

INCH-POUND

MIL-L-12197F
26 November 1993
SUPERSEDING
MIL-L-12197E
4 February 1975

MILITARY SPECIFICATION

LADDERS, FIRE, EXTENSION; LADDERS, FIRE, ROOF; AND LADDERS, FIRE, COMBINATION

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers extension, roof, and combination aluminum ladders.

1.2 Classification. Ladders shall be of the following classes and lengths as specified (see 6.2):

Class 1 - Extension
20-foot, 2 section
24-foot, 2-section
36-foot, 3-section

Class 2 - Roof
12-foot
14-foot
16-foot

Class 3 - Combination
14-foot, 2-section
21-foot, 3-section

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).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US ARMY BELVOIR RDE CTR, ATTN SATBE TSE, 10101 GRIDLEY RD STE 104, FT BELVOIR VA 22060-5818 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 4210

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SPECIFICATIONS

FEDERAL

- T-R-605 - Rope, Manila and Sisal.
- T-T-616 - Treatment: Mildew Resistant, for Rope and Cord.
- PPP-B-601 - Boxes, Wood, Cleated-Plywood.
- PPP-C-650 - Crates, Wood, Open and Covered.

MILITARY

- MIL-T-704 - Treatment and Painting of Materiel.
- MIL-W-5044 - Walkway Compound, Nonslip, and Walkway Matting, Nonslip.

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-130 - Identification Marking of US Military Property.
- MIL-STD-889 - Dissimilar Metals

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from: STDZN DCMNT ORDER DESK, BLDG 4D, 700 ROBBINS AVE, PHILADELPHIA PA 19111-5094.)

2.2 Non-Government publications. The following document(s) 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)

- B 221 - Aluminum-Alloy Extruded Bars, Rods, Shapes, and Tubes.
- D 3951 - Standard Practice for Commercial Packaging.

(Application for copies should be addressed to: AMERCN SCTY & MTRLS, 1916 RACE STRET, PHILADELPHIA PA 19103.)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- 1500 - Fire Department Occupational Safety and Health Program.
- 1931 - Standard on Design, and Design Verification Tests for Fire Department Ground Ladders.
- 1932 - Standard on Use, Maintenance, and Service Testing of Fire Department Ground Ladders.

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(Application for copies should be addressed to: NATL FIRE PROTECT ASS, BATTERYMARCH PARK, QUINCY MA 02269.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION (NMFTA)

National Motor Freight Classification Rules

(Application for copies should be addressed to: NATL MTR FRGHT TRFC ASS, ATTN TRFC ORDR SECT, 2200 MILL RD, ALEXANDRIA VA 22314.)

SOCIETY OF AUTOMOTIVE ENGINEERS, INC (SAE)

J492 - Rivets and Riveting.

(Application for copies should be addressed to: SCTY OF AUTOMTV ENGRS, INC, 400 CMNWLT DR, WARRENDALE PA 15096.)

UNIFORM FREIGHT CLASSIFICATION COMMITTEE (UFCC)

Uniform Freight Classification Rules.

(Application for copies should be addressed to: UNFRM FRGHT CLASS CMMTE, ATTN TARIFF PBLSHNG OFCR, ROOM 1106, 222 S RIVERSIDE PLZ, CHICAGO IL 60606.)

(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, (except for related associated detail specifications, specification sheets or MS standards), the text of NFPA 1931 and 1932 shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. The ladders furnished under this specification shall meet the requirements of NFPA 1500, 1931 and 1932 and shall be as specified herein. The ladders shall be as shown on figures 1 through 4.

3.2 Material. The main components of the ladders, such as the rungs and siderails or beams, shall be of aluminum. Materials used for rivets or bolts and other subcomponents shall be compatible with main components and the intended use of the ladder. Material not specified shall be selected by the contractor and shall be subject to all provisions of this specification.

