

DOD-S-87956
15 January 1979

MILITARY SPECIFICATION
SHELTER, S-80A AND S-82A

1. SCOPE

1.1 Scope. This specification covers two types of shelters, the S-80A and the S-82A, hereinafter referred to as the shelter or shelters.

1.2 Classification. Type I S-80A Nominal length 32 feet (9.75M)
Type II S-82A Nominal length 16 feet (4.88M)

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposals, form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

W-R-550	Rod, Ground (with attachments)
QQ-A-200	Aluminum Alloy, Bar, Rod Shapes, Tube and Wire Extruded. 3003
QQ-A-250/2	Aluminum Alloy, Plate and Sheet. 3003
QQ-A-250/11	Aluminum Alloy, Plate and Sheet. 6061
QQ-A-250/4	Aluminum Alloy, Plate and Sheet. 2024
MMM-A-132	Adhesives, Heat Resistant, Air Frame

MILITARY

MIL-P-116	Preservation, Methods of
MIL-W-5044	Walkway Compound, Non-Slip, and Walkway Matting, Non-Slip

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to : AFLC CASO/LODS, Federal Center, Battlecreek, MI 49016, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5410

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MIL-C-5541	Chemical films for Aluminum and Aluminum Alloys
MIL-L-11195	Lacquer, Lusterless, Hot Spray
MIL-H-21040	Honeycomb Materials, Structural, Paper Base
MIL-A-25463	Adhesive, Metallic, Structural Sandwich
MIL-L-54002	Ladders, Aluminum, Combination Step, Straight and Extension
STANDARDS	
<u>Federal</u>	
FED-STD-595	Colors
<u>Military</u>	
MIL-STD-129	Marking for Shipping and Storage
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-649	Aluminum and Magnesium Products, Preparation for Shipment and Storage
MIL-STD-794	Parts and Equipment, Procedures for Packaging and Packing of
MIL-STD-882A	Systems Safety Program, for Systems and Associated Subsystems and Equipment; Requirements for
MIL-STD-889	Dissimilar Metals
MIL-STD-1186	Cushioning, Anchoring, Bracing, Blocking and Waterproofing - With Appropriate Test Methods

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

UNDERWRITERS' LABORATORIES

UL Standards

(application for copies of UL publications should be addressed to Underwriters' Laboratories, Inc. 207 E. Ohio Street, Chicago, Illinois 60611.)

NATIONAL BUREAU OF STANDARDS

Handbook H-30 National Electric Safety Code

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

Occupational Safety and Health Act (OSHA) with Supplemental Revisions

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

UNIFORM CLASSIFICATION COMMITTEE (UCC)

Uniform Freight Classification Rules

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606.)

AMERICAN TRUCKING ASSOCIATION, INC. (ATA)

National Motor Freight Classification Rules

(Application for copies should be addressed to the American Trucking Association, Inc. (ATA), Traffic Dept. 1616 P Street, NW, Washington, DC 20036.)

AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS, INC (ASHRAE)

Handbook of Fundamentals

(Applications for copies should be addressed to the society at 345 East 47th Street, New York, NY 10017.)

3. REQUIREMENTS

3.1 PREPRODUCTION TESTING. This specification makes provision for preproduction testing (see 4.4).

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3.2 General Description. The shelters shall be constructed of materials as specified herein and shall be designed in accordance with this specification (see 3.6). The shelters shall have a minimum clear height of eleven feet, zero inches (3.35M). The minimum clear inside width (without obstructions such as columns, braces, etc.) shall be twenty-seven feet, zero inches (8.23M). The roofs shall have a minimum pitch of two on twelve. The S-80A shelter shall have a nominal length of thirty-two feet, zero inches (9.75M). The S-82A shelter shall have a nominal length of sixteen feet, zero inches (4.88M).

3.3 Components. The shelter shall be composed of all framing members, wall, roof and end coverings, floor sections, foundation pads, doors, utility openings, flashings, and fasteners necessary to form an integral structure. All components used in the makeup of the shelter shall be fully recoverable after each deployment, the exceptions being damaged fasteners and sealant.

