

INCH-POUND

MIL-S-0055541H(GL)
20 December 1991
USED IN LIEU OF
MIL-S-55541G(CR)
1 August 1984

MILITARY SPECIFICATION

SHELTER, ELECTRICAL EQUIPMENT S-250()/G

This specification is approved for use by the Natick Research, Development, and Engineering Center, Department of the Army, based upon currently available technical information but it has not been approved for promulgation as a coordinated revision of MIL-S-55514G (CR). It is subjected to modification. However, pending its promulgation as a coordinated military specification, it may be used in acquisition.

1. SCOPE

1.1 Scope. This specification covers one type of Shelter, Electrical Equipment S-250()/G.

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 shall be 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 used in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5017 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5411

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SPECIFICATIONS

MILITARY

- MIL-W-6858 - Welding, Resistance: Spot and Seam
- MIL-M-13231 - Marking of Electronic Items
- MIL-F-14072 - Finishes for Ground Based Electronic Equipment
- MIL-S-55507 - Shelter, Electrical Equipment (With or Without Equipment), Packaging of

STANDARDS

MILITARY

- MIL-STD-252 - Classification of Visual and Mechanical Defects for Equipment, Electronic, Wired, and Other Devices
- MIL-STD-285 - Attenuation Measurements for Enclosures, Electro-Magnetic Shielding, for Electronic Test Purposes, Method of
- MIL-STD-810 - Environmental Test Methods and Engineering Guidelines
- MIL-STD-1235 - Single-and Multi-Level Continuous Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-2219 - Fusion Welding for Aerospace Applications

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

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

DRAWINGS

U.S. ARMY NATICK RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

- DL-SM-B-563500 - Shelter, Electrical Equipment, S-250()/G
- DL-SM-B-649950 - Mod, Kit, EMI, MK-1092()/G
- DL-SM-B-650123 - Shelter, Electrical Equipment, S-250()/G (Shielded)
- SM-D-208679 - Outer Door Assembly
- SM-D-208682 - Inner Door Assembly
- SM-C-435904 - Latch Keeper
- SM-C-435937 - Nameplate
- SM-B-563559 - Adhesive
- SM-B-563655 - Foam, Rigid, Plastic
- SM-D-563754 - Diagram, Flatness and Squareness

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SM-C-564839 - Gasket, Silicone
 SC-C-595537 - Padlock and Key
 SC-B-595538 - Bonding Procedure
 SC-B-595539 - Cleaning Procedure
 SC-B-595564 - Core Material Urethane, Light
 SC-B-595565 - Core Material Urethane, Heavy
 SM-D-649951 - Modification Kit EMI MK-1092/G
 SM-D-649952 - Sling Assembly
 SM-D-649953 - Shelter, Elec Equip S-250/G
 SM-C-650082 - Skid Assembly
 SM-D-650085 - Test Weight Installation
 SM-C-650125 - Nameplate
 SM-D-781228 - Door Fixture Construction Tightness Test
 SC-D-781288 - Door Fixture Construction Tight
 SC-D-781235 - Drain, Fixture, Construction Tightness Test
 SC-D-781236 - Installation Construction Tightness Test
 SC-B-964240 - Nameplate, S-250 Shelter (with Rivnuts)

(Copies of drawings are available from the U.S. Army Natick Research, Development, and Engineering Center, ATTN: STRNC-UX, Natick, MA 01760-5017.)

FEDERAL AIR REGULATION (FAR)

FAR 25.853 Compartment Interior

(Application for copies should be addressed to the Flight Standards Service, Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591.)

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)

C 273 - Shear Test in Flatwise Plane of Flat Sandwich Construction or Sandwich Cores
 D 1621 - Compressive Properties of Rigid Cellular Plastics
 D 1622 - Apparent Density of Rigid Cellular Plastics
 D 2842 - Water Absorption of Rigid Cellular Plastics

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

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(Non-Government standards and other publications are normally available from 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. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance 4.4.

3.2 Materials and components. The materials and components shall be as specified herein and on the applicable drawings. Materials and components not definitely specified shall be of the quality normally used by the manufacturer provided the completed item complies with all the provisions of this document.

3.2.1 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this document.

3.2.2 Adhesive. The adhesive used to laminate per 3.3.2 shall meet the physical properties required by Drawing SM-B-563559 when tested in accordance with 4.6.1.

3.2.3 Sealer. The sealer, when tested in accordance with 4.6.1, used to meet the requirements of 3.3.3 shall have the following properties when tested in accordance with 4.6.1:

3.2.3.1 Sealer shear, ambient. The sealer and its bond to the aluminum shall have a minimum average shear strength of 200 psi when tested at $80^{\circ}\text{F} \pm 10^{\circ}\text{F}$.

3.2.3.2 Sealer shear, temperature extreme. The sealer and its bond to the aluminum shall have a minimum average shear strength of:

(a) 200 psi when tested at $-65^{\circ}\text{F} \pm 5^{\circ}\text{F}$

(b) 75 psi when tested at $200^{\circ}\text{F} +0^{\circ}\text{F} -5^{\circ}\text{F}$

3.2.3.3 Sealer shear, humidity exposure. The sealer and its bond to the aluminum shall withstand exposure to 95 percent relative humidity $\pm 5\%$ at $160^{\circ}\text{F} \pm 5^{\circ}\text{F}$ for fourteen days. After exposure the sealer shall have a minimum average shear strength of 75 psi when tested at $160^{\circ}\text{F} \pm 5^{\circ}\text{F}$.

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3.2.3.4 Sealer shear, salt spray exposure. The sealer and its bond to the aluminum shall withstand exposure to the salt spray test, Method 509 of MIL-STD-810 using a 20% NaCl solution at $95^{\circ}\text{F} \pm 5^{\circ}\text{F}$ for fourteen days. After exposure the sealer shall have a minimum average shear strength of 200 psi when tested at $80^{\circ}\text{F} \pm 10^{\circ}\text{F}$.

3.2.4 Core material. The core material shall be a slab type foamed plastic. All three core densities shall be used in the shelter. Disbursement within the shelter shall be in accordance with the drawings listed on DL-SM-B-563500. Density, compressive strength, flammability, water absorption, and shear strength properties shall be in accordance with Drawing SC-B-595564, SC-B-595565, and SM-B-563655, as applicable when tested in accordance with 4.6.2.

3.3 Construction.

3.3.1 General. All parts, sub-assemblies, and the final assembly of Shelter, Electrical Equipment, S-250()/G shall be constructed as specified herein and in accordance with the drawings listed on DL-SM-B-563500 or DL-SM-B-650123 when electromagnetic interference suppression is required (see 6.2). Shelters shall not be fork lifted at anytime during or after construction.

3.3.2 Lamination. During the laminating process the mating of all panel constituents shall be bonded without delaminations, i.e. discontinuation in, or separation between the constituents. Bonding shall be in accordance with SC-B-595538. Both sides of all panels prior to assembly into shelter form and all shelters shall be acoustically interrogated for delaminations using a tap hammer fabricated in accordance with figure 8. The shelter may be considered acceptable if it contains less than 12 distinctly individual delaminations or unbond type voids, provided none is greater than 2 inches across measured in any direction, and provided the shelter meets all other requirements.

3.3.3 Seal. All inner and outer skins, joints, edges, and hardware shall be sealed in a manner which will prevent collection and retention of water and provide a barrier against the entrance of water into any panel or the interior of the shelter. Unless otherwise specified on the shelter drawings, all exterior rivets, rivnuts, screws, and bolts shall be dipped in sealer prior to installation and the heads of rivets shall be covered with sealant after installation.

3.3.4 Cleaning. All metal parts shall be cleaned at that stage of assembly indicated on the applicable drawing listed on DL-SM-B-563500 or DL-SM-B-650123, by a process in accordance with Drawing SC-B-595539 or as specified in the applicable portion of MIL-F-14072. All foam and wood parts shall be cleaned in accordance with the applicable portion of Drawing SC-B-595538.

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3.3.5 Welding. Arc and spot welding shall be applied as specified by the drawings. No grinding of welds shall be required except as specified by the drawings. The Government reserve the right to perform any of the inspections where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

3.3.5.1 Arc welding. Inert gas shielded arc welding shall be in accordance with MIL-STD-2219.

3.3.5.2 Spot welding. Spot welding shall be in accordance with MIL-W-6858, Class B. Samples of the production items produced in accordance with the drawings shall be inspected by the supplier for appearance, external defects, sheet separation, surface identification, and weld location.

a. Test specimens shall be used to represent the manufacturing practice. Three single-spot shear specimens shall be used for checking purposes. These single shear specimens shall be tested for ultimate strength and variation in shear strength.

b. Failure of a test specimen or samples of welded items shall be cause for rejection of the production quantity the specimen or sample represents.

3.3.6 Riveting. No more than one rivet/rivnut in ten and no more than two adjacent rivets/rivnuts shall exhibit any of the defects specified below, when inspected as specified in 4.6.6.

3.3.6.1 Looseness. There shall be no evidence of looseness parallel to the plane of the mating surfaces due to oversized holes or looseness perpendicular to the plane of the mating surfaces due to rivets/rivnuts not being tightly seated.

