorporated current process of documenting discrepancies in the Fixed Ladder Inspection database maintained by the Operating Contractor Ladder System Engineer; updated references to reflect current AFI 91-202 (replaces 91-301) and 91-203 (replaces 91-501). Changed “operating contractor” to “base operating contractor” throughout.
06/15/10 J. Glover	Minor administrative changes and reformatting. No change to current process.
02/15/08 J. Glover	Added notes to Paragraph 4.2.1.2.4 regarding location of the safety climbing devices and Paragraph 4.2.4.2.1.1 concerning the inspection tag and what to do when one is missing. Updated Annex with current inspection labels and usage notes. Minor administrative changes and reformatting. No change to current process.
01/14/08 J. Glover	<p>Annual review: Added Updated Section 4 to reflect current OSHA, ANSI, and AFI 91-501 requirements; renumbered paragraphs as necessary. Major changes are summarized below; however, users should read the entire standard:</p> <ul style="list-style-type: none"> <li>• Definitions – Modified definition for <i>competent person</i> (for portable ladders); added definitions for <i>fixed ladder inspection program</i> and <i>inspection label</i>.</li> <li>• Competent person – Deleted requirement for designated competent persons to be responsible for organizational ladder programs to include tracking of portable ladders and ensuring annual inspection and repair/removal from service when damaged.</li> <li>• Training – Revised to comply with AFI 91-501.</li> <li>• Fixed ladders – For replacement/new construction: deleted references to cages or wells in keeping with AFI 91-501. Added requirements for existing fixed ladders. Updated and clarified maintenance and inspection requirements.</li> <li>• Portable ladders – Revised care and storage requirements. Deleted requirement for annual inspection by a ladder competent person; requirement now is for inspection prior to each use. Deleted requirement for marking of portable ladders with owning organization’s code to show custody.</li> <li>• Added Annex – Provides examples of inspection labels for fixed ladders.</li> </ul>
04/18/07 R. Eichel	Annual review; corrected typographical errors.
05/15/06 R. Eichel	Annual review; reformatted to number paragraphs previously formatted as lists; no other changes required.
03/01/05 R. Eichel	Added 2 definitions. Modified introduction/ scope/applicability paragraph. Added requirements for supervisors to turn in training records to contractor training.
01/20/04 R. Eichel	Complete re-write. Incorporating current ANSI, OSHA and AF requirements. Designates responsibility for inspection, records, and training.
09/30/02	Reformatted according COI 91-5.



# Safety, Health, and Environmental Standard

## FIXED AND PORTABLE LADDERS

### 1.0 INTRODUCTION/SCOPE/APPLICABILITY

- 1.1 Introduction – This standard was developed using the most current and applicable Occupational Safety and Health Administration (OSHA), American National Standards Institute (ANSI) and Air Force guidance. Under most conditions, when questions arise, the more stringent requirement shall be applicable. Contact base operating contractor Safety and Health for situations requiring interpretation.
- 1.2 Scope – Fixed and portable ladders are acquired, designed, used, maintained and disposed of in accordance with this standard.
- 1.3 Applicability – This standard applies to all AEDC personnel and operations, including Air Force, Navy, U. S. Army Corps of Engineers and Contractors at the Tennessee location and operations conducted by AEDC personnel outside the confines of Arnold AFB. Training for outside/subcontractor personnel will be provided by their management in accordance with appropriate requirements documents and standards.

This standard is applicable to all AEDC employees, contractors and sub-contractors.

### 2.0 BASIC HAZARDS/HUMAN FACTORS

Falls are the primary hazard associated with ladder use. Each type of ladder has different hazards. At-risk acts and unsafe conditions can be prevented by training workers, proper selection of ladders, supervisory enforcement of safe ladder use, and proper design, installation, and maintenance of ladders and climbing devices. Hazards generally associated with all ladders include carrying materials in hands while ascending or descending the ladder, and working or descending with back to the ladder. These hazards are minimized if workers adhere to proper ladder discipline and supervisors ensure equipment is inspected, maintained in good condition, and properly used.

#### 2.1 Fixed Ladders Hazards:

Haste, sudden movements, lack of attention during use, ladder condition (worn, damaged or poor design), user's physical condition, weather conditions etc. can contribute to falls. The footwear employed by the user may also contribute to falls.

#### 2.2 Portable Ladders Hazards

Ladders set on unstable surfaces, ladders placed in front of doors which open towards the ladder without proper guarding, or ladders used as scaffolds. Personnel reaching too far out to the sides or standing too high to maintain their balance. Use of a defective ladder (i.e., broken rail or rung). Improvising and using a make-shift ladder. Failure to follow manufacturer's recommendations.

