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MILITARY STANDARD

CLIMBER SETS, TREE AND POLE

AMSC N/A

FSC 4240

DEPARTMENT OF DEFENSE
Washington, DC 20301

Climber Sets, Tree And Pole

MIL-STD-1433A

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, U.S. Army Chemical Research, Development and Engineering Center, Attn: SMCCR-SPD-TS, Aberdeen Proving Ground, MD 21010-5423, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

4.12.4 Packaging data. Each mask is fitted with a faceform to drav

FOREWORD

This standard is approved for use by all Departments and Agencies of the Department of Defense in the selection of items for application. It is intended to prevent the entry of unnecessary items (sizes, types, varieties) into the Department of Defense logistics system. This document is not intended to restrict any service in selecting new items resulting from state-of-the-art changes.

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TABLES

FIGURES

1. SCOPE

1.1 Purpose. The purpose of this standard is to present the nomenclature, specification requirements, military uses, and safety information for climber sets, tree and pole. This standard does not necessarily include all of those items which are commercially available. It does contain items preferred for use in the selection of climber sets for application by the Department of Defense.

1.2 Application. Climber sets, tree and pole, are used by personnel in ascending and descending trees and poles.

2. REFERENCED DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation form a part of this standard to the extent specified herein.

SPECIFICATIONS

FEDERAL

A-A-1109 - Climber Set Tree and Pole: Steel, Interchangeable Gaff, w/Nylon Neoprene Coated Straps

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this standard to the extent specified herein.

CODE OF FEDERAL REGULATIONS (CFR)

Title 29, Chapter XVII - Department Of Labor, Occupational Safety And Health Administration

DEPARTMENT OF DEFENSE (DOD)

DOD 4160.21M - Defense Utilization And Disposal Manual

(Copies of specifications, standards, handbooks, drawings, and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following document(s) form a part of this standard to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of DODISS specified in the solicitation. The issues of documents which have not been adopted shall be those in effect on the date of the cited DODISS.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM F 887 - Standard Specification for Personal Climbing Equipment.

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

(Nongovernment standards are generally available for reference from libraries. They are also distributed among nongovernment standards bodies and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this standard and the references cited herein, the text of this standard shall take precedence.

3. DEFINITIONS

The following definitions are in accordance with ASTM F 887.

3.1 Billet. The free (buckle hole) end of a belt or strap, as opposed to the tongue (buckle) end, which is designed to pass through the buckle for closing.

3.2 Gaff. A component of a pole or tree climber attached to the climber shank, similar to a spur, which is shaped to permit the secure penetration of the pole or tree trunk.

3.3 Protector, gaff. A cap or guard designed to cover the points of pole or tree gaffs to protect gaffs from damage and from damaging equipment.

3.4 Stirrup, climber. The footrest of the pole or tree climber.

4. GENERAL REQUIREMENTS

4.1 Packaging data and labeling. Packaging, packing, labeling and marking shall be as specified in the contract or order.

4.2 Safety. The Occupational Safety and Health Administration (OSHA) regulations applicable to pole climbers and gaffs are stated in 29 CFR, section 1910.268, paragraph (g)(3).

4.3 Storage. Climber sets and their components covered by this standard shall be stored in their shipping containers in a cool dry place, away from heat sources and direct sunlight.

4.4 Disposal of excess or unserviceable material. To minimize disposal problems, it is recommended that no more than a one year's supply of each item listed in this standard be stocked. When stocks have been declared excess or unserviceable, they will be disposed of in accordance with the Defense Utilization and Disposal Manual, DOD 4160.21-M, and applicable DOD Policy Memoranda. Guidance can be obtained from your servicing Defense Reutilization and Marketing Office (DRMO) on procedures required for proper reporting and turn-in.

5. DETAILED REQUIREMENTS

5.1 Name. Climber Set, Tree and Pole

5.1.1 Specifications. A-A-1109, Climber Set Tree and Pole: Steel, Interchangeable Gaff, w/Nylon Neoprene Coated Straps
ASTM F 887, Standard Specifications for Personal Climbing Equipment

5.1.2 Technical description. A climber set shall consist of a pair of leg irons, climber gaffs, climber straps, and calf pads. A typical illustration is shown in Figure 1.