3.3.6.2 Heads. Rivet and rivnut heads shall not be cut, marred, chipped, eccentric, distorted, or otherwise mutilated. Countersunk rivets and rivnuts shall not project above or below the mating surface more than 15 percent of the mating material thickness.

3.3.6.3 Mating surface and materials. The mating surface shall not be marred or indented due to rivet or rivnut installation, nor shall there be any distortion or warpage of the mating materials. There shall be no foreign material between riveted surfaces.

3.3.7 Hardware. All locks, latches, hinges, hinge pins, fasteners, bolts, lifting and towing eyes, steps and other shelter hardware shall be made corrosion resistant in accordance with the applicable drawings listed on DL-SM-B-563500 or DL-SM-B-650123. The hardware shall be subjected to the test of 4.6.7 and shall show no evidence of corrosion or damage which in any way impairs the specified performance of the individual part.

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3.3.7.1 Padlocks and keys. All padlocks and keys shall be in accordance with SC-C-595537 and shall be interchangeable to the extent determined by 4.6.10.

3.3.8 Finish, protective. Protective finishes shall be in accordance with the applicable drawings listed on DL-SM-B-563500 or DL-SM-B-650123 and shall be free of the defects cited in the classification of visual finish defects of MIL-F-14072 when inspected as specified in 4.6.8 and 4.6.12.

3.3.9 Marking. Member centerline, punch marks, nameplates, instruction and data plates, and other markings shall be in accordance with MIL-M-13231 and the applicable drawings listed on DL-SM-B-563500 or DL-SM-B-650123. Marking shall be inspected as specified in 4.6.9 and 4.6.12.

3.3.10 Interchangeability. Like units, subassemblies, assemblies and replaceable parts shall be physically and functionally interchangeable without modification of such items or of the shelter. Dimensions shall be within the limits specified on the applicable drawings listed on DL-SM-B-563500 or DL-SM-B-650123. Reliance shall not be placed on any unspecified dimension, rating, characteristic, etc. Individual items shall not be hand picked for fit or performance. To determine compliance with this requirement the items listed in 4.6.10 shall be measured and shall be in accordance with the dimensions and tolerances specified on the applicable drawings.

3.3.11 Facsimiles. When specified (see 6.2), the contractor shall provide facsimiles of the nameplate and all data and instruction plates required by DL-SM-B-563500 and DL-SM-B-650123. Each facsimile shall be in accordance with its drawing and shall include any and all information required to be inserted, except shelter serial number. Artwork shall be of a quality at least comparable to the drawings.

3.3.12 Shelter weight. When inspected as specified in 4.6.12 and 4.6.13, the gross weight of the shelter, excluding the lift and tie down device, (Drawing SM-D-649952) shall be as follows:

- (a) 770 pounds \pm 20 pounds without Mod Kit, EMI, MK-1092()/G
- (b) 782 pounds \pm 20 pounds with Mod Kit, EMI, MK-1092()/G installed

3.3.12.1 Records. Records shall be maintained of Serial numbers and actual weight of shelters and shall indicate if EMI Kit MK-1092()/G is installed.

3.3.13 Service integrity. Unless otherwise specified, tests specified herein shall not result in any discontinuity in the bond between the aluminum, foam, and/or wood thermal barriers (i.e., a delamination) or in any buckling, splitting, or any other deformation and/or structural weakening of the shelter. The seal of 3.3.3 shall remain intact. All dimensions shall

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remain in accordance with the drawings listed on DL-SM-B-563500 or DL-SM-B-650123. Brackets, lugs, flanges, inserts, bolts, and any other mounting arrangement shall securely retain test loads, doors, and hardware. Any deformation of any mounting arrangement resulting from any specified test shall be within drawing tolerances and shall not cause degradation of its retaining ability or of specified shelter performance.

3.4 Environmental requirements. The shelter shall be capable of meeting the following environmental test requirements with no harmful effect to any finish or performance capability (see 3.3.13).

3.4.1 Moisture resistance. The shelter shall withstand daily exposure of up to 97% relative humidity for 20 hours and exposure at 100% relative humidity (with condensation) for 4 hours when tested as specified in 4.6.7.

3.4.2 Temperature. The shelter shall be capable of withstanding the following operating temperatures when tested as specified in 4.6.14:

3.4.2.1 Operating temperature. Exposure to an ambient temperature in the range of -65°F to 125°F plus a solar load such that the outside skin reaches a minimum temperature of 195°F ; exposure at any one time not to exceed 75 hours at the low temperature extreme and 4 hours at the high temperature extreme.

3.4.2.2 Non-operating temperature. Exposure to an ambient temperature in the range of -80°F to 160°F ; exposure at any one time not to exceed 24 hours at the low temperature extreme and 4 hours at the high temperature extreme.

3.4.3 Heat transfer. The thermal characteristics of the shelter shall be such that the overall coefficient of heat transfer of the shelter shall not exceed 0.50 British Thermal Units (BTU's) per hour per square foot per degree Fahrenheit when tested in accordance with 4.6.15.

3.5 Structural integrity of shelter. The shelter shall be capable of complying with the requirements of 3.5.1 thru 3.5.5. When a payload is required, 1,900 pounds in accordance with Drawing SM-D-650085 shall be used. The requirements of 3.3.13 are applicable to all tests.

3.5.1 Transportability. The shelter, with payload, shall be capable of being picked up by a crane, transported while suspended from the crane, and lowered to any predetermined point on the ground. The shelter shall also be capable of being transported as follows:

3.5.1.1 Rail transport. The shelter, with payload, shall be capable of being transported by railroad. Compliance with 4.6.16 shall constitute compliance with this requirement.

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3.5.1.2 Lift transport, simulated. The shelter, with payload, shall be capable of being suspended by its lifting eyes and exposed to 3.5 g's acceleration. Compliance with 4.6.17 shall constitute compliance with this requirement.

3.5.2 Drop. The shelter, with payload, shall be capable of being dropped as specified in 4.6.18. Every shelter subjected to drop tests shall be shipped only to a depot and shall have its nameplate "S-250 Shelter" (with rivnuts) per Drawing SC-B-964240 attached with rivets over the shelter nameplate, Drawing SM-C-435937 (SM-C-650125 if shielded) prior to shipment. Shipping document annotated (FOR DEPOT USE ONLY).

3.5.3 Towing, simulated. The shelter, with payload, shall withstand a force of a least 2,000 pounds applied to each of the skid assemblies, and their attachment to the shelter, as specified in 4.6.19.

3.5.4 Lifting and towing eye assembly. Each lifting and towing eye assembly, as attached to the shelter, shall withstand a minimum load of 5,000 pounds applied per 4.6.20.

3.5.5 Steps, roof access. Each of the two recessed folding steps installed to provide access to the shelter roof shall withstand a load of 400 pounds applied per 4.6.21.

3.6 Tightness of shelter. The shelter shall be capable of complying with the following:

3.6.1 Torque, door latches. Torques shall be measured as specified on Drawings SM-D-649951 and SM-D-649953 and shall be as specified in 4.6.22.

3.6.2 Electromagnetic interference (EMI) shielding. The shelter shall be capable of being shielded from electromagnetic interference by the installation of Modification Kit, electromagnetic interference, MK-1092()/G in accordance with DL-SM-B-649950 and with no other modification. Shielding shall provide at least 60 db attenuation to electric and magnetic fields and plane waves in the frequency range from 150 KHz to 10.0 GHz when tested in accordance with 4.6.23 and MIL-STD-285. Should a shelter subjected to the EMI test fail to pass, another shelter from the same lot shall be subjected to the EMI test.

3.6.3 Construction tightness. The shelter shall be airtight to the extent that it shall be capable of achieving and maintaining a pressurized state without leakage when tested in accordance with 4.6.24.

3.6.4 Watertightness. The shelter shall be watertight when tested in accordance with 4.6.25. Shelter weight after testing shall be as specified in 3.3.12 after allowing two pounds for the test weight mounting hardware of Drawing SM-D-650085, if applicable.

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3.6.5 Fording. The shelter, without the use of special fording kits, shall be capable of being immersed in water to a depth of 30 inches, as measured from the bottom of the shelter skids, with no failure of the seal specified in 3.3.3 or damage to the structure when tested and inspected as specified in 4.6.26. Shelter weight after testing shall be as specified in 3.3.12 after allowing two pounds for the test weight mounting hardware of Drawing SM-D-650085 if applicable.

3.6.6 Light tightness. No direct rays of light shall be visible through or around the air inlet louver assembly, as installed in the shelter and with the weather cover fully open, when tested in accordance with 4.6.27.

3.7 Lift and tie down device. A combination lift and tie down device (sling) conforming to Drawing SM-D-649952 shall be provided as part of each shelter. Each leg of the device shall be capable of exceeding the tensile load specified on the drawing and shall fail before slippage occurs at the sling sleeves when tested as specified in 4.6.28.

3.8 Impact panel. The shelter panels shall withstand the test of 4.6.29. After the test, the panel shall be cross sectioned through the impact area and examined. Impact shall not result in rupture to either skin. No delaminations between skin and core or crushing of core is allowed outside a 3 inch radius from the center of impact.