3.3.1 Interchangeability of components. The shelters shall be constructed of the least number of different components as possible for the maximum simplification of erection procedures. Like components, subassemblies and assemblies shall be physically and functionally interchangeable without modification.

3.3.2 Identification of members. All members of the shelter shall be marked so as to permit ready identification by reference to erection and assembly drawings. Identification markings shall be accomplished by depth stamping or other means and shall be completed prior to finishing and shall be clearly legible at a distance of six feet after finishing. The markings shall in no way flatten, deform or damage the members and panels.

3.4 Materials. All materials shall be as specified herein. Materials not covered by applicable specifications shall be of the best commercial quality, the lightest practical weight, entirely suited for its purpose, and readily available.

3.4.1 Reclaimed Materials. The shelter shall contain reclaimed materials to the maximum extent possible without jeopardizing their intended use and performance. Reclaimed materials shall have been reprocessed, remanufactured, or recycled in such a manner as to restore them to their original chemical composition and physical properties. Reclaimed material shall include, but not be limited to iron, steel, copper, brass, aluminum, lead, zinc, fiber products, plastic and elastomers that have been collected from discarded solid, liquid, semi-solid or gaseous waste such as garbage, refuse or sludge.

3.4.2 Metal. All metal used in the shelter shall be of aluminum alloy in accordance with QQ-A-200, QQ-A-250/2, QQ-A-250/11 or QQ-A-250/4. This includes, but is not limited to extrusions, structural shapes and flat sheets.

3.4.3 Fasteners. Fasteners subject to extreme wear shall be of hardened steel. All other fasteners shall be of aluminum alloy or other suitable, durable light weight material. Locking pins shall have tapered ends for easy insertion into matching holes. Where steel bolts are used against aluminum bearing surfaces, adequate precautions against electrolytic corrosion shall be taken (see 3.8).

3.4.4 Adhesives. Adhesives for sealing skins to cores shall be in accordance

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with MIL-A-25463, Type I, Class or in accordance with MMM-A-132. Where MIL-A-25463 is used, the temperature of 180°F shall be changed to 200°F.

3.4.5 Panels. Coverings for the floor, walls and roof shall be of sandwich construction, consisting of aluminum edge extrusions, aluminum skins, core material and a compressive seal. Panels for the floor, walls, and roof shall be a nominal four feet (1.25M) wide by nominal lengths of eight feet (2.5M), twelve feet (3.75M) or sixteen feet (5.0M) in accordance with the manufacturers standard design.

3.4.5.1 Panel skins. Skins for the panels shall be of aluminum alloy sheets of sufficient thickness and temper to resist the design loadings and deflection requirements of this specification.

3.4.5.2 Core material. Core material for panels shall be of non-migrating fire and water, poured in place, closed cell foam or paper honeycomb material in accordance with MIL-H-21040. The thermal resistance of the completed panel, air to air, shall have a "U-factor" not to exceed 0.20 when tested in accordance with ASHRAE Handbook of Fundamentals for winter conditions (15MPH Wind).

3.4.5.3 Structural members. Structural members shall be of aluminum alloy of sufficient size, shape and temper to carry the design loads (see 3.5.3).

3.4.6 Joint seals or sealant. The shelter, when deployed in the operational mode, shall be weather tight at the panel joints, around doors and around other openings. Integral compressive seals shall be provided on all panels. An alternate to integral compressive seals may be a joint sealant such as silicone. When used, joint sealant shall be gray, aluminum, or olive drab in color.

3.5 Performance. The shelter shall be designed and constructed to meet the following minimum performance standards.

3.5.1 Climatic. The shelter shall be designed and constructed to withstand these climatic conditions:

- | | |
|------------------------|---|
| a. Ambient Temperature | Minus 55 degrees centigrade to plus 71 degrees centigrade |
| b. Relative Humidity | Up to 100 percent, including condensation due to temperature change |
| c. Wind | 75 Knots |
| d. Ice and Snow | 20 pounds per square foot on a horizontal projection |
| e. Sand and Dust | Particles as small as 0.0017 inches |
| f. Rain | Waterproof in operational mode |

3.5.2 Structural. The maximum allowable deflection of structural members shall be less than 1/180 of the clear span of that member when subjected to the design loads of this specification. The maximum deflection of panels

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shall be less than 1/180 of the clear span of that panel when in operational form.

