INCH-POUND

MIL-STD-1433B
7 May 1993
SUPERSEDING
MIL-STD-1433A
25 May 1988

MILITARY STANDARD

CLIMBER SETS, TREE AND POLE

AMSC N/A

FSC 4240

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

FOREWORD

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 Edgewood Research, Development and Engineering Center, ATTN: SMCCR-PET-S, 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.

3. This standard is approved for use by all Departments and Agencies of the Department of Defense in the selecting of items or facilities for application. It is intended to prevent the entry of unnecessary configurations into the Department of Defense logistics system. This document is not intended to restrict state-of-the-art changes from being used.

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CONTENTS

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.

however, shall supersede applicable laws and regulations unless a specific

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

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

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099).

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications from a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

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 the Code of Federal Regulations are available on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Copies of DoD 4160.21M are available from the Defense Logistics Services Center, Battle Creek, MI 49017-3084.

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM F 887 Standard Specifications for Personal Climbing Equipment.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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 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 shall 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 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. An illustration of a typical climber is shown in Figure 1.

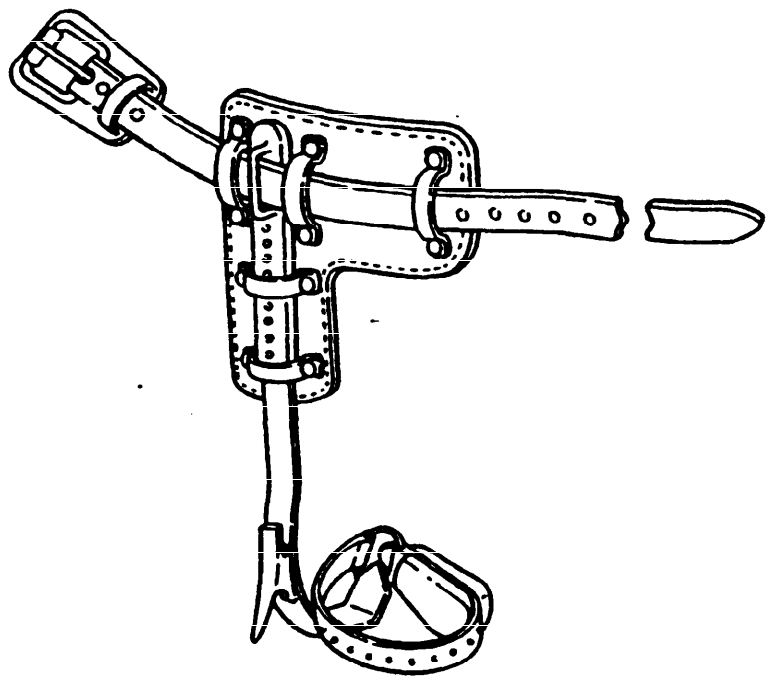


FIGURE 1. Illustration of a typical climber set, tree and pole.

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 degrees 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. Typical leg irons are shown in Figure 2.

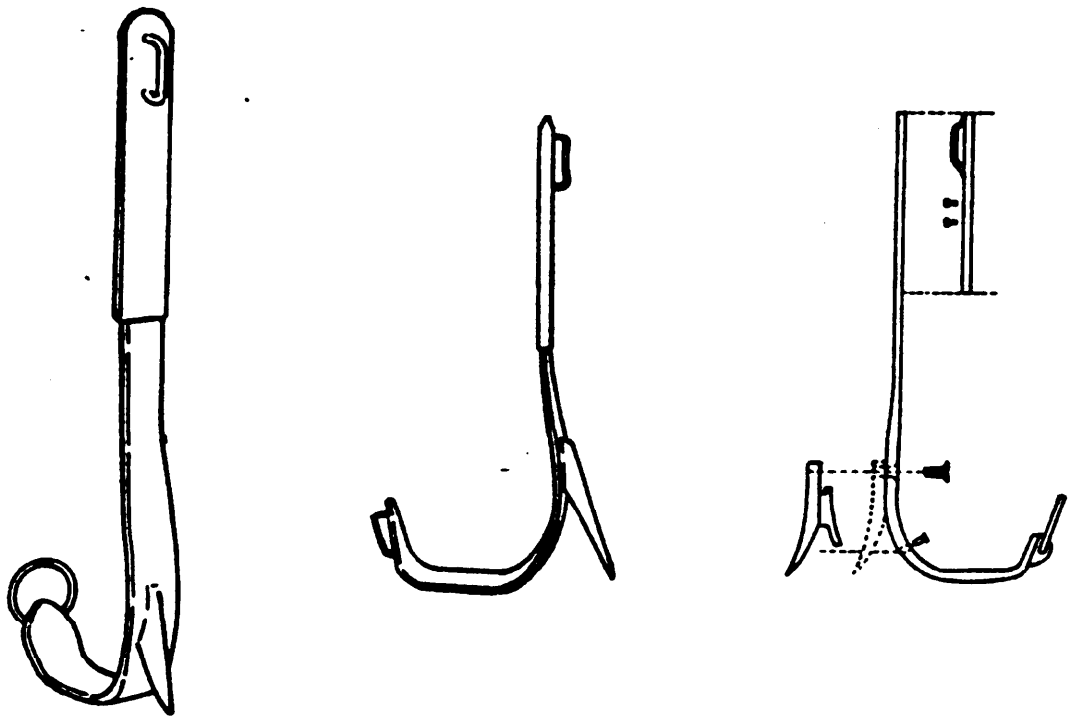


FIGURE 2. Illustration of typical leg irons, with gaffs and locking screws.