3.9 Fabrication and assembly. Samples (see 4.6.1.1) shall (a) be assembled using parts, materials (and their amounts), and processes that will be employed in production, (b) be fabricated and assembled in accordance with the specification, and (c) meet all requirements specified herein.

3.10 Workmanship. The shelter shall be manufactured with the degree of workmanship normally considered appropriate for each of the areas listed under 3.3 (see 4.6.12).

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, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specifications 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 must meet all requirements of sections 3 and 5. The inspections set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement 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 accept defective material.

4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, the inspection shall be made at any point, or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

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

- a. First article inspection (does not include packaging (see 4.4))
- b. Quality conformance inspection (see 4.5)

4.3 Inspection conditions. Unless otherwise specified, all shelters submitted for quality conformance inspection shall be completely assembled. The final finish need not be applied until after the Group A, Group B, and Group C inspections have been performed on that shelter. If the final finish is applied prior to performance of the Group A, Group B, and Group C inspection, the final finish on the floor shall not be applied until prior to final inspection. If the final finish is not applied until after the Group A, Group B, and Group C inspections, then those inspections related to the finish and marking shall be performed at final inspection. Unless otherwise specified, no other adjustment, additions or modifications shall be made before or during test and inspection (see 4.5).

4.4 First article inspection. When a first article is required (see 3.1 and 6.3), it shall inspected and tested for the characteristics specified in 4.4.1 and 4.4.2. Unless otherwise specified, inspections and tests shall be performed by the contractor. The failure to pass any inspection or test shall be cause for rejection of the first article.

4.4.1 First article specimens. The contractor shall provide and test the first article specimens listed in table I. All specimens shall reflect material and conditions which will be used in production. Failure of any specimen within a group shall be cause for rejection of all specimens within that group.

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TABLE I. First article specimens

| Inspection | Quantity | Req't | Test |
|--------------------------|---------------------------|-------|---------|
| Adhesive | 50 coupons | 3.2.2 | 4.6.1 |
| Sealer | 50 coupons | 3.2.3 | 4.6.1 |
| Core material: | | | |
| Density | 5 for every grade or type | 3.2.4 | 4.6.2.1 |
| Compressive strength | 5 for every grade or type | 3.2.4 | 4.6.2.2 |
| Flammability | 5 for every grade or type | 3.2.4 | 4.6.2.3 |
| Water absorption | 3 for every grade or type | 3.2.4 | 4.6.2.4 |
| of urethane | | | |
| Shear strength | 5 for every grade or type | 3.2.4 | 4.6.2.5 |
| Lift and tie down device | 1 complete | 3.7 | 4.6.28 |
| Impact panel | 1 for every type core | 3.8 | 4.6.29 |

4.4.2 First article shelter. The contractor shall provide and test a first article shelter which shall reflect material and conditions which will be used in production. Inspection shall consist of the inspection listed in table II and shall be in the sequence listed in table II.

TABLE II. Sequence of first article inspection 4/

| Inspection | Req't | Test |
|----------------------------------|---------|--------|
| Cleaning | 3.3.4 | 4.6.4 |
| Welding | 3.3.5 | 4.6.5 |
| Lamination | 3.3.2 | 4.6.3 |
| Interchangeability | 3.3.10 | 4.6.10 |
| Riveting | 3.3.6 | 4.6.6 |
| Construction tightness | 3.6.3 | 4.6.24 |
| Finish | 3.3.8 | 4.6.8 |
| Marking | 3.3.9 | 4.6.9 |
| Dimensional (per stated drawing) | 3.3.1 | 4.6.11 |
| Visual and Mechanical | 3.3.1 | 4.6.12 |
| Shelter weight | 3.3.12 | 4.6.13 |
| Door latch torque | 3.6.1 | 4.6.22 |
| Moisture resistance 1/ | 3.4.1 | 4.6.7 |
| Temperature | 3.4.2 | 4.6.14 |
| Heat transfer | 3.4.3 | 4.6.15 |
| Rail transport | 3.5.1.1 | 4.6.16 |
| Drops 3/ | 3.5.2 | 4.6.18 |

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TABLE II. Sequence of first article inspection 4/ (cont'd)

| Inspection | Req't | Test |
|---------------------------------|---------|--------|
| Construction tightness 2/ 5/ | 3.6.3 | 4.6.24 |
| Towing, simulated | 3.5.3 | 4.6.19 |
| Lifting and towing eye pulls | 3.5.4 | 4.6.20 |
| Lift transport, simulated | 3.5.1.2 | 4.6.17 |
| Steps, roof access | 3.5.5 | 4.6.21 |
| Light tightness | 3.6.6 | 4.6.27 |
| EMI shielding | 3.6.2 | 4.6.23 |
| Watertightness | 3.6.4 | 4.6.25 |
| Fording | 3.6.5 | 4.6.26 |
| Door latch torque (second time) | 3.6.1 | 4.6.22 |

- 1/ First article specimen testing shall be completed no later than the end of this test (see 4.4.1). This inspection shall not begin until at least seven days after final finish application including touch-up paint.
- 2/ For correlation data purposes only. CTT (construction tightness test) results are not to be used as accept/reject criteria for the drop test.
- 3/ See Note 10 of Table VI
- 4/ First article sample testing and shelter testing shall not begin until at least seven days after the sealer application, including application of touch-up sealer.
- 5/ Door portion and gasket portion only

4.5 Quality conformance inspection.

4.5.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified or qualified in this document or applicable purchase document.

4.5.2 In-process inspection. Inspection shall be made of the requirements specified in table III during the shelter manufacturing process and at the frequency specified below. Whenever nonconformance is noted, corrections shall be made to the items affected, the lot in process, and to the operation. Parts which can not be corrected shall be removed from production.

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TABLE III. In-process inspection

| Inspection | Requirement para | Sampling freq. para | Test para |
|---------------------------------|------------------|---------------------|-----------|
| Core material: | | | |
| Density | 3.2.4 | 4.5.2.1 | 4.6.2.1 |
| Compressive strength | 3.2.4 | 4.5.2.1 | 4.6.2.2 |
| Shear strength | 3.2.4 | 4.5.2.1 | 4.6.2.5 |
| Adhesive: | | | |
| Room temperature | 3.2.2 | 4.5.2.3 | 4.6.1 |
| Low temperature | 3.2.2 | 4.5.2.2 | 4.6.1 |
| High temperature | 3.2.2 | 4.5.2.2 | 4.6.1 |
| Sealer: | | | |
| Low temperature | 3.2.3.2 | 4.5.2.2 | 4.6.1 |
| Room temperature | 3.2.3.1 | 4.5.2.3 | 4.6.1 |
| High temperature | 3.2.3.2 | 4.5.2.2 | 4.6.1 |
| Cleaning | 3.3.4 | 4.5.2.4 | 4.6.4 |
| Welding | 3.3.5 | 4.5.2.5 | 4.6.5 |
| Lamination | 3.3.2 | 4.5.2.6 | 4.6.3 |
| Interchangeability | 3.3.10 | 4.5.2.7 | 4.6.10 |
| Riveting | 3.3.6 | 4.5.2.8 | 4.6.6 |
| Construction tightness, shelter | 3.6.3 | 4.5.2.9 | 4.6.24.1 |

4.5.2.1 Sampling for core material properties. Inspection of specimens for core material density, compressive strength, and shear strength properties shall be made once from the core material used in the first 50 shelters and once from the core material used in each additional 50 shelters or fraction thereof.

4.5.2.2 Sampling for adhesive and sealer, low and high temperature. Inspection of adhesive and sealer coupons at the low and high temperature conditions shall be at the following frequencies:

a. When automatic mixing and dispensing processes are used: once for each 15 batches.

b. When hand mixing and dispensing processes are used: once for each 15 batches.

4.5.2.3 Sampling for adhesive and sealer, room temperature. Inspection of adhesive and sealer coupons at the room temperature condition shall be at the following frequencies:

a. When automatic mixing and dispensing processes are used: once, at the start of the process, once, at the end of a shift, and once, at the end of a continuous run longer than 1 shift.

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b. When hand mixing and dispensing processes are used: once at the start of the process, and once each, whenever there is a change in batch, operating personnel, and shift.

4.5.2.4 Sampling for cleaning. Frequency of process inspections for cleaning shall be in accordance with Drawings SC-B-595538 and SC-B-595539.

4.5.2.5 Sampling for welding. Frequency of visual inspection of arc welding shall be in accordance with the requirements of maintenance sampling for production per MIL-STD-2219. For resistance welding, frequency of fabrication and inspection of production specimens and frequency of inspection of production parts shall be in accordance with MIL-W-6858.

4.5.2.6 Sampling for lamination. All roof, floor, wall, and door panels shall be inspected for delaminations and unbond type voids prior to their assembly into a shelter.

4.5.2.7 Sampling for interchangeability. Each shelter shall comply with the inspection of 4.6.10 and meet the requirement of 3.3.10.

4.5.2.8 Sampling for riveting. One shelter shall be randomly selected from each 10 shelters produced. Selection and inspection shall be prior to application of paint finish.

4.5.2.9 Sampling for construction tightness, shelter portion. All shelters shall be preconditioned in accordance with 4.6.24.1.