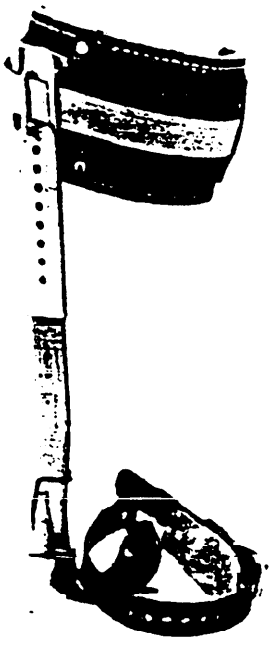


FIGURE 1. Typical illustration of a climber set, tree and pole.

5.1.2.1 Leg irons.

a. In accordance with A-A-1109, leg irons shall be of the straight type, and adjustable in length from approximately 15 to 19 inches (38 to 48 cm) by means of telescoping sleeves. They shall be forged of AISI 8640 or equivalent steel. The steel shall be heat treated to a Rockwell hardness (Rc) of 30 to 40. A standard stirrup and a split ring fastening for an ankle strap shall be provided. The tested leg irons, when cold, shall be capable of being bent through an angle of 180° around a 2 inch (51 mm) diameter mandrel without fracturing or cracking. All leg irons shall show no evidence of cracks or other discontinuities when tested by the magnaflux method. A typical illustration is shown in Figure 2.

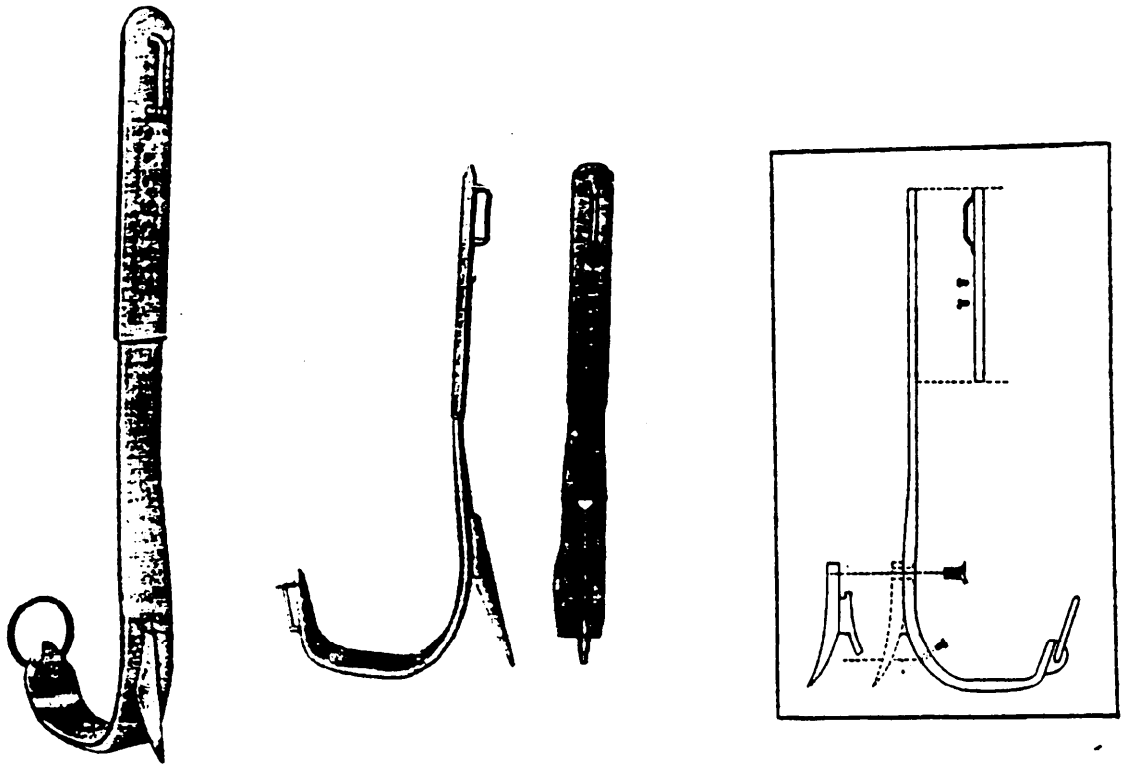


FIGURE 2. Typical illustration of leg irons, with gaffs and locking screws.