3.2.1 Aluminum. Aluminum shall conform to ASTM B 221, composition 6061, temper T6. Other composition and tempers may be used when specified by the contracting officer but shall not lessen the performance of the ladder or add weight and shall be in compliance with this specification.

3.2.2 Material deterioration prevention and control. The ladders shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration that

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may be encountered in any of the applicable operating and storage environments to which the ladders may be exposed.

3.2.3 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.2.4 Recovered materials. For the purpose of this requirement, recovered materials are those materials which have been collected from solid waste and reprocessed to become a source of raw materials, as distinguished from virgin raw materials. The components, pieces and parts incorporated in the ladders may be newly fabricated from recovered materials to the maximum extent practicable, provided the ladders produced meets all other requirements of this specification. Used, rebuilt or remanufactured components, pieces and parts shall not be incorporated in the ladders.

3.3 Rope. Rope shall have a minimum breaking strength of 825 pounds and shall be not less than 3/8 inch in diameter. The rope shall conform to T-R-605, type M, and shall be rendered fungus resistant in accordance with T-T-616.

3.4 Side rails. Side rails shall be straight and parallel. The side rails shall be of channel, tubular, I-beam, or combination section, and may be integral and built-up construction. The web may be continuous or interrupted between rungs for weight reduction.

3.5 Rungs. Rungs shall comply with NFPA 1931, as specified by the contracting officer. Rungs shall be tubular and shall be circular, D-shaped or rectangular in cross section as specified by the contracting officer. Rungs shall be not less than 1-1/4 inches in diameter nor more than 1-1/2 inches when circular or D-shaped. Rectangular rung dimensions shall be not less than 1-1/4 inches wide. Load-bearing surfaces shall be corrugated, knurled, serrated, dimpled or coated with skid resistant material common to fire service ladders. The rungs shall be welded, riveted, expanded, or bolted to the side rails. Rungs shall not twist or loosen under any condition of service. The rungs shall be parallel to each other and at right angles to the side rails and shall be spaced in compliance with NFPA 1931. The first and last rung shall be not more than 14 inches from the end of the side rail. The rungs (and the side rails) shall support a load of not less than 1000 pounds placed on any individual rung at one time when tested in accordance with NFPA 1931 as specified in 4.4.2.

3.6 Locks, guides and stops. The ladders shall be equipped with locks and guides that make the extension ladders equal in strength to ladders of the same length having continuous side rails. The locks shall be automatic in action. The guides shall prevent the upper sections from tipping or falling when the ladder is hoisted, lowered, or in use. Extension ladders shall be furnished the manufacturer's recommended, permanently attached stop, which shall prevent over extending the ladder.

3.7 Identification marking. Each ladder shall be identified in accordance with MIL-STD-130. Markings and labels required by NFPA 1931 - including but not limited to the heat sensor label - shall be permanently affixed and located in compliance with NFPA 1931.

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3.8 Treatment and painting. The ladders shall not be painted unless painting is specified (see 6.2). When painting is specified, the ladders shall be treated and painted in accordance with MIL-T-704, type A, color no. 14084, unless another color is specified (see 6.2).

3.9 Class 1, extension ladders. Class 1 ladders shall be as shown on figure 1, and shall consist of two telescoping sections for the 20- and 24-foot ladders, and three telescoping sections for the 36-foot ladder. The side rails of the upper section shall fit between the side rails of the lower section. The ladders shall be equipped with guide grooves and rails. Locks and stops shall be provided to prevent the ladders from extending beyond the specified lap and shall positively lock the section in place. Rail sections shall move freely and smoothly. Overlapping sliding sections shall operate without hazard to the hands or fingers of operating personnel. The dimensions of Class 1 ladders shall be as shown in table I ($\pm 1/8$ inch). Each ladder shall be in compliance with NFPA 1931.

TABLE I. Dimension of class 1 ladders.