4.5.3 End item inspection. The end items (see 4.3) shall be inspected in accordance with the following paragraphs. When AQL percents are specified, inspection shall be performed utilizing the multi-level continuous sampling procedure, CSP-T, of MIL-STD-1235. The sampling frequency code letter used shall be A. The production interval shall be the entire contract quantity of shelters.

4.5.3.1 Group A inspection. Except for the shelter portion of the construction tightness test, which shall be performed on Group A Audit units only, the inspection specified in table IV shall be performed on each fully assembled shelter. Conforming shelters shall then be verified by a Group A Audit utilizing the AQL percents specified.

TABLE IV. Group A inspection

| Inspection | Req't | Test | AQL percent (audit only) | |
|------------------------------|-------|----------|-----------------------------|-------|
| | | | Major | Minor |
| Construction tightness: | | | | |
| Shelter portion (audit only) | 3.6.3 | 4.6.24.1 | 1.0 | - |
| Door portion | 3.6.3 | 4.6.24.2 | 1.0 | - |
| Gasket portion | 3.6.3 | 4.6.24.3 | 1.0 | - |

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TABLE IV. Group A inspection (cont'd)

| Inspection | Req't | Test | AQL percent (audit only) | |
|-----------------------|--------|--------|-----------------------------|-------|
| | | | Major | Minor |
| Visual and mechanical | 3.3.1 | 4.6.12 | 1.0 | 4.0 |
| Dimensional | 3.3.1 | 4.6.11 | 1.0 | - |
| Door latch torque* | 3.6.1 | 4.6.22 | 1.0 | - |
| Shelter weight | 3.3.12 | 4.6.13 | - | - |

* Door latch torque to be repeated during the final cursory visual mechanical inspection.

4.5.3.2 Group B inspection. The inspections specified in table V shall be performed on shelters that have been subjected to and satisfied Group A inspection. Inspection shall be in the order listed in table V. The provision in MIL-STD-1235 which requires that sampling inspection be terminated and 100 percent inspection be resumed if the production process is interrupted for more than three operating days shall not apply. Inspection shall not begin until at least seven days after sealer application, including application of touch-up sealer.

TABLE V. Group B inspection

| Inspection | Req't para | Test para | AQL percent |
|----------------------------------|---------------|--------------|----------------|
| Lifting and towing eyes | 3.5.4 | 4.6.20 | 6.5 |
| Steps, roof access | 3.5.5 | 4.6.21 | 6.5 |
| Light tightness | 3.6.6 | 4.6.27 | 6.5 |
| Finish | 3.3.8 | 4.6.8 | 6.5 |
| Construction tightness <u>1/</u> | 3.6.3 | 4.6.24 | 1.0 |

1/ Door portion and gasket portion only

4.5.3.3 Group C inspection. Group C inspection shall consist of the inspections specified in table VI. Shelter tests shall be performed on shelters that have been subjected to and satisfied Group A and Group B inspection. Unless otherwise specified, tests shall be in the order listed. Actions required relative to Group C failures shall be as specified in the contract or purchase order (see 6.2 and 6.4).

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TABLE VI. Group C inspection

| Inspection | Req't para | Sampling | Test |
|---|------------|-----------|---------|
| Drops <u>10/</u> | 3.5.2 | 4.5.3.3.1 | 4.6.18 |
| Construction tightness <u>6/ 11/12/</u> | 3.6.3 | - | 4.6.24 |
| Watertightness <u>1/</u> | 3.6.4 | - | 4.6.25 |
| Fording <u>1/</u> | 3.6.5 | - | 4.6.26 |
| Door latch torque <u>1/</u> | 3.6.1 | - | 4.6.22 |
| EMI shielding | 3.6.2 | 4.5.3.3.2 | 4.6.23 |
| Watertightness <u>2/ 3/ 4/</u> | 3.6.4 | - | 4.6.25 |
| Fording <u>2/ 3/</u> | 3.6.5 | - | 4.6.26 |
| Door latch torque <u>2/ 3/</u> | 3.6.1 | - | 4.6.22 |
| Lift and tie down device | 3.7 | 4.5.3.3.3 | 4.6.28 |
| Core material: | - | - | - |
| Flammability | 3.2.4 | 4.5.3.3.4 | 4.6.2.3 |
| Water absorption | 3.2.4 | 4.5.3.3.4 | 4.6.2.4 |
| Adhesive | - | - | - |
| Humidity exposure | 3.2.2 | 4.5.3.3.4 | 4.6.1 |
| Salt spray exposure | 3.2.2 | 4.5.3.3.4 | 4.6.1 |
| Sealer | - | - | - |
| Humidity exposure | 3.2.3.3 | 4.5.3.3.4 | 4.6.1 |
| Salt spray exposure | 3.2.3.4 | 4.5.3.3.4 | 4.6.1 |
| Impact panel | 3.8 | 4.5.3.3.4 | 4.6.29 |
| Environmentals <u>6/</u> | - | 4.5.3.3.4 | - |
| Moisture resistance <u>3/</u> | 3.4.1 | - | 4.6.7 |
| Temperature <u>3/</u> | 3.4.2 | - | 4.6.14 |
| Heat transfer <u>3/</u> | 3.4.3 | - | 4.6.15 |
| EMI shielding <u>7/ 8/</u> | 3.6.2 | - | 4.6.23 |
| Watertightness <u>3/ 7/</u> | 3.6.4 | - | 4.6.25 |
| Fording <u>3/ 7/</u> | 3.6.5 | - | 4.6.26 |
| Door latch torque <u>3/ 7/</u> | 3.6.1 | - | 4.6.22 |
| Rail transport <u>3/</u> | 3.5.1.1 | 4.5.3.3.4 | 4.6.16 |
| Drops <u>3/ 9/ 10/</u> | 3.5.2 | - | 4.6.18 |
| Construction tightness <u>3/ 12/</u> | 3.6.3 | - | 4.6.24 |
| EMI shielding <u>3/ 5/</u> | 3.6.2 | - | 4.6.23 |
| Water tightness <u>3/</u> | 3.6.4 | - | 4.6.25 |
| Fording <u>3/</u> | 3.6.5 | - | 4.6.26 |
| Door latch torque <u>3/</u> | 3.6.1 | - | 4.6.22 |
| Towing, simulated | 3.5.3 | 4.5.3.3.4 | 4.6.19 |
| Lift transport, simulated | 3.5.1.2 | 4.5.3.3.4 | 4.6.17 |

1/ If the EMI shielding test is to follow the drop test on the same shelter, these tests shall be done after EMI.

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- 2/ To be performed only if EMI test followed drop test on the same shelter or if adjustment to gasket compression was necessary to satisfy EMI suppression requirements.
- 3/ Modification Kit MK-1092()/G to remain installed during these tests.
- 4/ If shelter was not drop tested prior to EMI testing, this watertightness test shall use only the nine nozzles located at the door end of the shelter.
- 5/ For correlation data purposes only. CTT test results are not to be used as accept/reject criteria for the drop test.
- 6/ These inspections shall be performed on the same (serial number) shelter and shall not begin until at least seven days after final finish application, including touch-up paint.
- 7/ If the rail transport test is to follow the environmental tests on the same shelter these tests shall be done after the drop test.
- 8/ This inspection may also satisfy sampling for EMI suppression per 4.5.3.3.2.
- 9/ This inspection may also satisfy sampling for drop tests per 4.5.3.3.1.
- 10/ Bulges which might occur during tests on the door end panel exterior surface at the joint (knee) area are not considered delaminations. Therefore, in these areas, if no paint cracks appear and the rivets and spot welds remain intact the shelter shall be considered not to have failed the tests.
- 11/ The CTT test (6 in. H₂O) shall be performed before the water tests. The shelter shall be completely assembled. The air leaks found during the test shall not be corrected before proceeding with the water tightness and fording tests. Records, available to the Government shall be kept of this test, i.e., location, size, and condition of any air leaks present. Electrical rubber tape shall be attached to the doors and cover jambs so as to be in bearing contact with the shelter weather gaskets. Pieces of masking tape placed at intervals across the rubber tape may be used for better attachment to the shelter. Tape shall be removed before the water tests are performed.
- 12/ Door portion and gasket portion only.

4.5.3.3.1 Sampling for drop. One shelter shall be randomly selected from the first 50 shelters produced. In the event that the first delivery quantity is less than 50 units, the sample shall be selected from the first delivery quantity; thereafter, one sample shall be selected from each additional 150 shelters or fraction thereof.

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4.5.3.3.2 Sampling for electromagnetic interference suppression. One shelter shall be randomly selected from the first 10 shelters produced, one shelter from the next 40 shelters produced, and one shelter from each additional 50 shelters or fraction thereof.

4.5.3.3.3 Sampling for hold down assembly. Two complete hold down assemblies in accordance with Drawing SM-D-649952 shall be randomly selected from the first 50 assemblies produced. In the event that the first delivery quantity is less than 50 units, the sample shall be selected from the first delivery quantity but shall be considered the sample for the first 50 units. Thereafter, one assembly shall be selected from each additional 100 assemblies or fraction thereof.

4.5.3.3.4 Sampling for remainder of group C inspection. These inspections shall be performed once during production on a shelter/specimen randomly selected from the first 50 shelters produced. In the event that the first delivery quantity is less than 50 units, the sample shall be selected from the first delivery quantity but shall be considered the sample for the first 50 units.