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 Replacement Gaff Climbers
Steel:		
Elongation in 2 in (5 cm), min	14%	14%
hardness	23 to 38 HRC* 243 to 353 HB**	32 to 40 HRC* 300 to 375 HB**
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**
Yield strength, min, psi (MPa)	---	65 000 (448)

* HRC – Rockwell hardness (Rc).
** HB – Brinell hardness number 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 force shall be exerted 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 positive 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 or bend away from the leg iron, which permanently deflects the top at least 3/8 inch (9.5 mm) with respect to the ridge on the upper section of the gaff. The radius of the bend shall be approximately 5/8 inch (15.9 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. A typical pole gaff is shown in Figure 3, and Figure 4 shows a typical tree gaff.

FIGURE 3. Illustration of a typical pole gaff.

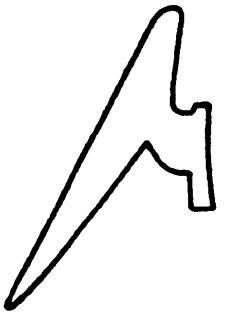


FIGURE 4. Illustration of a typical tree gaff.

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 degrees to 17 degrees 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* 421 to 546 HB**
Yield strength, psi (MPa)	212 000 (1460)

* 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.

** 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 that 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 straps are shown in Figures 5 and 6.

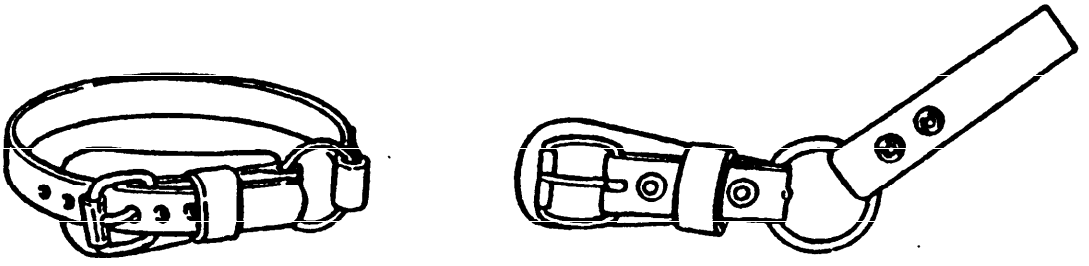


FIGURE 5. Illustration of a typical ankle strap.

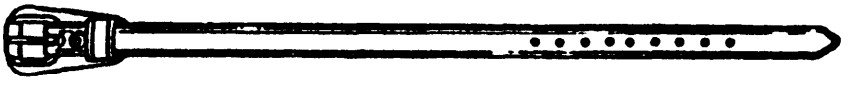


FIGURE 6. Illustration of a typical calf strap.

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 the 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 inches (61 cm) for the one-piece ankle strap. Two-piece ankle straps shall be not less than 24 inches (61 cm) in length.

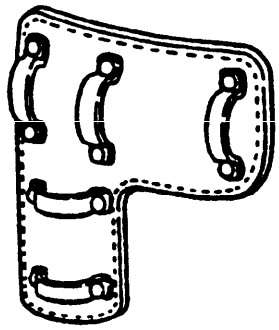
(2) Climber straps shall be manufactured of leather or of fabric. Leather used in climber straps shall be top grain cowhide, and shall have a breaking strength of not less than 450 lbf/in (78.8 kN/m) of width with buckle holes. The buckle holding strength of the leather shall be not less than 200 pounds (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 degrees 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 degrees 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 holes in the climber straps shall not exceed 3/16 inch (4.76 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 equivalent. The vertical section shall have internal padding. A typical calf pad is shown in Figure 7.



Right hand wing pad

FIGURE 7. Illustration of a typical 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

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

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 Issue of DODISS. When this standard is used in acquisition, the issue of the DODISS to be applicable to this solicitation must be cited in this solicitation.

6.3 Subject term (key word) listing.

Billet
Buckle, strap
Calf pad
Climber gaffs
Gaff
Gaffs, pole
Gaffs, tree
Leg irons
Pole climber
Stirrup, climber
Strap, ankle
Straps, climber

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

CONCLUDING MATERIAL

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

Review activities:
DLA - GS, DP
Air Force - 84

User activities:
Army - CR, ME
Navy - MC

Preparing activity: Army - EA
(Project Number 4240-0584)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER	2. DOCUMENT DATE *(YYMMDD)*

3. DOCUMENT TITLE

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) AUTOVON *(If Applicable)* / 7. DATE SUBMITTED *(YYMMDD)*

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE *(Include Area Code)* (1) Commercial (2) AUTOVON
c. ADDRESS *(Include Zip Code)*	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340