b. In accordance with ASTM F 887, climbers shall be designated as follows:

Type A - Fixed length, non-adjustable, with permanently attached gaffs.

Type B - Adjustable length with permanently attached gaffs.

Type C - Adjustable length with replaceable and interchangeable gaffs (that is, pole to tree).

(1) Type A shall be available in sizes from 14 to 22 inches (35 to 56 cm) in 1/2 inch (12.7 mm) graduations. Type B and C shall be available with the size adjustment capability of 14-3/4 to 21 inches (37 to 53 cm) by increments of 1/4 inch (6.35 mm).

(2) Adjustable climbers shall be equipped with positive locking, length-adjusting sections that can be double locked securely to the leg iron, permitting full compliance with standards established for fixed length climbers.

(3) Leg irons shall be forged, utilizing forging-quality alloy steel or aluminum alloys. SAE4140, 8630 and 8640 steel alloys, with quenched and tempered structure, and 2014T6 aluminum alloy are recommended. Other steel and aluminum alloys having the properties listed in Table I are acceptable.

TABLE I. Properties of steel and aluminum alloys acceptable for climbers.

	For Fixed Gaff Climbers	For Replaceable Gaff Climbers
Steel:		
Elongation in 2 in (5 cm), min	14%	14%
Hardness	23 to 38 HRC 1/	32 to 40 HRC 1/
	243 to 353 HB 2/	300 to 375 HB 2/
Yield strength, min, psi (MPa)	118 000 (813)	130 000 (896)
Aluminum:		
Elongation in 2 in (5 cm), min	---	10%
Hardness	---	125 to 140 HB 2/
Yield strength, min, psi (MPa)	---	65 000 (448)

1/ HRC - Rockwell hardness (Rc).
2/ HB - Brinell hardness number with 3000 kg load, 10 mm ball.

(4) The design of the leg irons shall be such; that the maximum tensile stress at the point subjected to a fluctuating bending force of 300 lbf (1.3 kN), applied to the center of the stirrup section of the leg iron with sleeve in position, shall be in accordance with the limits shown in Table II. The climber shall be held in climbing position by the gaff, and at the top of the climber with the sleeve extended to provide a 16 inch (40.6 cm) length.

TABLE II. Leg iron tensile stress test.

Leg Iron Metal	Maximum Tensile Stress, psi (MPa)
Steel	27,000 (186)
Aluminum	9,000 (62)

(5) Leg irons shall be free of surface cracks and seams. All steel leg irons shall be finished with a rust-resistant coating.

5.1.2.2 Gaffs.

a. In accordance with A-A-1109, one set of pole gaffs and one set of tree gaffs shall be furnished with each climber set. Gaffs shall be firmly affixed to leg irons by means of a postive locking method. Gaffs shall be forged, AISI 4340 or equivalent steel. The steel shall be annealed, hardened and tempered to a Rc of 45 to 55. The tested gaffs shall be capable of withstanding without fracture a bend away from the leg iron, which permanently deflects the top at least 3/8 inch (9.53 mm) with respect to the ridge on the upper section of the gaff. The radius of the bend shall be approximately 5/8 inch (14.0 mm). All gaffs shall show no evidence of cracks or other discontinuities when tested by the magnaflux method. Gaff replacements shall only be supplied by the original manufacturer. Typical illustrations are shown in Figures 3 and 4.

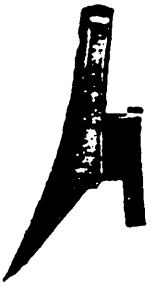


FIGURE 3. Typical illustration of a pole gaff.