4.5.4 Packaging inspection. The sampling and inspection of the preservation packaging, packing and container marking shall be in accordance with the requirements of MIL-S-55507.

4.6 Methods of inspection.

4.6.1 Coupon samples. Coupon samples for both adhesive and sealer tests shall be fabricated in accordance with the physical properties paragraph of Drawing SM-B-563559. Ten coupons are required for each of the five conditions for first article samples. Five coupons are required for each of the test conditions for production inspection.

4.6.1.1 Compatibility of fabrication and cure. Samples shall be fabricated and cured using materials, processes, and conditions compatible with those used on panels and/or shelters, including:

- a. Surface conditions of and method of preparing materials to be bonded.
- b. Same batch and type of material.
- c. Duration of, temperature, and pressure during cure.
- d. Minimum cure time before handling.
- e. Time elapsed between application of adhesive to the first item (coupon or panel) in a lot to the application of pressure to the lot of items. Compatibility shall be determined by the Government technical activity. Two or more part mixes of adhesive and/or sealer shall be verified as being in accordance with the manufacturer's recommendations before shear

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tests and made on coupons. Automatic dispensing machines, when used to mix and/or deliver two or more part adhesive and/or sealer, shall be calibrated at least once every 4 hours. Sealer coupons shall be cured at ambient temperature and the lap joint shall be under a pressure of approximately five psi.

4.6.1.2 Shear strength tests. Coupons shall be tested after being subjected to the specified exposure, if applicable, and at the specified temperature. The temperature of the coupons shall be stabilized at the specified level and shall be measured by a thermocouple attached to the coupons over the lap joint. The thermocouple shall not be attached on that side of the lap joint closest to the heat or cold source nor shall the method of attachment impair the application or measurement of the shear force in any way. The shear force shall be applied to destruction with the rate of application constant at less than or equal to 1 inch per minute. Any noncompliance with 3.2.2 for adhesive and 3.2.3 for sealer shall constitute failure of this test.

4.6.2 Core material tests. Core material samples shall be subjected to the following tests: For each test a set of five specimens is required for each type or grade of core material used in the shelter. Specimens shall be fabricated from actual shelter core material pieces randomly selected from production core material parts. Specimen dimensions shall be within ± 0.015 inch. Except for flammability, compliance with 3.2.4 shall be determined by the average of the specimen results, with the lowest result no less than 90 percent of the required value. Failure to meet the requirements of 3.2.4 shall constitute failure of this test.

4.6.2.1 Apparent density, core material. Five specimens, each 2 by 3 by 3 inches, shall be tested in accordance with ASTM D 1622.

4.6.2.2 Compressive strength, core material. Five specimens each 2 by 3 by 3 inches, shall be tested in accordance with ASTM D 1621, Procedure A, with the load applied to the 3 by 3 inch faces.

4.6.2.3 Flammability. Flame resistance of the five specimens, each 1/2 by 2 by 6 inches, shall be determined in accordance with FAR 25.853 Appendix F. The average extinguish time shall not exceed 15 seconds and average burn distance shall not exceed 6 inches.

4.6.2.4 Water absorption. Three specimens, each 6 by 6 by 3 inches, shall be tested in accordance with ASTM D 2842 with the following changes: each specimen shall be weighed as it is first submerged; the weighing jig shall also be weighed at this time; for the final weight, the specimens must be weighed and removed from the water in reverse order; the water absorption shall be calculated as follows: (see table I).

$$\text{lb water /ft}^2 = \frac{(W2a-W1a)-(W2-W3)}{A} \times \frac{2.048 \text{ lb/ft}^2}{\text{gm/cm}^2}$$

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where: W1a = Initial submerged weight of jig and samples (gm)
 W2a = Initial submerged weight of jig (gm)
 W2 = Final submerged weight of jig (gm)
 W3 = Final submerged weight of jig and samples (gm)
 A = Specimen surface area (cm²)

4.6.2.5 Shear strength. Five specimens, each 1/2 by 1-1/2 by 6 inches, shall be tested in accordance with ASTM C 273, except that the load shall be applied at a constant rate such that the maximum load will occur in one minute or more.

4.6.3 Delamination testing and repair. Individual panels and shelters shall; be tested for delaminations by use of the tap hammer, figure 8. Detection shall be accomplished by tapping with the spherical end with a force equal to that produced when the head is raised approximately one inch above the panel and allowed to fall against the panel. A hammer blow on a laminated area produces a "solid" or "firm" or "ringing" sound whereas a delaminated area produces a "deadened" or "hollow" or "metallic slap" sound. The flat end of the hammer shall be used for patting into corners. The extent of interrogation of each side of each panel shall be at least 4 hammer impacts per square foot of panel area between members and at least 4 hammer impacts per square foot over members on the interior side of the panel. Once a suspect area has been located, said area shall be interrogated in detail by at least 1 hammer impact per inch in all directions. The delamination boundaries shall be marked as the point of acoustic change ("deadening") plus 1/2 inch. Failure to meet the requirements of 3.3.2 shall constitute failure of this test.

4.6.3.1 Disposition of delaminated panels. All delaminated panels found before assembly into shelter form shall be rejected. The number of rejected panels per calendar month shall be limited to 5 percent of all panels fabricated during that entire calendar month. Rejected panels in excess of this amount, even though repaired, shall not be accepted without the written approval from the contracting officer.

4.6.3.2 Disposition of shelters containing delaminated panels. All shelters found to contain delaminated panels shall be rejected. The number of rejected shelters per calendar month shall be limited to 1.0 percent of the total contract quantity with the total no more than 5 percent of the total contract quantity. A shelter shall not contain more than two repaired panels regardless of when it was repaired, i.e., before or after use in the shelter. Shelters not complying with these limitations shall only be accepted by written approval of the contracting officer. A record of the shelters containing a repaired panel, including which panel, location, and extent, shall be maintained and reported as required elsewhere in the contract.

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4.6.3.3 Condition of shelter exterior skins. The exterior skin of the shelter panels may contain dents between structural members provided the skin is not punctured and provided the maximum depth of the dent does not exceed 1/16 inch and no more than one shelter in ten contains one dent not exceeding 1/8 inch in depth.

4.6.3.4 Delamination repair.

a. Repair procedures for delaminations shall be documented. The contractor may utilize a procedure only after receiving approval from the Government technical activity designated in the contract. The contractor should be aware and fully understand, however that should the Government later determine that the procedure is objectionable or inadequate, or its implementation does not fulfill its intended purpose, the government may require that its use be discontinued and that another consultation be held to resolve the inadequacy.

b. The maximum area of any single delamination and the maximum number of single delaminations per panel allowed is stated in para 3.3.2. Multiple delaminations on a panel shall be separated by a structural member in order for that panel to be considered eligible for repair. A delamination on the interior side of a panel and another delamination on the exterior side of the same panel and with both delaminations being between the same two members shall not be considered separated.

4.6.4 Cleaning inspection. Inspection of the cleaning process shall be in accordance with SC-B-595539. Any noncompliance shall require recleaning of the parts processed since the last acceptable inspection.

4.6.5 Welding inspection. Arc welding shall be visually inspected in accordance with the requirements of maintenance sampling for production per MIL-STD-2219. For resistance welding, fabrication and inspection of production specimens and inspection of production parts shall be in accordance with MIL-W-6858. Failure to meet the requirements of 3.3.5, with sub-paragraphs, shall constitute failure of this test.

4.6.6 Riveting inspection. Riveted joints or rivnuts shall be examined for tightness, the joined parts for damage and for the rivet/rivnut heads to be properly seated and tight against their bearing surfaces. Rivets/rivnuts not meeting the requirements of 3.3.6 shall be replaced with properly installed rivets/ rivnuts and then reinspected as specified above.

4.6.7 Moisture resistance test. The shelter with doors open shall be subjected to the Moisture Resistance Test of MIL-STD-810, Method 507.3, Procedure II with the exception of steps 2, 3, 4, 7 and 8. After cycling has been completed, there shall be no evidence of delamination, cracking, corrosion, or deterioration to any part of the shelter and there shall be no malfunction of doors, latches, hinges, or any other hardware. Failure to meet the requirements of 3.3.7 and 3.4.1 shall constitute failure of this test.

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4.6.8 Finish inspection. Finish shall be inspected in accordance with the quality assurance provisions of MIL-F-14072 including paint adhesion, and 4.6.12 of this specification. Failure to meet the requirements of 3.3.8 shall constitute failure of this test.

4.6.9 Marking inspection. Marking shall be visually inspected to determine compliance with 3.3.9. Failure to meet the requirements of 3.3.9 shall constitute failure of this test.

4.6.10 Interchangeability inspection. The dimensions listed below shall be gaged or measured to determine compliance with the physical interchangeability requirements of 3.3.10. When a dimension is not within specified or design limits, it shall be considered a defect.

- a. Dimension of doors and door openings.
- b. Mounting dimensions of hinges and latches.
- c. Size and mounting dimensions of skids.
- d. Size and mounting dimensions of towing eyes.
- e. Size and mounting dimensions of lifting eyes.
- f. Dimensions of drain and drain plug.
- g. Padlocks and keys shall be checked for proper operation. Keys (4) shall be checked against at least 3 different padlocks.