3.5.3 Design loads. The shelter shall be designed to support the following load combinations:

- a. Dead Load.
- b. Dead Load plus Wind Load.
- c. Dead Load plus Snow Load.
- d. Dead Load plus Wind Load plus one-half Snow Load.
- e. Dead Load plus Snow Load plus one-half Wind Load.
- f. 100 Pounds per sq ft. - Floor Loading.

3.5.4 Erection and disassembly. The shelter shall be so designed as to allow a trained crew of 12 men to unpack and erect or disassemble and repack the S-80A shelter within 12 working hours using only common hand tools. No power tools or scaffolding shall be required for the erection or disassembly. Temporary bracing, if required, shall be a part of the shelter package. The shelter shall be designed to withstand a minimum of 5 assembly and disassembly cycles. Two ten-foot aluminum ladders in accordance with MIL-L-54002 shall be furnished with each shelter.

3.5.5 Mobility. In the disassembled mode, the entire shelter package shall be capable of fitting on Air Force 463L pallets. A standard 463L pallet is 88 inches by 108 inches. The maximum loading height including pallet is 96 inches. Maximum total weight limitation is 10,000 pounds per pallet. Packages of the shelter may be stacked lengthwise over two or more pallets.

3.6 Design.

3.6.1 General. The overall dimensions shall be in accordance with this specification (see 3.2). The shelter shall be designed in easily handled sections and the weight of any one section shall not exceed 175 pounds (80 KG). Insofar as possible, without affecting the structural integrity of the member, no member or panel shall exceed sixteen foot five inches in length (5.0M).

3.6.2 Doors. The shelter shall be provided with two personnel doors. The dimensions of which shall be 2 feet 6 inches \pm 1 inch wide by 6 feet 8 inches \pm 1 inch high. Doors shall be outward opening, and located in standard panels at opposite ends of the shelter. The doors shall be constructed of aluminum alloy sheeting and framing and insulated in accordance with 3.4.4.2. All hardware, ice breakers, weather proofing, flashings, an industrial type door knob set, which is easily assembled and disassembled, and other items necessary for the installation and operation of the doors shall be furnished with the shelter by the supplier. Blackout curtains with provisions for hanging shall be provided with each door.