### 3.0 DEFINITIONS/TERMS

For definitions not listed, consult ANSI A14.3.

Angle of Inclination — The preferred pitch for portable non-self-supporting ladders.

Base Operating Contractor – A long-term contractor directly accountable to the Air Force for the AEDC mission.

Competent Person — For the purpose of this standard, a portable ladder competent person is one who has been trained to properly inspect the ladder, can identify existing or predictable hazards with the ladder, and has the authorization to take prompt corrective action to eliminate those hazards.

Extension Ladder — A non-self-supporting portable ladder, adjustable in length. It contains two or more sections traveling in guides or brackets or equivalent and so arranged as to permit length adjustments.

Fixed Ladder — A ladder permanently attached to a structure.

Fixed Ladder Inspection Program (F.L.I.P) — A program to inspect, record, and tag all fixed ladders in active areas with an inspection label stating deficiencies. The program also includes tagging all lower level fixed ladders in non active areas with a warning label stating the need for inspection before use.

Inspection Label — A label placed on a fixed ladder which notifies the climber that the ladder has been inspected and lists any deficiencies found during inspection. (See Annex)

Ladder — A device incorporating or employing side rails, steps, rungs, or cleats on which a person may step to ascend or descend.

Ladder Cage — A barrier that is an enclosure mounted on the side rails of a fixed ladder or fastened to the structure to enclose the climbing space of a ladder in order to safeguard the employee climbing the ladder.

Ladder Safety System — An assembly of components whose function is to arrest the fall of a user and includes the carrier and its associated attachment elements, safety sleeve, body support and connectors. The carrier is permanently attached to the climbing face of the ladder or immediately adjacent to the ladder.

Landing — Any area such as the ground, roof, or platform that provides access/egress for a fixed ladder.

Outside Contractor/Subcontractor — An organization employed by a contractor or the Air Force to do construction, maintenance, repair or other work at AEDC. There is no employment relationship, control or supervision of the subcontractor's employees by AEDC contractors. Also referred to as the construction contractor.

Platform — A landing surface that is used as a working or standing location.

Portable Ladder — A ladder that can readily be moved or carried, usually consisting of side rails joined at intervals by steps or rungs and braces.

Stepladder — A self-supporting portable ladder, non-adjustable in length, with steps and a hinged back.

Three-Point Contact — The employee having two hands and one foot or two feet and one hand in contact with the ladder at all times while ascending or descending.

## **4.0 REQUIREMENTS/RESPONSIBILITIES**

### **4.1 Base Operating Contractor Procedures**

#### **4.1.1 Facilities Maintenance Shall:**

Inspect and document inspections of fixed ladders installed on real property facilities or real property installed equipment (RPIE). See Paragraph 4.2.4.2.

#### **4.1.2 Training Shall:**

Maintain records of ladder training.

#### **4.1.3 Safety Shall:**

Develop, maintain and provide a formal ladder safety training program covering ladders in general for new hires who will use ladders.

#### **4.1.4 Carpenter Shop Shall:**

4.1.4.1 Determine whether damaged portable wood ladders can be repaired; dispose of un-reparable ladders after rendering them useless.

4.1.4.2 Notify the owning organization if the ladder is to be destroyed.

#### **4.1.5 Sheet Metal Shop Shall:**

4.1.5.1 Determine whether damaged portable metal or fiberglass/plastic ladders can be repaired; dispose of un-reparable ladders after rendering them useless.

4.1.5.2 Notify the owning organization if the ladder is to be destroyed.

### **4.2 Fixed Ladders**

#### **4.2.1 Acquisition/Retrofit of Fixed Ladders**

##### **4.2.1.1 Procurement of Fixed Ladders, Their Parts and Accessories, and Safety Devices.**

4.2.1.1.1 Fixed ladders shall be procured to meet the requirements of OSHA 29 CFR 1926.1053 and/or ANSI A14.3 whichever is more stringent at the time of installation.