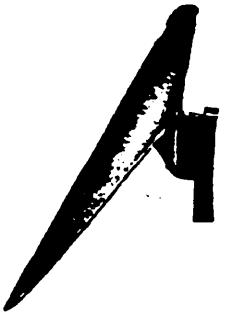


FIGURE 4. Typical illustration of a tree gaff.

b. In accordance with ASTM F 887, pole gaffs shall measure at least 1-7/16 inch (37 mm) on the underside. Tree gaffs shall measure not more than 3-1/2 inches (89 mm), nor less than 2-1/4 inches (57 mm). Degree of angle of the gaff shall range from 11° to 17° measured from a line parallel with the straight section of the climber leg iron that intersects the outside point of the gaff. The point of a pole gaff shall be a minimum of 3/8 inch (9.5 mm) above the lowest point of the leg iron stirrup. The inside flat surface of the gaff at the tip shall be finished with a radius of approximately 1/4 inch (6.4 mm) in accordance with the gage profile. All gaffs shall be forged of forging quality steel with the properties shown in Table III.

TABLE III. Properties of steel alloy acceptable for gaffs.

Elongation in 2 in (5 cm), min	12%
Hardness (tip)	45 to 55 HRC 1/ 421 to 546 HB 2/
Yield strength, psi (MPa)	212 000 (1460)

1/ There may be a variation of no more than three points in the Rockwell hardness readings taken from the tip of the gaff to a point 1-1/4 in (3.2 cm) back from the tip on the fixed gaff climber, 1 in (2.5 cm) from the tip on replaceable gaff climbers.

2/ Brinell hardness number with 3000-kg load, 10-mm ball.

All fins and burrs shall be removed from the cutting edges of gaffs, and the surfaces shall be finished with a rust-resistant coating. The size and shape of gaffs shall be checked with a gage available from the same manufacturer. Replaceable gaffs, whether pole or tree, fit only the climber leg irons of the particular manufacturer.

5.1.2.3 Climber straps.

a. In accordance with A-A-1109, straps for attaching climbers shall be made of neoprene impregnated nylon having a minimum of four plies of thickness, folded to one inch (2.54 cm), and allowing no exposed raw edges. The tensile strength of straps, when assembled, shall be not less than 300 pounds per inch (52.5 $kN/_m$) of width using a straight pull. Ankle straps, when assembled to ring, shall measure a minimum of 36 inches (91 cm), and calf straps a minimum of 22 inches (56 cm). Typical illustrations are shown in Figures 5 and 6.

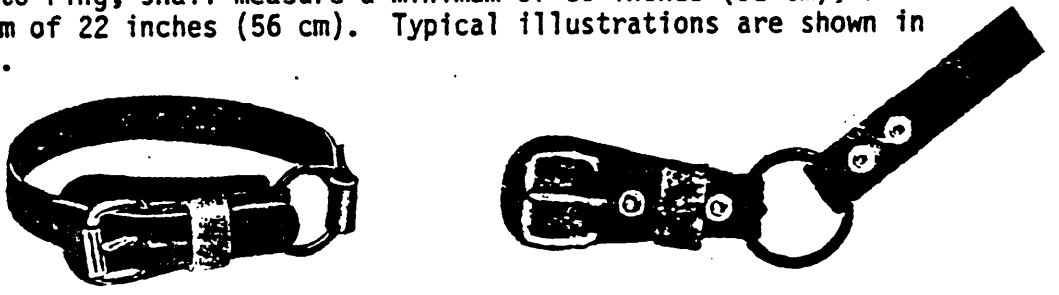


FIGURE 5. Typical illustration of an ankle strap.

FIGURE 6. Typical illustration of a calf strap.

b. In accordance with ASTM F 887, climber straps shall be designated as follows:

Type A - One-piece straps that pass through the loops or rings on climbers and buckle one end to the other.

Type B - Two-piece ankle or bottom straps made so that each section can be attached to the climber ring, leaving the buckle end free to engage with free billet end of the other piece.