	20-foot	24-foot	36-foot
Distance between outside side rails (bottom section) (maximum)	24 in.	24 in.	26 in.
Distance between inside side rails (top section) ^{1/} (minimum)	16 in.	16 in.	16 in.
Length (open) (minimum)	20 ft.	24 ft.	35 ft. 10 in.
Overlap between sections (minimum)	4 ft.	4 ft.	4 ft. 6 in.
Length (closed) (maximum)	13 ft.	15 ft.	15 ft. 4 in.
Thickness (closed over hardware) (maximum)	6-3/4 in.	6-3/4 in.	9 in.

^{1/} Distance shall be measured between innermost projection of the side rails.

3.9.1 Shackles and pulleys. Class 1 ladders shall be equipped with shackles and pulleys, together with necessary rope to enable the sections to be raised and locked in place from the ground. Shackles and pulleys shall be installed in such a manner as not to weaken the rungs or the side rails.

3.9.2 Rigging. The 20- and 24-foot ladders shall be rigged in accordance with the contractor's recommendation. Rigging of the 36-foot ladder shall be such that the two extended sections raise simultaneously from a single rope or cable. Raising shall be accomplished from the ground with a pull of not more than 80 pounds.

3.9.3 Shoes. The side rails of the lower sections shall be equipped with hinged shoes. The shoes shall be equipped with nonskid tread. Shoes shall extend not more than 1-1/2 inches beyond any part of the side rails.

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3.10 Class 2, roof. Class 2 ladders shall be as shown on figure 2, and shall be roof ladders with a hook at the top of each side rail. Each ladder shall be in compliance with NFPA 1931.

3.10.1 Shoes. Class 2 ladders shall be equipped with shoes as specified in 3.9.3.

3.11 Class 3, combination ladders. Class 3 ladders shall be as shown on figure 3 and 4. The 14-foot combination ladder shall be in compliance with NFPA 1931. The 21-foot ladder shall be in compliance with the NFPA criteria established for the 14-foot combination ladder. When employed as an A-frame or folding ladder it shall comply with NFPA 1931 criteria established for A-frame or folding ladders of that height.

3.11.1 Spiked feet. Spiked feet or ice pick plates shall be provided on the lower end of both sets of side rails. Hinged retractable shoes shall be provided on one set of side rails on the A-frame. When the shoes are in the retracted position, the spike ends or ice pick plates shall be exposed.

3.11.2 Nonslip coating. The bottom edge of the side rails of class 3 ladders shall be coated with a nonslip material conforming to MIL-W-5044, type I, class 2, to minimize slippage when the ladder is resting against the metal surface of an aircraft skin. The bottom edge is defined as the inner surface of the A-frame section and the lower edge of the extension.

3.11.3 14-foot ladder. The 14-foot combination ladder shall be as shown on figure 3 and shall consist of two 7-foot sections hinged together at the top. Three configurations shall be possible with this ladder, i.e.:

- a. The side rails folded together to form a 7-foot double ladder.
- b. The side spread apart to form an A-frame ladder.
- c. The side rails extended to form a 14-foot ladder.

A hinge-lock shall be provided to engage the hinged end of the second butt section to prevent movement. The hinge-lock shall be equipped with a quick-release mechanism to allow fast, efficient unlocking. The hinge-lock shall positively lock the hinge when the ladder is in either position, prevent the ladder from collapsing and shall insure a rigid, stable configuration. The hinge-lock shall not hinder longitudinal movement of the fly section. The quick-release mechanism shall be located on the first butt section in such a manner that it is easily accessible and requires only one hand to actuate when the ladder is set up in any of its positions. When in the A-frame position, the legs shall form an angle of 72 degrees, ± 3 degrees, with a horizontal surface.

3.11.4 21-foot ladder. The 21-foot combination ladder shall be as shown on figure 4 and shall consist of an A-folding section as specified in 3.11.3, plus an extension rising along one of the legs. Three configurations shall be possible with this ladder, i.e.:

- a. The two A-frame legs folded together to form an extension ladder, with the extension free to slide along one leg.
- b. A-frame set up as illustrated in the figure. In this position the ladder shall be free standing.