4.2.1.1.2 Procurement specifications shall require best-available factory finish for corrosion control.

##### **4.2.1.2 Requirements for Replacement/New Construction of Fixed Ladders.**

4.2.1.2.1 Fixed ladders shall be designed and constructed to meet the requirements of ANSI A14.3 unless otherwise noted.

- 4.2.1.2.2 Fixed ladders are provided as a means of access to roofs, pits, silos, towers, tanks, and other limited-access areas. Fixed industrial stairs shall be provided where access is daily or during each shift for gauging, inspection, regular maintenance, or when carrying tools or equipment is normally required and sufficient space is available.
- 4.2.1.2.3 Where possible, new construction shall have stairs installed, within the preferred range of 30-50 degrees, rather than using ladders for access. If a stairway cannot be used, the design engineer shall select the appropriate type of fixed ladder to be installed. Selection will vary due to location and environmental conditions. Refer to ANSI A14.3 for design details.
- 4.2.1.2.4 New procurement of a fixed ladder (where fall protection is required) shall include a safety climb device rather than a cage or well. See AFI 91-203, Paragraph 7.4.2.2.1.3.  
**NOTE:** Ladder climbing devices are kept at the ETF Bldg 876 tool crib and at Bldg 440 rigging office.
- 4.2.1.2.5 A ladder safety system shall be provided where the length of climb is greater than 24 feet above or below ground level, or above or below a floor or roof with access/egress from ground level, floor, or roof.
- 4.3.1.2.6 A ladder safety system shall be provided where the length of climb is less than 24 feet but the top of the ladder is at a distance greater than 24 feet above ground level, floor, or roof.
- 4.2.1.2.7 A ladder safety system shall be provided where a single length of climb is greater than 24 feet.
- 4.2.1.2.7.1 Where ladder safety systems are used, the length of climb may be continuous, but rest platforms shall be provided at maximum intervals of 150 feet. All components of ladder safety systems shall meet the design requirements of ANSI A14.3, Section 7.
- 4.2.1.2.8 A landing platform shall consist of a horizontal area on which a person may step while climbing a ladder, either for rest purposes or for access to another section of the ladder.
- 4.2.1.2.8.1 All platforms shall be provided with standard railings and toe boards.
- 4.2.1.2.8.2 The total depth of the platform shall provide a minimum space of 30 inches from the centerline of the ladder on the climbing side. The width of the platform shall be not less than 30 inches.
- 4.2.1.2.9 All parts and surfaces of fixed ladder installations shall be free of sharp edges, burrs, or other details that may be hazardous to the person using the ladder.
- 4.2.1.3 Fixed Ladder Clearances**
- 4.2.1.3.1 Climbing Side of Ladders**
- 4.2.1.3.1.1 Ladders shall have a minimum perpendicular distance of 30 inches from the centerline of the steps and rungs to the nearest permanent object on the climbing side.
- 4.2.1.3.1.2 When unavoidable obstructions are encountered, the minimum clearance may be reduced to 24 inches if deflector plates are provided.
- 4.2.1.3.2 Back Side of Ladders**
- 4.2.1.3.2.1 The perpendicular distance from the centerline of the steps and rungs, or grab bars, or both, to the nearest permanent object in back of the ladder shall be not less than 7 inches.
- 4.2.1.3.2.2 For a through ladder, the step across distance from the centerline of the steps or rungs to the nearest edge of the structure, building, or equipment shall not be less than 7 inches or more than 12 inches.
- 4.2.1.3.3 Width of Side Clearance**
- Ladders shall have a minimum clear width to the nearest permanent object of at least 15 inches on each side of the centerline of the ladder.
- 4.2.1.4 Steps and Rungs of Fixed Ladders**
- 4.2.1.4.1 Vertical spacing of the first rung of the climb shall be permitted to be adjusted within the range of 14 inches. All vertical spacing of the rungs from the center of the first rung throughout the length of the climb shall be 12 inches and uniform in the same length of climb.
- 4.2.1.4.2 The minimum inside clear width of step surface for steps and rungs shall be 16 inches, and this width shall be uniform in the same length of climb.
- 4.2.1.4.3 The top step or rung of a ladder shall be level with the top of the access / egress level or landing platform served by the ladder.
- 4.2.1.4.4 All rungs shall have a minimum diameter of  $\frac{3}{4}$  inch.

**4.2.1.5 Side Rails of Fixed Ladders**

- 4.2.1.5.1 Any shape side rail may be used that provides a uniform gripping surface for the hands of the person using the ladder, as long as the shape allows a power grip.
- 4.2.1.5.2 The same shape of side rails shall be maintained for all ladders in the same length of climb.
- 4.2.1.5.3 The side rails of through or side-step ladders shall extend 3 feet 6 inches above the top of the access/egress level or landing served by the ladder.
- 4.2.1.5.4 For through ladder extensions, steps or rungs shall be omitted from the extension, and the extension of the side rails shall be flared to provide not less than 24 inches, nor more than 30 inches, clearance between the side rails.
- 4.2.1.5.5 For side-step ladders, the side rails and the steps or rungs shall be continuous in the 3 feet 6 inch extension above the platform.