4.6.11 Dimensional inspection. The shelters and panels shall be inspected for conformance with the drawings in the following areas: 1/ 2/

- a. Items listed in table VII
- b. Interior and exterior dimensions
- c. Location and visibility of punch marks for mounting members. Location shall be verified at the individual panel stage of fabrication.
- d. Locations of holes on painted interior shelter panel surfaces shall be verified at the shelter assembled stage of fabrication.

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TABLE VII. Dimensional inspection

| Inspection | Drawing | Flatness req'd |
|--|-------------|---|
| Frame flatness <u>5/</u> | - | Within .030 inches |
| Door handle torque | SM-D-649953 | <u>Torque req'd</u> Small door 10 ft-lbs Large door 15 ft-lbs |
| Door handle torque (Shielded Shelter) | SM-D-649951 | Small door 20 ft-lbs Large door 25 ft-lbs |
| Shelter flatness <u>6/ 7/</u> | SM-D-563754 | <u>Deviations allowed</u> 3 out of 36 <u>3/</u> |
| Shelter squareness <u>6/ 7/</u> | SM-D-563754 | 6 out of 36 <u>4/ 8/</u> |

- 1/ Check list shall be maintained (Indicate Serial Number of Shelter).
- 2/ Record actual and required measurements.
- 3/ Four deviations out of the 36 interior measurements on any one sample shall be cause for rejection of the shelter.
- 4/ Seven deviations out of the 36 interior measurements on any one sample shall be cause for rejection of the shelter.
- 5/ Flatness of doors and openings at gasket and contact surfaces. This shall be inspected by checking the flatness of the four (4) sides and the flatness at the corners using a straight edge, JO-Blocks, dial indicator height gage, and/or surface plate. Flatness shall be within .030 inches total.
- 6/ Method of measurement and tolerances with tools and gages used shall be subjected to approval by the Government technical activity designated in the contract.
- 7/ The Government technical activity designated in the contract shall be notified by the contractor 15 days before this inspection is to be performed.
- 8/ More than 2 deviations in any one corner of the shelter shall be cause for rejection of the shelter.

4.6.12 Visual and mechanical inspection. Equipment shall be examined for the requirements of construction (see 3.3). The item requirements listed in MIL-STD-252, Type 4, 5, 7, 8, 9 and 11 defects only shall be complied with. Further, a shelter weight above the required maximum (see 3.3.12) shall be classified as a major defect.

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4.6.13 Shelter weight test. Compliance with 3.3.12 shall be determined by weighing on a platform beam or dial indicator scale. The platform of the scale shall be of sufficient extent so as to allow the placement of the entire shelter on it. The beam or indicator shall have one pound or less graduations. The scale shall have an accuracy of at least plus or minus one pound or one-sixth of one percent of full scale reading whichever is smaller. The scale shall be calibrated at least twice per month using standard weights traceable to the Institute for Standards and Technology. Failure to meet the requirements of 3.3.12 shall constitute failure of this test.

4.6.14 Temperature test. The shelter, with both doors and the louver cover closed and with the drain hole closed in a manner acceptable to the Government shall be placed in a temperature controlled room and subjected to the tests of 4.6.24.1 and 4.6.24.2. Air temperature shall be measured by 10 thermocouples located per figure 2. Outside thermocouples shall be provided with radiation shields of aluminum foil between the thermocouple and radiation surface. Air circulation shall not exceed a velocity of 7 miles per hour at 3 inches away from any shelter surface. Inspection to determine compliance with 3.4.2 shall be conducted after completion of each test.

4.6.14.1 Operating temperature. The air temperature inside and outside the shelter shall be stabilized at 120°F to 125°F for a period of 5 minutes, during which time the doors and latches shall be checked for ease of operation and freedom from binding. The exterior of the shelter roof panel shall then be subjected to an additional simulated solar load which shall be applied as rapidly as possible and shall produce a temperature of 195°F (minimum) on the outside skin of the roof panel as measured by 12 thermocouples located per figure 3. The simulated solar load shall be obtained using at least 28 lamps, type 100T3, 230 volts, as made by General Electric or Sylvania, or equal. The lamps shall be arranged in 4 rows of 7 lamps each and shall be operated within 10 percent of rated voltage. The 120°F to 125°F ambient air temperature plus the roof solar load shall be maintained for a period of 4 hours, at which time the solar load shall be removed and the air temperature both inside and outside the shelter shall be increased to 160°F -0°F +5°F (as measured by the 10 thermocouples of figure 2) as rapidly as possible and maintained for 5 minutes. The shelter shall then be completely removed from the heated chamber to an ambient temperature between 60°F and 85°F.

NOTE: The length and position of the thermocouples wires shall permit complete removal. The shelter drain hole shall be opened prior to shelter removal.

4.6.14.2 Storage test. The shelter shall be subjected alternately to Method 501.3 Section II-3.1 and Method 502.3 Section II-3.1 of MIL-STD-810, except that 3 cycles of each test (high temperature and low temperature) shall be performed. The cycles shall range from 160°F for the high temperature tests and -80°F for low temperature tests (as measured by the ten thermocouples of figure 2). In addition, all doors and latches shall operate freely without binding at either temperature extreme.

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4.6.15 Heat transfer test. The shelter shall be placed in a temperature controlled room which shall be a constant temperature of $-40^{\circ}\text{F} + 5^{\circ}\text{F}$ outside the shelter. The walls and ceiling of the chamber shall be a minimum distance of 2-1/2 feet from the walls and ceiling of the shelter. A 3KW electric coil open frame heater shall be placed at the center of the shelter floor. A multispeed 10 or 12 inch diameter fan shall be placed 6 inches in the back of the heater such as to direct air through the heater toward the front of the shelter at an inclined angle of 15° . A stabilized temperature inside the shelter of not less than 100°F above the outside shall be maintained. Air circulation shall not exceed a velocity of 7 miles per hour at 3 inches away from any shelter surface. Electrical power input and temperatures shall be stabilized when the inside and outside groups of thermocouples each vary less than $2\text{-}1/2^{\circ}\text{F}$ while maintaining the minimum differential of 100°F located per figure 2. Temperature and electrical power input stabilization shall be maintained for at least 1/2 hour. In the stabilized condition the electrical power input will equal the heat loss. The rpm of the fan shall not be changed and the power input to the fan and heater shall be constant during the stabilization period and shall be measured by an ammeter, voltmeter and wattmeter in the electrical circuit. The power input, the average inside and outside temperature, and the inside surface area of the shelter shall be used in calculating the overall coefficient of heat transfer, which shall be no greater than that specified in 3.4.3. Failure to meet the requirements of 3.4.3 shall constitute failure of this test.

NOTE: TO avoid a large pressure differential between the inside and outside of the shelter, a form of pressure relief should be incorporated into the drain hole.

4.6.16 Rail transport, impact test. The shelter shall be loaded with a 1900 pound load per Drawing SM-D-650085 and shall be loaded on a railroad flat car, with standard (draft gear) couplings, in accordance with figure 4. The test shall be performed per MIL-SID-810, method 516.4, procedure VIII. The shelter shall be impact tested, positioned in both the longitudinal and lateral directions on the flat car. A damage survey shall be made after each impact. The shelter shall have sustained no deformation and shall meet the requirements of 3.5.1.1 and 3.3.13. Failure to meet the requirements of 3.5.1.1 and 3.3.13 shall constitute a failure of this test.

4.6.17 Lift transport, simulated test. The shelter shall be loaded with 8605 ± 5 pounds of water contained in a waterproof bag which rests against the floor and sides of the shelter and boards placed inside the shelter across the door opening. The shelter shall then be suspended for a period of 30 minutes by the four lifting eyes using the lift and tie-down device. An inspection for deformation shall be conducted between 30 and 60 minutes after removal of the load. Failure to meet the requirements of 3.5.1.2 shall constitute failure of this test.

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4.6.18 Drop test. All drop tests shall be performed in an environment at a temperature between 50°F and 95°F. The shelter with 1,900 pound payload, shall be lifted from the ground as specified in 4.6.18.1 and 4.6.18.2, quick released and allowed to fall freely (i.e., dropped such that the skid impacts onto a hard concrete flat surface) and shall meet the requirements of 3.5.2. All drop heights shall be measured perpendicular to the concrete surface and from the surface to the bottom of the raised skid. The shelter shall be thoroughly inspected after each specified drop and shall meet the requirements of 3.5.2. Failure to meet the requirements of 3.5.2 shall constitute failure of this test.

4.6.18.1 Flat drop. The entire shelter shall be lifted 18 inches and dropped once. Initial contact shall be along the entire length of both skids.

4.6.18.2 Rotational drops. After completion of the flat drop test, the shelter shall be subjected to 4 rotational drops as follows: A 4 inch (nominal) high board shall be placed under one edge of the shelter such that (a) the entire length of a skid is on the board (for the roadside and curbside drops), or (b) the ends of both skids are on the board (for the rear and front end drops). The edge of the shelter opposite the board shall then be raised 18 inches and dropped. The rotational drops, i.e., the edge which impacts, shall be performed in the following order: rear end, front end, roadside, curbside.