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- c. With the A-frame extended end-to-end forming an extension ladder. The sliding section shall move along both legs of the A-frame when the A-frame is extended.

A locking device shall be provided to rigidly lock the A-frame legs in each position. When in the A-frame position, the legs shall form an angle of 72 degrees, ± 3 degrees, with a horizontal surface.

3.11.4.1 Outriggers. The 21-foot combination ladder shall be equipped with outriggers as shown on figure 4. The outriggers shall retract and nest against each side rail of the rear A-frame section. The outriggers shall snap and lock into either the folded or extended position. When in the extended position, the outriggers shall provide a minimum effective base of 48 inches. The length or foot position of each outrigger shall be individually adjustable, extending not less than 4 inches above and 4 inches below the ladder foot. The outrigger foot shall automatically lock in any position. The extending or folding of the outriggers and adjusting of the foot length shall be accomplished without the use of tools. The plane of the outriggers, in folded and extended positions, shall be in a plane with the ladder.

3.11.4.2 Rigging. Ladders shall be rigged in accordance with the contractor's recommendation. A reel that automatically retracts the rope shall be provided below the first rung of the butt section. The reel shall be so designed and mounted that it does not interfere with the storage and use of the ladder. The reel shall be not less than 6 inches from the ground and shall be nested between the rails.

3.12 Workmanship.

3.12.1 Metal fabrication. Metal used in fabrication shall be free from kinks and sharp bends. The straightening of material shall be done by methods that will not cause injury to the material. Corners shall be square and true. All bends shall be made with controlled means to insure uniformity of size and shape. External surfaces shall be free of burrs, sharp edges and corners, except when sharp edges or corners are required or where they are not detrimental to safety.

3.12.2 Riveted connections. Rivets shall fill the holes completely. The upset rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the member, and shall be in accordance with SAE J492.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, and unless disapproved by the Government, the contractor's own facilities or any other, suitable for the performance of the inspection requirements specified herein, may be used. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

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4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Component and material inspection. The contractor is responsible for insuring that components and materials are manufactured, examined, and tested in accordance with referenced specifications and standards, as applicable.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Quality conformance inspection (see 4.3).
- b. Inspection of packaging (see 4.5).

4.3 Quality conformance inspection.

4.3.1 Sampling. Sampling for examination and testing shall be in accordance with MIL-STD-105, inspection level III.

4.3.2 Examination. Samples selected in accordance with 4.3.1 shall be examined for the defects specified in 4.4.1. Presence of 1 or more defects shall be cause for rejection.

4.3.3 Tests. Samples selected in accordance with 4.3.1 shall be subjected to the tests specified in 4.4.2, as applicable. Failure to pass any test shall be cause for rejection of the lot.

4.4 Inspection procedure.

4.4.1 Examination. The ladders shall be examined as specified herein for the following defects:

- 101. Material not as specified (see 3.2).
- 102. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other (see 3.2.3).
- 103. Used, rebuilt or remanufactured components, pieces, or parts incorporated in the ladder (see 3.2.4).
- 104. Dimensions not as specified (see 3.9, table 1).
- 105. Rope not as specified (see 3.3).
- 106. Side rails not as specified (see 3.4).
- 107. Load-bearing surfaces of rungs not as specified (see 3.5).
- 108. Locks, guides, and stops not as specified (see 3.6).
- 109. Identification marking not as specified (see 3.7).
- 110. Treatment and painting not as specified (see 3.8).
- 111. Extension ladders not as specified (see 3.9 thru 3.9.3).
- 112. Roof ladders not as specified (see 3.10 thru 3.10.1).

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- 113. Combination ladders not as specified (see 3.11 thru 3.11.4.2).
- 114. Workmanship not as specified (see 3.12 thru 3.12.2).

4.4.2 Tests. Ladders shall be tested in compliance with all design verification tests of NFPA 1931, according to the size and type of ladder. The 21-foot combination ladder shall be tested by the same criteria as the 14-foot combination ladder. Failure of any NFPA test shall be cause for rejection of that ladder.