**4.2.2 Requirements for Existing Fixed Ladders**

- 4.2.2.1 Fixed ladders shall be inspected using requirements of OSHA 29 CFR 1910.27 unless otherwise noted.
- 4.2.2.2 A cage, well, or ladder safety system shall not be required where the length of climb is 24 feet or less above or below ground level, or above or below a floor or roof with access/egress from ground level, floor, or roof.
- 4.2.2.3 A cage, well, or ladder safety system shall be provided where the length of climb is less than 24 feet but the top of the ladder is at a distance greater than 24 feet above ground level, floor, or roof.
- 4.2.2.4 A cage, well, or ladder safety system shall be provided where a single length of climb is greater than 24 feet but does not exceed a maximum unbroken length of 30 feet.
- 4.2.2.5 Ladders having a length of climb greater than 30 feet shall meet the following requirements depending on the use of a cage, well, or ladder safety system:
  - 4.2.2.5.1 Where cages or wells are used:
    - 4.2.2.5.1.1 A landing platform shall be provided at least every 30 feet within the length of climb.
    - 4.2.2.5.1.2 Each section shall be horizontally offset from adjacent sections.
  - 4.2.2.5.2 Where ladder safety systems are used, the length of climb may be continuous, and no landing platforms are required.
- 4.2.2.6 A landing platform shall consist of a horizontal area on which a person may step while climbing a ladder, either for rest purposes or for access to another section of the ladder.
  - 4.2.2.6.1 All platforms shall be provided with standard railings and toe boards.
  - 4.2.2.6.2 The platform shall be not less than 24 inches in width and 30 inches in length.
- 4.2.2.7 Cages shall consist of horizontal bands or supports and vertical bars.
  - 4.2.2.7.1 Cages shall extend not less than 27 inches, or more than 28 inches from the centerline of the step or rung (excluding the flare at the bottom of the cage), and shall not be less than 27 inches in width. The inside of the cage shall be clear of projections.
  - 4.2.2.7.2 Horizontal bands shall be spaced not more than 4 feet on center vertically.
  - 4.2.2.7.3 Vertical bars shall be spaced at intervals not more than 40 degrees on center around the circumference of the cage. This will give a maximum spacing, center to center, of approximately 9 ½ inches.
  - 4.2.2.7.4 The bottom of the cage shall be at a level not less than 7 feet or more than 8 feet above the point of access/egress to the bottom of the ladder. The bottom band of the cage shall be flared not less than 4 inches all around.
  - 4.2.2.7.5 Cages shall extend no less than 42 inches above the top landing, unless other means of protection is provided.
- 4.2.2.8 All parts and surfaces of the fixed ladder shall be free of sharp edges, burrs, or other details that may be hazardous to the person using the ladder.
- 4.2.2.9 A ladder safety system may be used in combination with a cage.

**4.2.3 Clearances for Existing Fixed Ladders****4.2.3.1 Climbing side of Ladders**

- 4.2.3.1.1 Ladders without cages or wells shall have a minimum perpendicular distance of 30 inches from the centerline of the steps and rungs to the nearest permanent object on the climbing side for ladders at a pitch of 90 degrees, and 36 inches for ladders at a pitch of 76 degrees.
- 4.2.3.1.2 Ladders with cages or wells shall have a clearance to the cage bands between 27 inches and 28 inches as stated in Paragraph 4.3.2.7.1.

**4.2.3.2 Back Side of Ladders**

- 4.2.3.2.1 The perpendicular distance from the centerline of the steps and rungs, or grab bars, or both, to the nearest permanent object in back of the ladder shall be not less than 7 inches.
- 4.2.3.2.2 For a through ladder, the step across distance from the centerline of the steps or rungs to the nearest edge of the structure, building, or equipment shall not be less than 2<sup>1</sup>/<sub>2</sub> inches or more than 12 inches.

**4.2.3.3 Width of Side Clearance**

Ladders without cages or wells shall have a minimum clear width to the nearest permanent object of at least 15 inches on each side of the centerline of the ladder.