3.6.3 Utility openings.

3.6.3.1 The openings shall be located as shown in Figure I.

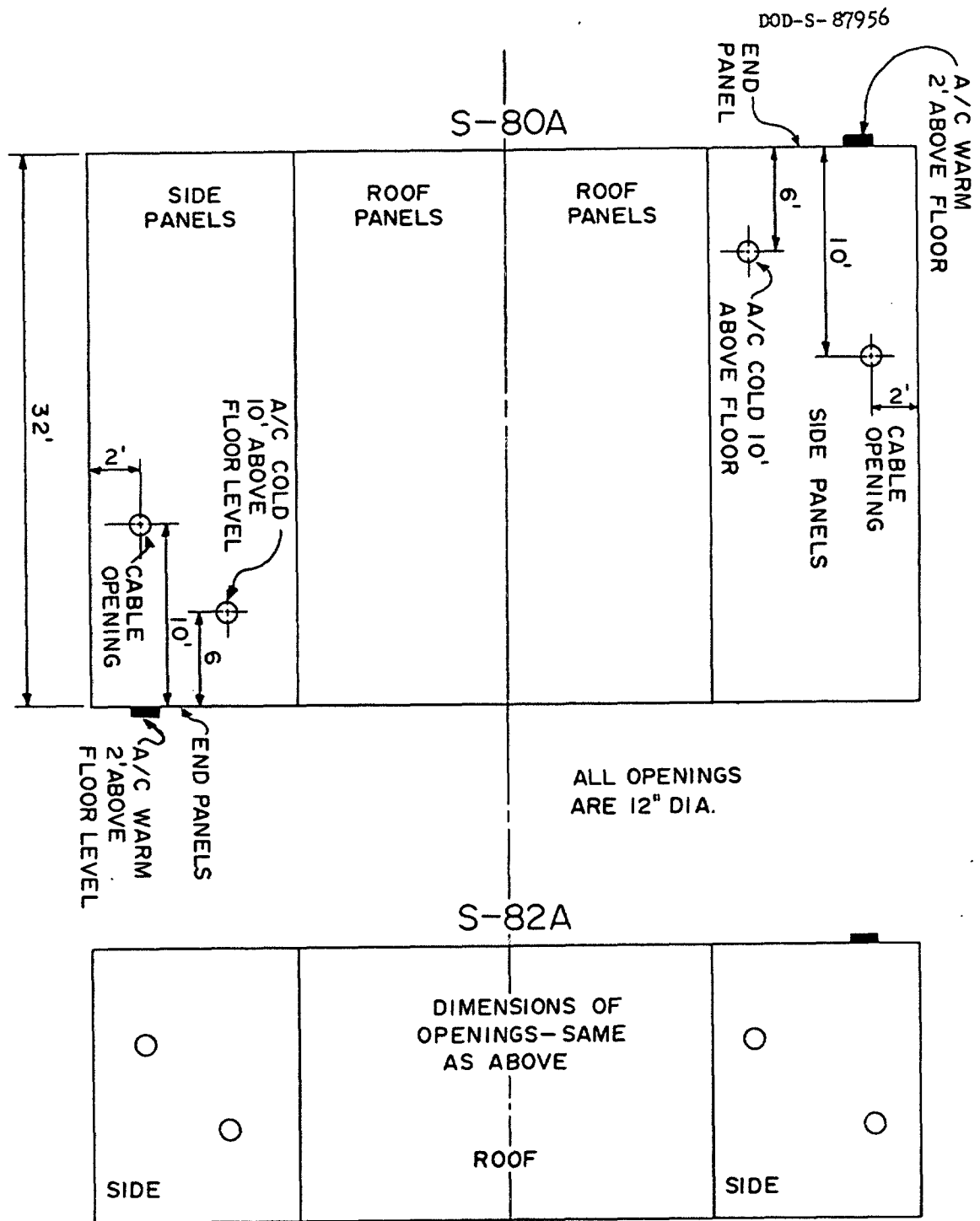


FIGURE I
UTILITY OPENINGS
 (SEE 3.6.3.1)

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3.6.3.2 Utility opening covers. A cover shall be supplied for each of the utility openings to keep the shelter weatherproof while the opening is not in use. The cover shall be compatible with the construction and finish of the shelter. The cover shall be easy to install or remove and shall, by the use of captivating screws, be permanently attached to the walls of the shelter.

3.6.4 Foundation pads. Each frame shall rest on an aluminum foundation pad. The pads shall be sized for use on soil with a bearing strength of 4,000 pounds per square foot. The pads shall have anchor pins to counter any possible resultant uplift due to wind, and any spreading tendency of the frames when used in soils classified as SC or better by the Unified Soil Classification System. The pads shall be easily attached to or removed from the frame.

3.6.5 Flooring. A sectionalized floor shall be provided with the shelter. The floor will be required to support a uniform load of 100PSF. The floor must be tight enough to prevent the entrance of dust and dirt (if necessary, a fabric subflooring may be used to meet this requirement). The walking surface of the flooring shall be covered with walkway compound in accordance with MIL-W-5044, class I, or shall be of aluminum tread plate.

3.6.6 Electrical Service. The electrical service shall include a storage box, a fused/circuit breaker distribution panel, four two-tube fluorescent light fixtures, eight convenience outlets and wiring. The distribution panel shall be designed for 110/220 input voltage at 50/60 cycles, alternating current. One circuit shall consist of the four fluorescent lights designed to be located in the center of the shelter with two, two-way switches located near each personnel door. Two circuits shall service 4 each convenience outlets located 18-24 inches above the floor, and there shall be at least two spare circuits included. The wiring shall be sized in accordance with design standards handbook H-30, and an additional 100 feet of wiring harness shall be furnished with each shelter. All wiring and fixtures shall have UL approval and the entire shelter shall be grounded. The S-82A shelter shall have two fluorescent light fixtures, and four convenience outlets. Otherwise as described above.