4.5 Inspection of packaging.

4.5.1 Quality conformance inspection of pack.

4.5.1.1 Unit of product. For the purpose of inspection, a completed pack prepared for shipment shall be considered a unit of product.

4.5.1.2 Sampling. Sample size shall be determined by table I and table IIA of MIL-STD-105.

4.5.1.3 Examination. Samples selected in accordance with 4.5.1.2 shall be examined for the following defects. Any defect shall be cause for rejection of the whole lot.

- 115. Materials, methods and containers not as specified for level A, C, or commercial (see 5.1 thru 5.1.2).

5. PACKAGING

5.1 Packing. Packing shall be level A or commercial in compliance with ASTM D 3951.

5.1.1 Level A. Complete ladders of like description, shall be packed in wood cleated-plywood boxes conforming to PPP-B-601, overseas type, grade B, in quantities not to exceed the weight limitations of the box specification. Ladders and ladder sections exceeding 7 feet shall be packed in crates conforming to PPP-C-650, type II, style A. Blocking, bracing, cushioning, and tiedowns shall be provided to prevent movement and damage to the contents. The boxes and the crates shall be closed and strapped in accordance with the appendix to the applicable specification. Strapping shall conform to ASTM D 3951, finish B, type I, and size as applicable, unless otherwise specified (see 6.2).

5.1.2 Commercial. Ladders shall be packed and marked in compliance with ASTM D 3951.

6. NOTES

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

6.1 Intended use. The ladders are intended to be used by fire-fighting personnel in combating fires.

6.2 Acquisition requirements. Acquisition documents should specify the following:

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- a. Title, number, and date of the specification.
- b. Class and length of ladder required (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. When the ladders shall be painted and the color required if other than specified in 3.8.
- f. Degree of packing required (see 5.1).

6.3 Information figures. Figures 1 through 4 show types of ladders which have been found acceptable; however, the figures are included for illustration only and are not intended to preclude the furnishing of other ladders which conform to this specification.

6.4 Classification change. Styles have been eliminated since they are no longer required.

6.4.1 Part or identifying number (PIN). A Part or Identifying Number (PIN) has been added to assist in clarification of each ladder class and length. In the PIN the character immediately following the slash (/) is the class of the ladder. The digit immediately following the dash (-) is the length of the ladder required.

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Classification and lengthPIN

Class 1 - Extension

20-foot, 2 section

24-foot, 2-section

36-foot, 3-section

M12197/1-20

M12197/1-24

M12197/1-36

Class 2 - Roof

12-foot

14-foot

16-foot

M12197/2-12

M12197/2-14

M12197/2-16

Class 3 - Combination

14-foot, 2-section

21-foot, 3-section

M12197/3-14

M12197/3-21

6.5 Subject term (key word) listing.

Aluminum

Fire

Combination

Roof

Outriggers

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - ME

Navy - YD

Air Force - 99

Preparing activity:

Army - ME

Project 4210-0457

Review activities:

Air Force - 84

DLA - CS

User activity:

Navy - MC

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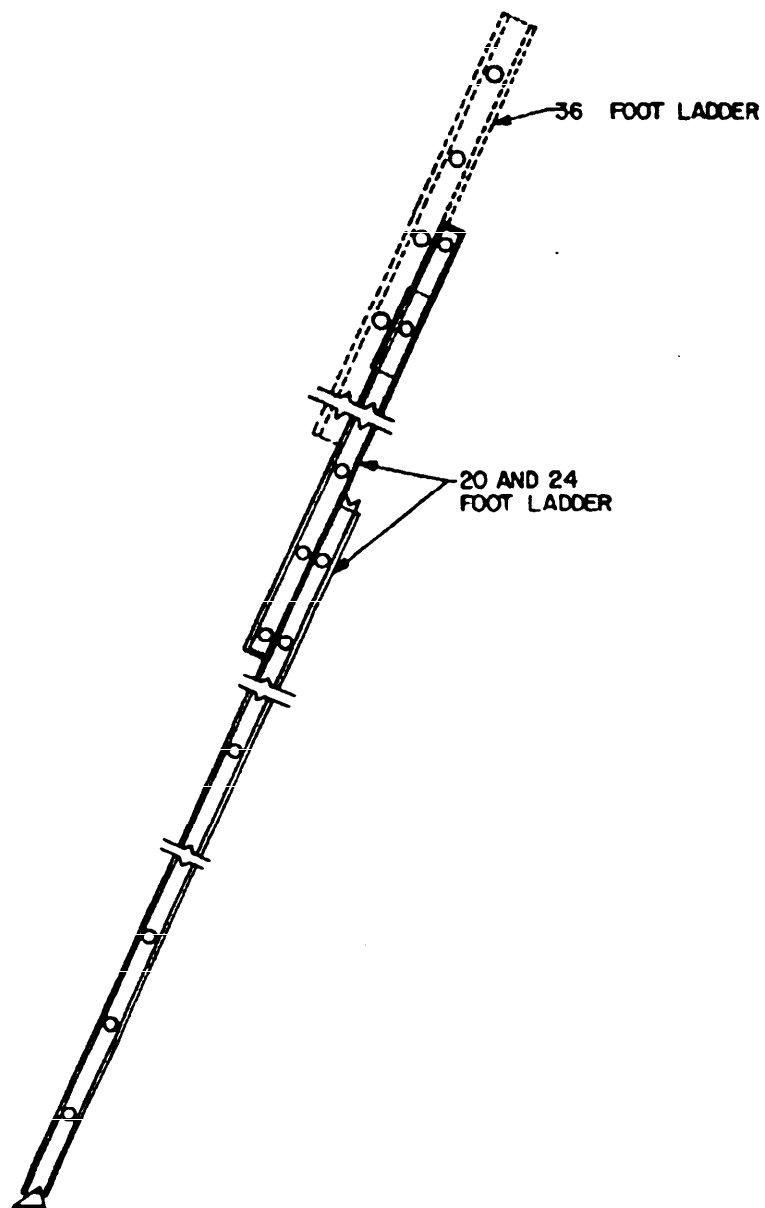


FIGURE 1. Extension Ladder.

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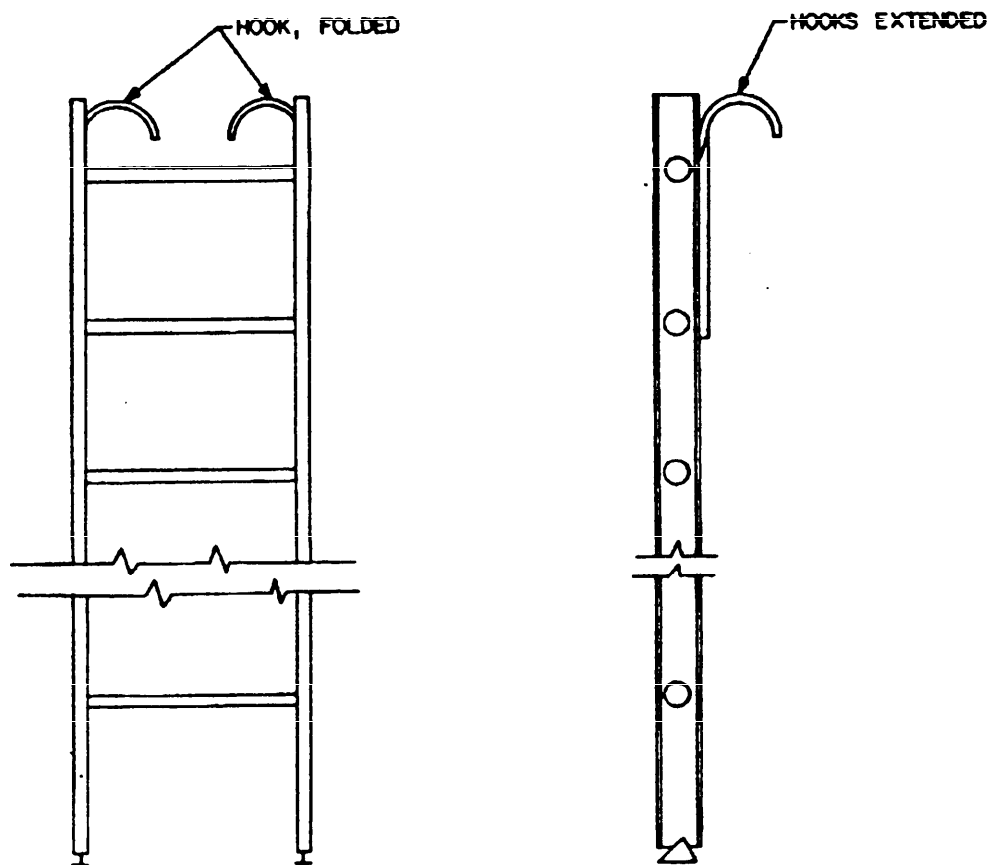