**4.2.3.4 Steps and Rungs of Fixed Ladders**

- 4.2.3.4.1 The vertical distance between rungs throughout the length of the climb shall be 12 inches and uniform in the same length of climb.
- 4.2.3.4.2 The minimum inside clear width of step surface for steps and rungs shall be 16 inches, and this width shall be uniform in the same length of climb.
- 4.2.3.4.3 The top step or rung of a ladder shall be level with the top of the access / egress level or landing platform served by the ladder.
- 4.2.3.4.4 All rungs shall have a minimum diameter of <sup>3</sup>/<sub>4</sub> inch.

**4.2.3.5 Side Rails of Fixed Ladders**

- 4.2.3.5.1 Any shape side rail may be used that provides a uniform gripping surface for the hands of the person using the ladder, as long as the shape allows a power grip, and is uniform through the length of climb.
- 4.2.3.5.2 The side rails of through or side-step ladders shall extend 3 feet 6 inches above the top of the access/ egress level or landing served by the ladder.
- 4.2.3.5.3 For through ladder extensions, the steps or rungs shall be omitted from the extension and the extension of the side rails shall be flared to provide not less than 18 inches, or more than 24 inches, clearance between the side rails.
- 4.2.3.5.4 For side-step ladders, the side rails and the steps or rungs shall be continuous in the 3 feet 6 inch extension above the platform.

**4.2.4 Use and Inspection of Fixed Ladders****4.2.4.1 Use of Fixed Ladders**

- 4.2.4.1.1 When ascending/descending a ladder, the user shall face the ladder and maintain a three-point contact at all times.
- 4.2.4.1.2 The user shall not carry tools or equipment while ascending/descending a ladder. Both hands and arms shall remain free for climbing. Hand tools shall be carried in a pouch holster or otherwise secured, so as not to create a hazard.
- 4.2.4.1.3 The user shall never jump or slide down from a ladder or climb more than one rung/step at a time.
- 4.2.4.1.4 The user shall wear footwear with heels when climbing a ladder.
- 4.2.4.1.5 The user shall avoid using greasy or slippery gloves and/or footwear while ascending/ descending a ladder.
- 4.2.4.1.6 Users shall avoid ascending/descending a ladder during ice/frost conditions.
- 4.2.4.1.7 Users who tire easily, who are subject to fainting, vertigo, and/or are taking medication or prescription drugs, which may cause physical impairment, shall not be permitted to use fixed ladders.

#### 4.2.4.2 Inspection of Fixed Ladders

- 4.2.4.2.1 A formal, fully documented inspection of all fixed ladders will be accomplished upon installation and at least every 3 years thereafter.
- 4.2.4.2.1.1 Inspections will be conducted by the base operating contractor Base Civil Engineering Ladder System Engineer. Documentation will include the ladder identification number, location, a brief description, date of inspection, and a detailed list of all discrepancies will be documented in the Fixed Ladder Inspection database maintained by the ladder system engineer. Ladders may have an inspection tag that includes general information for identification purposes only. In the event the ladder has a tag missing it shall be permissible to use the ladder after a visual inspection by the user.  
**NOTE:** Base operating contractor employees notify facilities maintenance if the Ladder Inspection Tag is missing or needs to be replaced.
- 4.2.4.2.1.2 Base operating contractor Facilities Maintenance shall inspect fixed ladders installed on real property facilities or real property installed equipment (RPIE).
- 4.2.4.2.1.3 The using organization is responsible for ensuring inspections are done for facilities and equipment which are not real property.  
**NOTE:** When qualified personnel are not available in using organizations, the contractor facilities maintenance shall provide assistance.
- 4.2.4.2.1.4 All bolts and welds shall be in place and secure before a ladder is used, and no ladder shall be used if any fastenings or welds are missing, or if the joints between the rungs and the side rails are not tight.
- 4.2.4.2.1.5 Where structural damage or defects make a ladder hazardous, the ladder shall be taken out of service and either repaired by a competent individual or locked, blocked, fenced, or removed so it cannot be used.
- 4.2.4.2.1.6 Specific hazards to look for during inspections are: loose, worn, damaged rungs or side rails; damaged corroded bolts and rivet heads; damaged or corroded handrails and brackets on platforms; and deteriorated masonry where fixed anchorages are secured to a structure, including loose or damaged carrier rails or cables.

#### 4.2.4.3 Retrofit/Modification of Existing Fixed Ladders

- 4.2.4.3.1 It is the policy of AEDC not to modify or retrofit existing fixed ladders if they met existing standards at the time of installation and documentation is in existence to substantiate this compliance.
- 4.2.4.3.2 During the maintenance inspection required by 4.3.4.2 of this standard, ladders that do not meet current requirements will be identified by an inspection label. (See Annex.)
- 4.2.4.3.3 Using the information from this inspection, or from scheduled, periodic or spot inspections, base operating contractor safety shall determine if any non-compliant ladder requires modification. Risk to employees from use of the non-compliant ladder will be assessed, and assigned a Risk Assessment Code (RAC) and entered into the Base Hazard Abatement Program in accordance with AEDC Safety, Health, and Environmental Standard A5 Hazard Abatement Program.