4.6.19 Towing, simulated test. The shelter shall be positioned such that the outboard vertical surface of the roadside skid is against the 2 inch side of a 2 inch by 4 inch (nominal) by 7 foot board which is anchored to the ground so that it can not move (or an equivalent stop approved by the Government technical activity designated in the contract). A minimum force of 2,000 pounds shall then be simultaneously applied to each roadside towing eye in a direction parallel to the ground and perpendicular to the side of the shelter. The applied force shall be maintained for a period of at least 5 minutes. The test shall then be repeated for the curbside skid and towing eyes. The shelter shall be examined to determine compliance with 3.3.13 and 3.5.3. Failure to meet the requirements of 3.3.13 and 3.5.3 shall constitute failure of this test.

4.6.20 Lifting and towing eye tests. All lifting and towing eye tests shall be performed in an environment whose temperature is between 50°F and 95°F. Each lifting and towing eye shall be subjected to a tensile load of 5,000 pounds applied in each of three mutually perpendicular directions which are described by the line of intersection of two adjacent panels. The test shall be performed by outward pulls between each adjacent pair, without deformation to the eye assemblies or the shelter. After all pulls, the shelter shall be examined to determine compliance with 3.3.13 and 3.5.4. Failure to meet the requirements of 3.3.13 and 3.5.4 shall constitute failure of this test.

all be conducted indoors <http://www.everyspec.com> links of this test shall be corrected before proceeding this test.

ion. The shelter shall be placed in a position which exterior joints and fasteners on all surfaces and

ws:
by

condition. No sealant, caulking, tape, etc. shall be pt as detailed on the drawings. The shelter shall be assemblies (SM-C-650082) and the latch keepers be installed and the inner and outer door assemblies (8679) need not be installed. The rivnuts used to lever, shall be installed in the shelter. The shelter 3. (nted before the second portion, para 4.6.24.2 of the

audit test. The shelter shall be completely

3. (dr wi lo re

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wi ess test. Compliance with 3.5.5 shall be determined sh ed of 400 (-0, +5) pounds to the center of the outer the load for 30 seconds. Failure to meet the d 3.3.13 shall constitute failure of this test.

us

co ue test. The torque of each door latch shall be (S specified on drawings SM-D-649951 and SM-D-649953. (S examined for the requirements for construction per co

ex

te test. The shelter shall be tested for shielding in of MIL-STD-285 and shall meet the requirements of and EMI filter shall be installed in accordance with as SM-B-649950 for the test. No other modification ll be performed at the following frequencies with air the full open position. Failure to meet the all constitute failure of this test:

in the 150 to 200 KHz range for low impedance d.

Hz, 18.0 MHz, for high impedance electric field.

Hz, and 10.0 GHz for plane waves.

ightness test. This test shall be performed in 3

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4.6.24.1.2 Test fixtures and equipment. This test requires the use of the following:

- a. Door fixture per SC-D-781228
- b. Drain fixture per SC-D-781235
- c. U-tube manometer with graduations of 0.1 inch of water or less
- d. Air flow regulating device
- e. Temperature potentiometer and two thermocouples, with a combined accuracy of $\pm 0.2^{\circ}\text{F}$ or less.
- f. Air flow measuring device with graduations of 0.05 SCFM (Standard Cubic Feet per Minute) or less and with an accuracy of ± 0.05 SCFM or less.
- g. Miscellaneous rubber tubing and fittings, as required.

4.6.24.1.3 Performance of test. Test fixtures and equipment shall be installed and/or assembled as required by Drawing SC-D-781236. Testing shall then proceed as follows:

4.6.24.1.3.1 Procedure. Clean, dry air shall be introduced into the shelter thru the drain fixture. The temperature differential between the pressurized air inside the shelter and the air outside the shelter shall not exceed 2°F . Testing shall not proceed until the temperatures have stabilized within that limit. An interior differential pressure of 12.0 ± 0.3 inches of water shall be achieved and maintained. The air flow required to maintain this pressure shall not exceed 1.5 SCFM. If the flow exceeds this limit, the shelter shall be considered as having failed this test. Rework shall be accomplished. The rework area(s) shall then be reinspected per 4.6.24.1. The inspection of 4.6.24.1.3.2 shall be performed, regardless of the pressure and SCFM achieved to locate any leak(s).

4.6.24.1.3.2 Report. While the interior differential pressure is maintained, every joint rivet, rivnut, bolt, and any other area on the exterior where two pieces interface shall be painted with a soap and water solution. There shall be no leaks, as evidenced by bubbling or spurting. If there is a leak(s), rework shall be accomplished. Detection and rework of leak(s) at this stage shall not be considered as a failure of the construction tightness test unless said test was being performed in compliance with the Group A audit requirement of 4.5.2. In any event, the reworked area(s) shall be reinspected per 4.6.24 after rework.

4.6.24.2 Door portion. After successful completion of the shelter portion per 4.6.24.1, the shelter shall be tested as follows:

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4.6.24.2.1 Assembled condition. No sealant caulking, tape, etc. shall be used on the doors except as detailed on the drawings. The doors and louver cover shall be completely assembled with all hardware and gaskets installed on the shelter, and shall be closed and latched. The requirements of note 23 on drawing SM-D-649953 and the tightening instruction on sheet 4 of drawing SM-D-208682 shall be met before proceeding with this test.

4.6.24.2.2 Test fixtures and equipment. This test requires the use of the items in 4.6.24.1.2. b, c, d, e and g.

4.6.24.2.3 Performance of test. The test fixture and equipment shall be installed and/or assembled as required by drawing SC-D-781236. Testing shall then proceed as follows:

4.6.24.2.3.1 Procedure. Clean dry air shall be introduced into the shelter thru the drain fixture. The temperature differential between the pressurized air inside the shelter and the air outside the shelter shall not exceed 2°F. Testing shall not proceed until the temperatures have stabilized within that limit. An interior differential pressure of 6.0 ±0.3 inches of water shall be achieved and maintained. If the shelter is unable to achieve and maintain that pressure the shelter shall be considered as having failed this test. The inspection of 4.6.24.2.3.2 shall be performed regardless of the pressure achieved, to locate the leak(s). Rework shall be accomplished. The reworked area(s) shall then be reinspected per 4.6.24.2.

4.6.24.2.3.2 Report. While the interior differential pressure is maintained, every joint, rivet, rivnut, bolt, and any other area on the shelter exterior of the doors and louver cover where two pieces interface shall be painted with a soap and water solution, except the gaskets and their bearing surface where air will be allowed to blow through. There shall be no leaks, as evidenced by bubbling or spurting. If there is a leak(s), rework shall be accomplished. Detection and and rework of leak(s) at this stage shall not be considered as a failure of the construction tightness test unless said test was being performed in compliance with the Group A audit requirement of 4.5.2. In any event, the reworked area(s) shall be inspected per 4.6.24.2 after rework.

4.6.24.3 Gasket portion. After successful completion of the outer door portion per 4.6.24.2, the gasket seating on the inner and outer doors and the louver cover shall be tested as follows:

4.6.24.3.1 Assembled condition. The assembled condition shall be as required in 4.6.24.2.1.

4.6.24.3.2 Test equipment. This test requires the use of a piece of paper 0.0035 inch maximum thickness by 2-1/2 inches wide.

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4.6.24.3.3 Performance of test. The following inspection shall be performed on both the outer and inner door assemblies, and the louver cover, once at the center of the top and bottom (except on top of the louver cover), 1/2 inch away from each corner (NOTE: Where hinge interferes with inspection, perform inspection adjacent to the hinge), at two places along each side at approximately 1/3 and 2/3 the height of each door and louver cover. (Total inspection locations are 14 for each door and 11 for the louver cover.) The door or cover shall be closed so that the paper is between the weather gasket (SM-C-564839) and its bearing surface but not under the EMI gasket (if so equipped). The paper shall be withdrawn while the door or cover is closed. The absence of any resistance to the withdrawal indicates that the gasket is not touching its bearing surface. If this condition is found the gasket compression shall be increased and this inspection shall be repeated. If a gasket(s) is unable to meet this inspection requirement without exceeding the requirements stated in 4.6.24.3.1 the shelter shall be considered as having failed this test. Rework shall be accomplished. The rework area(s) shall then be reinspected per 4.6.24.2 and 4.6.24.3.

4.6.24.4 Construction tightness test records. The contractor shall maintain records of all construction tightness tests performed, including any reinspection and tests performed in compliance with the Group A audit requirement of 4.5.2. Records shall contain, as a minimum, the shelter serial number and the following:

4.6.24.4.1 Shelter portion.

- a. An indication of compliance with 4.6.24.1.1 and Drawing SC-D-781236.
- b. Temperature differential, interior differential pressure, and air flow per 4.6.24.1.3.1.
- c. If any leak was found.
- d. Date inspection was performed.
- e. A statement that rework was performed, if applicable.
- f. Date reinspection was performed, if applicable.

4.6.24.4.2 Door portion.

- a. An indication of compliance with 4.6.24.2.1 and Drawing SC-D-781236.
- b. Temperature differential and interior differential pressure per 4.6.24.2.3.1.
- c. If any leak was found.