3.6.6.1 Ground Rods. A minimum of 4 each ground rods 5/8" Ø x 8' - 0" in accordance with W-R-550 shall be furnished with each shelter.

3.7 Finish. Aluminum alloy structural and bracing members shall require no further finish. Aluminum alloy panel skins shall be given a conversion coating of amorphous chromate, phosphate or oxide meeting the requirements of MIL-C-5541, Class 1A. The surface shall then be primed with zinc chromate primer in accordance with MIL-L-11195. Olive drab color for the outside and charcoal grey, No. 36081 of FED-STD-595 for inside panels. Factory pre-finished panel skins may be used in lieu of the finish called out above.

3.8 Dissimilar metals. Dissimilar metals as defined by MIL-STD-889 shall not be used in intimate contact without suitable protection against electrolytic corrosion.

3.9 Extra material. The supplier shall furnish not less than an additional ten percent of bolts, pins, nuts and washers; one of each standard panels; one gallon of each type of paint and sufficient sealant, if used, for one complete erection of the shelter (see 3.4.5).

3.10 Identification marking. Identification marking shall be in accordance with MIL-STD-130.

3.11 Safety. The shelter shall be consistent with OSHA standards and shall be free of Category I and Category II hazards as determined by MIL-STD-882

3.12 Workmanship. The shelter shall be neatly finished and all burrs or rough edges shall be removed. Welds shall be sound, smooth and free from pits, fractures, burn through or fissures. Bolt holes shall be accurately punched or drilled and shall have burrs removed. Lockwashers shall be furnished in accordance with standard commercial practice. Electrical wiring shall be provided with adequate slack to relieve strain, and wiring shall not be abraded, poorly joined, or loose at terminals.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements specified herein. The supplier may utilize his own facilities or any commercial laboratory acceptable to the Government for the performance of inspection requirements. The Government reserves the right to perform any or all of the inspections specified herein where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Classification of tests. Tests shall be classified as preproduction (see 4.4) and acceptance (see 4.5).

4.3 Test Conditions. Unless otherwise specified, all tests required by this specification shall be made at prevailing ambient temperature and humidity conditions.

4.4 Preproduction tests. Preproduction testing shall consist of the tests listed in paragraphs 4.4.2 through 4.4.5.

4.4.1 Preproduction sample. One S-80A or S-82A shelter, representative of production shelters shall be submitted for preproduction testing. The shelter shall be identified by contract number, shelter nomenclature, manufacturer, and date submitted.

4.4.2 Pre-erection inspection test. The shelter shall be given a thorough visual inspection to determine that the quality of all materials and workmanship are in compliance with the requirements of this specification. Particular attention shall be given to, but not limited to the following:

- a. Choice and quality of materials, along with certificates of conformance.
- b. Legibility of name plates, identification markings and/or labels.
- c. Finishes and other corrosion prevention treatments.
- d. Permanent joints, both fastened and welded.

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- e. Ragged or sharp exposed edges.
- f. Dimensional checks.
- g. Completeness of parts.
- h. Other visual defects.

4.4.3 Erection. The sample S-80A shelter shall be unpacked and erected by a crew of 12, using common hand tools and limited small special tools furnished with the shelter. Temporary bracing, scaffolding, or ladders required for erection shall be furnished with the shelter. No cutting, drilling, or forcing to fit will be permitted. The shelter shall be completely erected and operational within 12 working hours of the start. Upon completion of erection, the shelter shall be given a thorough visual inspection and particular attention shall be given, but not limited to the following:

- a. The fit of parts into their proper locations, especially the restriction of outside light through adjacent panels.
- b. The firmness of the wall, roof, and end sections when struck by hand.
- c. The ease of operation of doors and utility opening covers.
- d. The operation of lights and electrical outlets.
- e. Dimensional check on minimum dimensional requirements including a check for the squareness of the shelter.
- f. A check of framing members, side, roof, and end walls, and floor (when placed on a flat, level surface) for excessive waviness. (Excessive is more than 1/2 inch in 10 feet.)