### 4.3 PORTABLE LADDERS

#### 4.3.1 Requisitions of Portable Ladders

Requisitions for all portable ladders shall specify that ladders meet requirements of current OSHA standards (OSHA Sections 1910.25 and 26) and/or ANSI A14 series, ladder standards, whichever is applicable at the time of purchase. Additionally, requisitions shall specify that only Type I- Heavy Duty Industrial Use, Type IA Extra Heavy Duty Industrial Use, or Type IAA Special Duty, Industrial Use, ladders be purchased.

#### 4.3.2 Marking of Portable Ladders

- 4.3.2.1 All portable metal ladders not already marked with electrical safety instructions by the manufacturer shall be painted DANGER – DO NOT USE AROUND ELECTRICAL EQUIPMENT in 2-inch high red letters or the largest letters the surface will allow (minimum letter size is 1 inch).
- 4.3.2.2 Do not remove any manufacturer labels from ladder.

#### 4.3.3 General Use of Portable Ladders

- 4.3.3.1 Metal ladders conduct electricity. Keep away from electrical circuits. Use nonconductive ladders to perform electrical related tasks.

- 4.3.3.2 Consult manufacturer for use in chemical or other corrosive environments.
- 4.3.3.3 Use ladder per manufacturer recommendations. Ladders are designed for one person only; do not overload.
- 4.3.3.4 Do not use in high winds or during storm.
- 4.3.3.5 Keep shoes clean. Leather soles should not be worn, and shoes shall have heels.
- 4.3.3.6 Never leave ladder set up and unattended.
- 4.3.3.7 Select a ladder with the proper duty rating to support combined the weight of user and materials. Ladders are available with duty ratings of 250, 300 and 375 pounds. Do not use ladders with a duty rating of less. (See Paragraph 4.3.1.)
- 4.3.3.8 Select ladder of proper length to safely reach desired height and to allow for any required extension above the landing.
- 4.3.3.9 Inspect thoroughly for missing or damaged components. Never use a damaged ladder or make temporary repairs.
- 4.3.3.10 Inspect thoroughly for loose fasteners. Make sure all working parts are in good working order.
- 4.3.3.11 Clean ladder of all foreign material (wet paint, mud, snow, grease, oil, etc) prior to use.
- 4.3.3.12 Tag ladder out of service if damaged, worn, or exposed to fire or chemicals. Notify supervision.
- 4.3.3.13 Do not use ladders as permanent work platforms.
- 4.3.3.14 Ensure the area surrounding in-use ladders is controlled to prevent injury from falling objects and ladder being knocked over by moving equipment.

#### **4.3.4 Self-Supporting Portable Ladders (Step)**

##### **4.3.4.1 Proper Set Up**

- 4.3.4.1.1 Obtain help in setting up large ladders.
- 4.3.4.1.2 Set all feet on firm, level surface. Do not place on unstable, loose, or slippery surfaces.
- 4.3.4.1.3 Place ladder where access is not obstructed.
- 4.3.4.1.4 Do not place in front of unlocked doors.
- 4.3.4.1.5 Secure ladder from movement where possible.
- 4.3.4.1.6 Do not use ladders on scaffolds. If additional height is required, construct additional work levels of scaffolding.
- 4.3.4.1.7 Make sure spreaders are fully open, locked and ladder is stable before climbing.

##### **4.3.4.2 Step Ladder Use**

- 4.3.4.2.1 Climb only front side of ladder. Do not climb on bracing supporting the back legs of stepladders.  
**NOTE:** Mechanic ladders, extension trestle ladders and double-sided ladders, designed for climbing of both sides may be climbed from either side.
- 4.3.4.2.2 Face ladder when climbing up or down. Maintain a firm grip. Use both hands in climbing.
- 4.3.4.2.3 Keep body centered between side rails. Do not overreach. Get down and move ladder as needed.  
**NOTE:** Always face the ladder, do not turn around to perform work. Your stability is dependent on your knees and legs being in contact with the ladder at all times.
- 4.3.4.2.4 Do not climb, stand, or sit above second step from top. Do not climb, stand, or sit on spreader braces, ladder top, or pail shelf.
- 4.3.4.2.5 Do not straddle front and back. Do not climb from one ladder onto another.
- 4.3.4.2.6 Avoid pushing or pulling off to side of ladder. Do not “walk” or “shift” ladder while on it.