(1) Climber straps shall be a minimum of 1 inch (2.5 cm) in width and 1/8 inch (3.18 mm) in thickness. The length shall be not less than 22 inches (56 cm) for the calf strap, and 24 inch (61 cm) for the one-piece ankle strap. Two-piece ankle straps shall be not less than 24 inches (61 cm) in length.

(2) Climber straps shall be manufactured of leather or of fabric. Leather used in climber straps shall be top grain cowhide, and shall have a breaking strength of not less than 450 lbf/in (78.8 $kN/_m$) of width with buckle holes. The buckle holding strength of the leather shall be not less than 200 pounds (90.9 kg) of static load when tested as specified. The leather shall show no cracking on the grain side when bent slowly over a 1/2 inch (12.7 mm) diameter mandrel through an angle of 180° with the grain side out. The leather shall not show piping or wrinkling of the grain side when bent over a one inch (25.4 mm) diameter mandrel through an angle of 180° with the grain side in Fabric used in climber straps shall have a breaking strength of not less than 600 lbf/in (105 $kN/_m$) of width with buckle holes. Construction shall

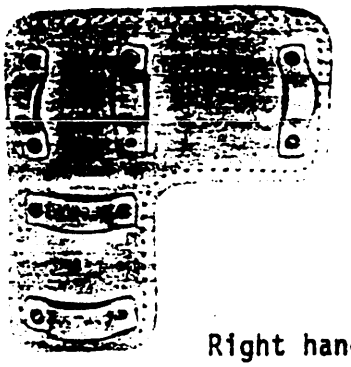
be a minimum of four plies of thickness with no cut edges exposed. The fabric shall be impregnated with neoprene, or the equivalent, so that the plies or strands are not readily separable except by chemical means.

The buckle holding strength of the finished strap shall be not less than 300 pounds (136 kg) static load without evidence of failure. Buckle tear shall be in the direction of load application when tested to failure. Buckle boles in the climber straps shall not exceed 3/16 inch (4.77 mm) in diameter. Straps shall be riveted to the buckles by at least two rivets, with the strap keeper centered between the rivets. The completed assembly shall meet the strength requirements for leather or fabric material and buckle holding strength.

(3) Buckle frames shall be of welded wire or forged construction. Tongues shall be of an adequate gage wire to meet the strength criteria stated above.

5.1.2.4 Calf pads.

In accordance with A-A-1109, calf pads shall be L-shaped and shall be made of neoprene impregnated nylon or equal. The vertical section shall have internal padding. A typical illustration is shown in Figure 7.



Right hand wing pad

FIGURE 7. Typical illustration of calf pad.

5.1.3 Use. Climber sets, tree and pole, are intended for military use by personnel in ascending and descending trees and poles. Commercial applications are the same.

5.1.4 Packaging data and labeling. Refer to 4.1.

5.1.5 Safety. Refer to 4.2.

5.1.6 Storage. Refer to 4.3.

5.1.7 Disposal of excess or unserviceable material. Refer to 4.4.

6. NOTES

6.1 Intended use. This standard is intended for use by Department of Defense personnel in the selection of preferred climber sets, tree and pole, and component items.

6.2 Subject term (key word) listing.

Ankle strap
Billet
Buckle, strap
Calf pad
Climber gaffs
Climber set
Climber stirrup
Climber straps
Gaff
Gaff, pole
Gaff, tree
Gaff protector
Leg irons
Pole climber
Pole gaffs
Protector, gaff
Stirrup, climber
Strap, ankle
Straps, climber
Tree climber
Tree gaffs

6.3 Changes from previous issue. Asterisks or vertical lines are not used n this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.4 Abbreviations. The use of abbreviations shall be in accordance with MIL-STD-12 where applicable. Metric system abbreviations and symbols shall be in accordance with ASTM E 380.

Custodians:
Army - EA
Navy - YD
Air Force - 99

Review activities:
DLA - GS
Air Force - 84

User activities:
Army - CR, ME
Navy - MC

Preparing activity: Army - EA
(Project Number 4240-0552)

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

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1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-STD-1433A	CLIMBER SETS, TREE AND POLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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