4.4.4 Rain Test. The assembled shelter with personnel doors and utility openings closed shall be subjected to a water spray test of 15 minutes duration (per roof side). The water spray shall be applied utilizing 28 equally spaced spray nozzles positioned 40 inches above and parallel to the plane of the roof. Water shall be applied at 25 P.S.I.G. Upon completion of the spray mode the shelter shall be opened and inspected for evidence of leakage. None shall be present.

4.4.5 Disassembly test. A crew of 12 shall completely disassemble and repack the S-80A or S-82A shelter in 12 working hours. All parts, except damaged fasteners and sealant shall be recoverable.

4.5 Acceptance tests. Acceptance tests shall consist of a visual inspection as described in para 4.4.2, pre-erection inspection test.

5. Preservation and packaging. The preservation and packaging shall be level A or C.

5.1.1 Level A.

5.1.1.1 Components. Methods of preservation and packaging for the shelter components shall be determined and accomplished in accordance with MIL-P-116

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and MIL-STD-794. Interior containers shall be determined and utilized in accordance with MIL-STD-794. The contents of each package shall contain items and quantities which will facilitate efficient and expeditious placement at the erection site for timely depacking and erection in established steps of succession called for in the erection manual.

5.1.1.2 Paint. Paint shall be preserved in accordance with MIL-P-116 method III.

5.1.1.3 Fasteners. Bolts, pins, nuts, washers, clips, screws and similar small items shall be preserved in accordance with MIL-P-116 method IC-2, except where small quantities (2 pounds or less) are involved, then method IC-3 shall be used.

5.1.1.4 Technical publications. The technical publications required for each shelter shall be preserved in accordance with MIL-P-116, method IC-1 or IC-3.

5.1.2 Level C. The complete shelter shall be preserved and packaged in accordance with the supplier's standard practice.

5.2 Packing. The packing shall be level A or C as specified (see 6.2).

5.2.1 Level A. Packing and exterior shipping containers shall conform to the requirements of MIL-STD-794. Cushioning, blocking, bracing and water-proofing shall be accomplished in accordance with MIL-STD-1186. Aluminum alloy framing members, panels and structural shape components shall be packed in accordance with MIL-STD-649. Packing for each complete shelter shall be accomplished in as few exterior containers as practical and shall be configured to be compatible with the Air Force 463L Pallet System.

5.2.2 Level C. The complete shelter shall be packed in a manner to insure arrival at its destination in satisfactory condition and which will be acceptable to carriers at the lowest rates. Packing shall comply with UCC Uniform Freight Classification Rules or ATA National Motor Freight Classification Rules, according to the mode of transportation.

5.3 Marking. Interior packages and exterior containers shall be marked in accordance with MIL-STD-129. Set or assembly markings in accordance with paragraph 5.4.2 MIL-STD-129 shall be mandatory.

6. NOTES

6.1 Intended use. The shelter covered by this specification intended for use as a light weight, quick erecting and disassembling operations shelter.

6.2 Ordering Data.

- a. Title, date and number of this specification.
- b. Type required (1.2).
- c. Level of packing and packaging (see 5.0).

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Custodian:

Air Force - 99

Preparing Activity:

Air Force - 99

Project Number 5410-F274

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

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DOCUMENT IDENTIFIER (Number) AND TITLE

DOD-S-87956, Shelter S-80A and S82A

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

☐ VENDOR ☐ USER ☐ MANUFACTURER

1. ☐ HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? ☐ IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

A. GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDED WORDING CHANGE

C. REASON FOR RECOMMENDED CHANGE(S)

2. REMARKS

SUBMITTED BY (Printed or typed name and address — Optional)

TELEPHONE NO.

DATE

DD FORM 1426

1 OCT 76

PREVIOUS EDITION WILL BE USED.