#### **4.3.5 Non-Self Supporting Portable Ladders (Extension Ladders)**

##### **4.3.5.1 Proper Set Up**

- 4.3.5.1.1 Use help in setting up large ladders.
- 4.3.5.1.2 Set base of ladder on firm, level surface. Ladder leveling devices are available for use on uneven ground.
- 4.3.5.1.3 Place ladder where access is not obstructed.
- 4.3.5.1.4 Do not place on unstable, loose, or slippery surfaces.

- 4.3.5.1.5 Do not place in front of unlocked doors.
- 4.3.5.1.6 Ladders are not intended to be used on scaffolds.
- 4.3.5.1.7 Secure base section before raising ladder to upright position. Do not raise or lower with upper section(s) extended.
- 4.3.5.1.8 Extend upper section(s) and engage rung locks; ensure extension rope does not create a trip hazard or interfere with activity near ladder. Tying the bottom extension rung to the adjacent base rung is recommended.
- 4.3.5.1.9 Extend and retract upper section only from ground and when no one is on ladder.
- 4.3.5.1.10 Do not overextend. A minimum overlap of sections is required as follows:
  - 4.3.5.1.10.1 Ladder size up to and including 32 feet – 3 foot overlap
  - 4.3.5.1.10.2 over 32 feet up to and including 36 feet – 4 foot overlap
  - 4.3.5.1.10.3 over 36 feet up to and including 48 feet – 5 foot overlap
  - 4.3.5.1.10.4 sizes over 48 feet – 6 foot overlap
- 4.3.5.1.11 Position ladder against upper support surface. Make sure ladder does not lean to side. Ladder must make a 75 <sup>1</sup>/<sub>2</sub> degree angle with the ground.  
**NOTE:** To establish if ladder is at proper angle - Determine the vertical distance between the top and bottom support points of the ladder. Divide this distance by 4. (4 to 1 height to base ratio) The result will be the horizontal distance between the top and bottom support points.
- 4.3.5.1.12 Erect ladder with 3 feet minimum extending above roof line or top working surface.
- 4.3.5.1.13 Top of ladder shall be secured when possible. (A co-worker must hold the base while the ladder is being ascended, tied off, or untied and descended after untying.)
- 4.3.5.1.14 Check that top and bottom of ladder are properly supported and make sure rung locks are engaged before climbing.

#### **4.3.5.2 Proper Use of Extension Ladders**

- 4.3.5.2.1 Face ladder when climbing up or down. Maintain a firm grip.
- 4.3.5.2.2 Use both hands in climbing.
- 4.3.5.2.3 Keep body centered between side rails. Do not overreach. Get down and move ladder as needed.  
**NOTE:** Always face the ladder, do not turn around to perform work. Your stability is dependent on your knees and legs being in contact with the ladder at all times.
- 4.3.5.2.4 Do not climb above top support point. Do not climb from one ladder to another.
- 4.3.5.2.5 Do not straddle or sit on rungs.
- 4.3.5.2.6 Avoid pushing or pulling off to side of ladder. Do not “walk” or “shift” ladder while on it.

#### **4.3.6 Proper Care and Storage of Portable Ladders**

- 4.3.6.1 Never store materials on ladder.
- 4.3.6.2 Never drop or apply an impact load to ladder.
- 4.3.6.3 Securely support ladder in transit.
- 4.3.6.4 Never paint a ladder. Treat with clear preservative.
- 4.3.6.5 Protect ladders from exposure to the elements, but allow good ventilation. Keep away from heat and moisture.

#### **4.3.7 Inspection and Tagging**

##### **4.3.7.1 Inspections**

##### **4.3.7.1.1 Daily/Before Use**

- 4.3.7.1.1.1 Portable ladders shall be visually inspected before each use, for obvious defects and/or damage which could cause the ladder to be hazardous for use.
- 4.3.7.1.1.2 Should the ladder contain obvious defects or damage, the user shall tag the ladder out of service immediately and report it to the immediate supervisor who will remove it from service and make arrangements for repair or destruction.