FIGURE 2. Single (Roof) Ladder.

X-2793A

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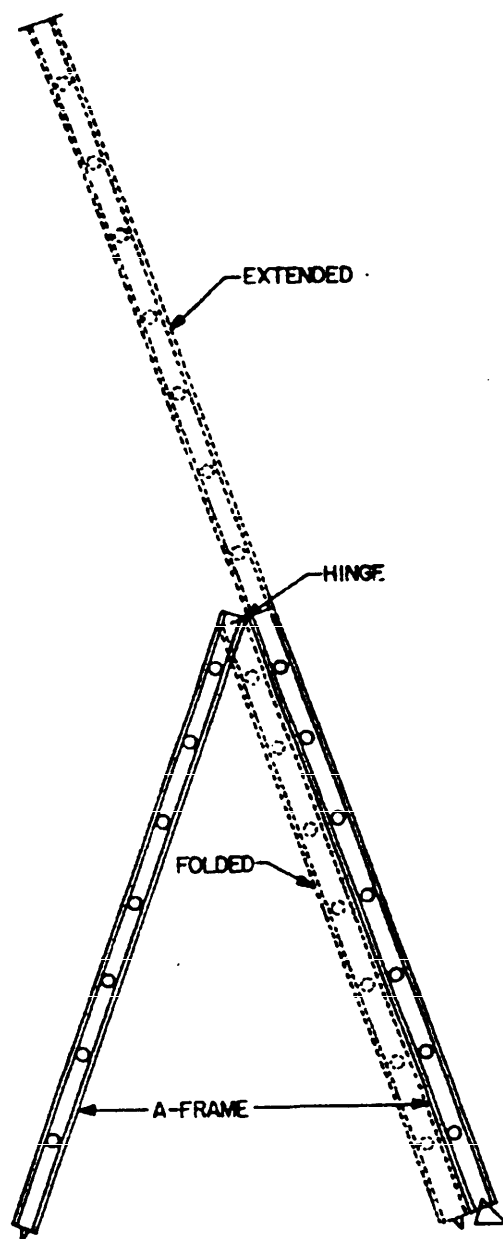


FIGURE 3. 14-Foot Combination Ladder.

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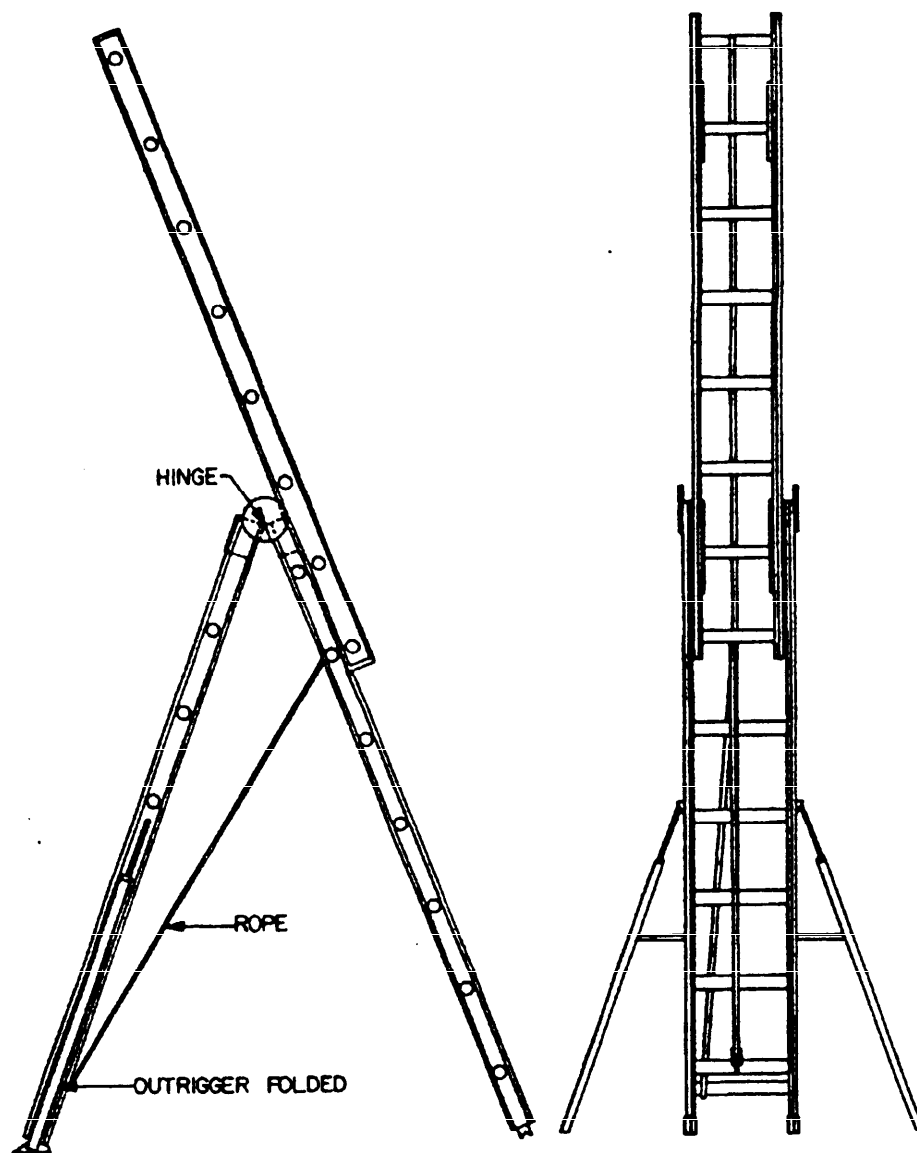


FIGURE 4. 21-Foot Combination Ladder.

X-1575B

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.
The submitter of this form must complete blocks 4, 5, 6, and 7.
2. 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.

RECOMMEND A CHANGE:

1. DOCUMENT NUMBER

MIL-L-12197F

2. DOCUMENT DATE (YYMMDD)

931126

3. DOCUMENT TITLE Ladders, Fire, Extension: Ladders, Fire, Roof; and Ladders, Fire Combination

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

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
(if applicable)

(2) DSN

7. DATE SUBMITTED

8. PREPARING ACTIVITY

a. NAME

Carolyn B. Johnson

b. TELEPHONE (Include Area Code)

(1) Commercial
(703) 704-3468(2) DSN
654-3468

c. ADDRESS (Include Zip Code)

/S ARMY BELVOIR RDE CTR
ATTN SATBE TSE
10101 GRIDLEY RD STE 104
FT BELVOIR VA 22060-5818

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