4.3.7.1.1.3 Tag defective ladders out of service. Base operating contractors shall accomplish this with a Form GC-82, Safety Information Tag, and mark the tag as follows:

**DANGEROUS—Do NOT USE.**

**4.3.8 Operating Contractor Disposal of Defective Ladders**

4.3.8.1 Send defective wooden ladders to the Carpenter Shop for repair or disposal.

4.3.8.2 Send defective metal or plastic/fiberglass ladders to the Sheet Metal Shop for repair or disposal.

**5.0 TRAINING**

Ensure all employees who use ladders are properly trained in correct ladder use.

**6.0 INSPECTIONS/AUDITS**

AEDC or Operating Contractor Safety may conduct ladder safety inspections/audits as directed by Air Force or Operating Contractor management.

**7.0 REFERENCES**

**AEDC Safety, Health, and Environmental Standards (SHE Std.)**

A5 Hazard Abatement Program

**Air Force Instructions(AFI)**

AFI 91-202, The United States Air Force Mishap Prevention Program

AFI 91-203, Air Force Consolidated Occupational Safety Instruction

**American National Standards Institute (ANSI) Standards for Ladders**

A14.1, Portable Wood – Safety Requirements

A14.2, Portable Metal – Safety Requirements

A14.3, Fixed – Safety Requirements

A14.5, Portable Reinforced Plastic – Safety Requirements

**OSHA**

29 CFR 1910.25, Portable Wood Ladders

29 CFR 1910.26, Portable Metal Ladders

29 CFR 1910.27, Fixed Ladders

29 CFR 1926.1053, Ladders

29 CFR 1926.1060, Training Requirements

**8.0 ANNEX**

AEDC Base Operating Contractor Inspection Labels

**9.0 SUPPLEMENT**

NFAC A321-0801-XSP D9 Fixed and Portable Ladders

ANNEX

AEDC BASE OPERATING CONTRACTOR INSPECTION LABELS



The green inspection label shown at left is placed on a fixed ladder that meets or exceeds the requirements of OSHA 29 CFR 1910.27, Fixed Ladders, and/or ANSI A14.3, American National Standard for Ladders – Fixed – Safety Requirements whichever was applicable at the time of installation.

The yellow caution label shown at right is placed on a fixed ladder where code violations exist. If ladder has been listed as a RAC 2 or 3, then label will be accompanied by an AF Form 1118 that states the code violations when the box is marked stating 1118 required. If the ladder has been listed as a RAC 4 or 5, then the box will be marked stating minor code violations. If the ladder is deemed hazardous then it is taken out of service by either using a locking device or by other appropriate means.



# A321-0801-XSP- D9 Fixed and Portable Ladders

This supplement has been approved for the NFAC Site.

**Review:** This supplement will be reviewed and updated using the same cycle as the AEDC Safety Standard D9 “Fixed and Portable Ladders”.

**References:** AEDC Safety Standard D9 – Fixed and Portable Ladders at the AEDC NFAC Site.

**Scope:**

This supplement was developed using the most current and applicable Occupational Safety and Health Administration (OSHA), American National Standards Institute (ANSI) and Air Force guidance. Under most conditions, when questions arise, the more stringent requirement shall be applicable.

Fixed and portable ladders are acquired, designed, used, maintained and disposed of in accordance with this supplement.

This supplement applies to all NFAC personnel, customers and vendors.

**NFAC Worksite Application:**

- I. NFAC Site Management shall:
  1. Ensure that their personnel adheres to safe practices concerning Ladder Safety and this supplement
- II. NFAC Supervisors and Test Directors shall:
  1. Ensure the supplement is followed
  2. Ensure that staff and customers use the correct ladder, inspect ladder before use and use it correctly
- III. NFAC Safety Engineer/Management Designee shall:
  1. Approve ladder purchases (ladders are defined as a safety item) through the ATOM Purchasing process
- IV. NFAC Staff shall:
  1. Ensure that manufacturer’s recommendations for proper use and storage are followed.
  2. Ensure that all portable ladders are visually inspected prior to use for deficiencies or hazards that would render the ladder unsafe for use.
  3. Procurement for new portable ladders shall specify that ladders meet requirements of current OSHA standards (OSHA Sections 1910.25 and 26) and/or ANSI A14 series, ladder standards, whichever is applicable at the time of purchase. Additionally, requisitions shall specify that only Type I- Heavy Duty Industrial Use, Type IA Extra Heavy Duty Industrial Use, or Type IAA Special Duty, Industrial Use, ladders be purchased.
  4. Ladders are defined as Safety equipment and all procurement requests shall be coordinated with the NFAC Safety Engineer.
  5. Use shoes with standard heels when using ladders to prevent slipping off rung.