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- d. Date inspection was performed.
- e. A statement that rework was performed, if applicable.
- f. Date reinspection was performed, if applicable.

4.6.24.4.3 Gasket portion.

- a. An indication of compliance with 4.6.24.3.1 and the 25 inspection location points per 4.6.24.3.3.
- b. If the shelter was equipped with EMI gaskets.
- c. If an inadequate gasket bearing was found and at what location.
- d. Date inspection was performed.
- e. A statement that rework was performed, if applicable.
- f. Date reinspection was performed, if applicable.

4.6.24.4.4 Availability of records. The contractor shall make the above records available to the Government for review upon request.

4.6.24.5 CTT rework. The 9 holes in the floor panel shall be plugged in accordance with note 18 on drawing SM-D-649953 after successful completion of first portion of test 4.6.24.1 and after compliance with Group A audit sampling requirements of 4.5.2.

4.6.25 Water tightness tests. The test shall be conducted in still air. The shelter, after painting and prior to the fording test and without the use of external sealing, caulking, taping, etc., shall be subjected to a two part spray test to determine compliance with 3.6.4. Failure to meet the requirements of 3.6.4 shall constitute failure of this test. Nozzles, model G29SQ (or GG29SQ) as made by Spraying Systems Company, Wheaton, Illinois, or equal, pointing directly at the surface under test shall be used. Gages shall be permanently installed in piping to indicate pressure at remote nozzles. Prior to the performing of the spraying the weight of the shelter shall be recorded and shall meet the requirements of paragraphs 3.3.12. The shelter doors shall be opened and closed so that the latching mechanism is completely engaged for a total of ten operations.

4.6.25.1 Doors and louver cover closed (see figure 5). Each of the five exposed surfaces of the shelter shall first be sprayed with the nozzles arranged to provide uniform coverage of the panel under test. Each end panel shall be tested using nine nozzles, each side using nine nozzles, and the roof using four nozzles. Each nozzle shall operate at a pressure of forty psig at the nozzle and shall be located nineteen inches from the panel under

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test, with the exception of the roof nozzles which shall be at a distance of thirty-two inches. Each panel shall be sprayed for a period of forty minutes. After the test, there shall be no visual evidence of leakage into the shelter.

4.6.25.2 Door louver cover open (see figure 6). The inlet louver shall be tested with the louver cover fully opened to the limit of the stop, by spraying water at the door end panel. Five nozzles shall be located across the width of the end of the inlet louver. Three nozzles shall be located across the width of the end panel, thirty inches above the roof, and thirty-six inches from the end panel. The remaining two nozzles shall be located to each side, thirty inches above the roof, twelve inches from the end panel and thirty-six inches from the side panel. Each nozzle shall operate at a pressure of fifteen psig at the side panel. Each nozzle shall operate at a pressure of fifteen psig at the nozzle. The panel shall be sprayed for a period of twenty minutes. After the test, there shall be no visual evidence of leakage into the shelter. To determine whether or not water has entered the space between the skins, holes shall be drilled in the shelter in accordance with figure 7. Prior to fording the holes shall be sealed with rivets and sealer per 3.3.3.

4.6.26 Fording test. The shelter shall be securely restrained and immersed in water to a depth of $30 \pm 1/2$ inches, measured from the bottom of the shelter skids, for a period of 1 hour. After immersion, the shelter shall be examined to determine compliance with 3.6.5. Failure to meet the requirements of 3.6.5 shall constitute a failure of this test.

4.6.26.1 Weight differential. To determine compliance with 3.6.5, the shelter shall be weighed in accordance with 4.6.13 before and after fording. Holes shall be drilled per figure 7 if a weight differential of 1 or more pounds exists. Any water escaping from any of the drilled holes shall constitute failure of the fording test. A weight differential of more than 2 pounds after the fording test shall constitute failure of this test.

4.6.27 Light tightness test. The inlet louver assembly shall be tested for light tightness with an unshielded, lighted 100 watt incandescent lamp placed in a plane one foot from the outside shelter surface of the louver. Regardless of the position of the lamp in the plane relative to the louver, no direct rays of light shall be visible when viewed by the observer from the darkened shelter interior. Failure to meet the requirements of 3.6.6 for light tightness shall constitute failure of this test.

4.6.28 Lift and tie down device test (Drawing SM-D-649952). All slings shall be pre-stretched by subjecting each sling leg to a load of $5,000 + 50$ pounds. The slings shall be subjected to a destructive tensile load. The cable shall fail before slippage occurs about the sling sleeves. Each sling leg shall fail at a load higher than 9,500 pounds. Failure to meet the requirements of 3.7 shall constitute failure of this test.

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4.6.29 Impact panel test. A 24 inch square specimen having no support from internal structural members shall be subjected to impact as follows: a 70 pound steel cylinder three inches in diameter and hemispherical at one end shall be dropped vertically 30 inches so that the hemispherical end of the weight strikes the center of the outer skin of the section on a horizontal plane. The specimen shall be supported along its four edges by a framework backed by concrete. The frame shall be made of four pieces of 2 by 4 inch (nominal) lumber, rigidly bolted together to form a square 24 inches on a side (outside dimension), 4 inches (nominal) high, so that the frame rests on the 2 inch (nominal) faces. The panel specimen shall have the four edge surfaces bound with a 1 inch flange channel frame of skin material attached through flanges by 3/16 blind rivets on 3 inch centers and shall be bolted to the frame with a minimum of two 1/4 inch diameter bolts per edge (see figure 1). After the test, the specimen shall be opened for examination for conformance with applicable drawings. Failure to meet the requirements of 3.8 when tested as specified above shall constitute failure of this test.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-S-55507.

5.2 Padlock and key. Shelters for delivery shall be padlocked. Padlock keys shall be concealed by taping to the underside of the door cover. The shipping document shall be so annotated.

6. NOTES

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

6.1 Intended use. The shelter is a lightweight field and mobile shelter designed for transport by cargo truck, fixed or rotary winged aircraft, by rail, ship, and landing craft.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. 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).
- c. When a first article is required (see 3.1, 4.4, 6.3).
- d. When electromagnetic interference suppression capability is required on all delivered shelters (see 3.3.1, 3.6.2).
- e. If facsimiles are required (see 3.3.11).
- f. Marking and shipping of sample shelters.

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- g. Actions required relative to Group C failures and reinspection of conforming Group C sample units (see 4.5.3.3).
- h. Level A or B preservation and packing (see 5.1, 6.5).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of Federal Acquisition Regulation (FAR) 52.209-4. First article inspection shall be in accordance with 4.4 and shall consist of specimens (see 4.4.1) and one complete shelter with MK-1079()/G installed. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Noncompliance. In the event of a Group C failure, approval to ship may be withheld, at the discretion of the contracting officer, pending his decision on the adequacy of corrective action.

6.5 Level B preservation. When level B preservation is specified, this level of protection will only be used under known favorable conditions during transportation, storage, and handling.

6.6 Environmental. Environmental pollution prevention measures are contained in the packaging material specification referenced herein. Refer to the material specifications or to the preparing activity for recommended disposability methods.

6.7 Definitions.

6.7.1 Inspection. Inspection is the examination or testing, or both, of supplies to determine compliance with the applicable requirements. Sampling is an element of inspection.

6.7.2 Examination. Examination consists of simple, generally nondestructive determinations of compliance, without the use of special testing equipment.

6.7.3 Testing. Testing consists of determinations of compliance, using technical means.

6.7.4 Voids. For the purpose of this specification, a void is defined as any unauthorized separation or space within a shelter panel or section, i.e., any separation or space that is in conflict with the drawings or other contractual requirements. Voids range from gaps as wide as the space created

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by a missing piece of core material to as thin as a break in the continuity of material. Voids may be located solely within one type of material, such as a core material separation; they may exist between adjacent materials, such as unbonded core material; or they may be located between other parts within a panel, such as where a piece of material is missing, damaged, or undersized. Voids may have been created at the time of construction such as where a part was omitted; or may be created at a later time, such as a core separation or delaminated skin.

6.7.5 Delaminations. For the purpose of this specification, a delamination is defined as the condition that exists within a shelter section or panel when two surfaces that once were bonded together are no longer bonded together. Delaminations may occur between any two bonded surfaces, examples include: separations between thermal barriers and members, between thermal barriers and skins, between members and core, or between skins and core. They may be the result of a poor quality bond or they could occur due to misuse or severe handling of the panels or the shelter after bonding. Test requirements of this specification shall not be construed as misuse or severe handling as these terms apply to the definition of delaminations.

6.8 Nomenclature. The parentheses in the nomenclature will be deleted or replaced by a letter identifying the particular design; for example: S-250X/G. The contractor should apply for nomenclature in accordance with the applicable clause in the contract.

6.9 Verification inspection. Verification by the Government will be limited to the amount deemed necessary to determine compliance with the contract and will be limited in severity to the definitive quality assurance provisions established in this specification and the contract. The amount of verification inspection by the Government will be adjusted to make maximum utilization of the contractor's quality control system and the quality history of the product.

6.10 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.

Custodian:

Army - GL

Review activity:

Army - TR

Preparing activity:

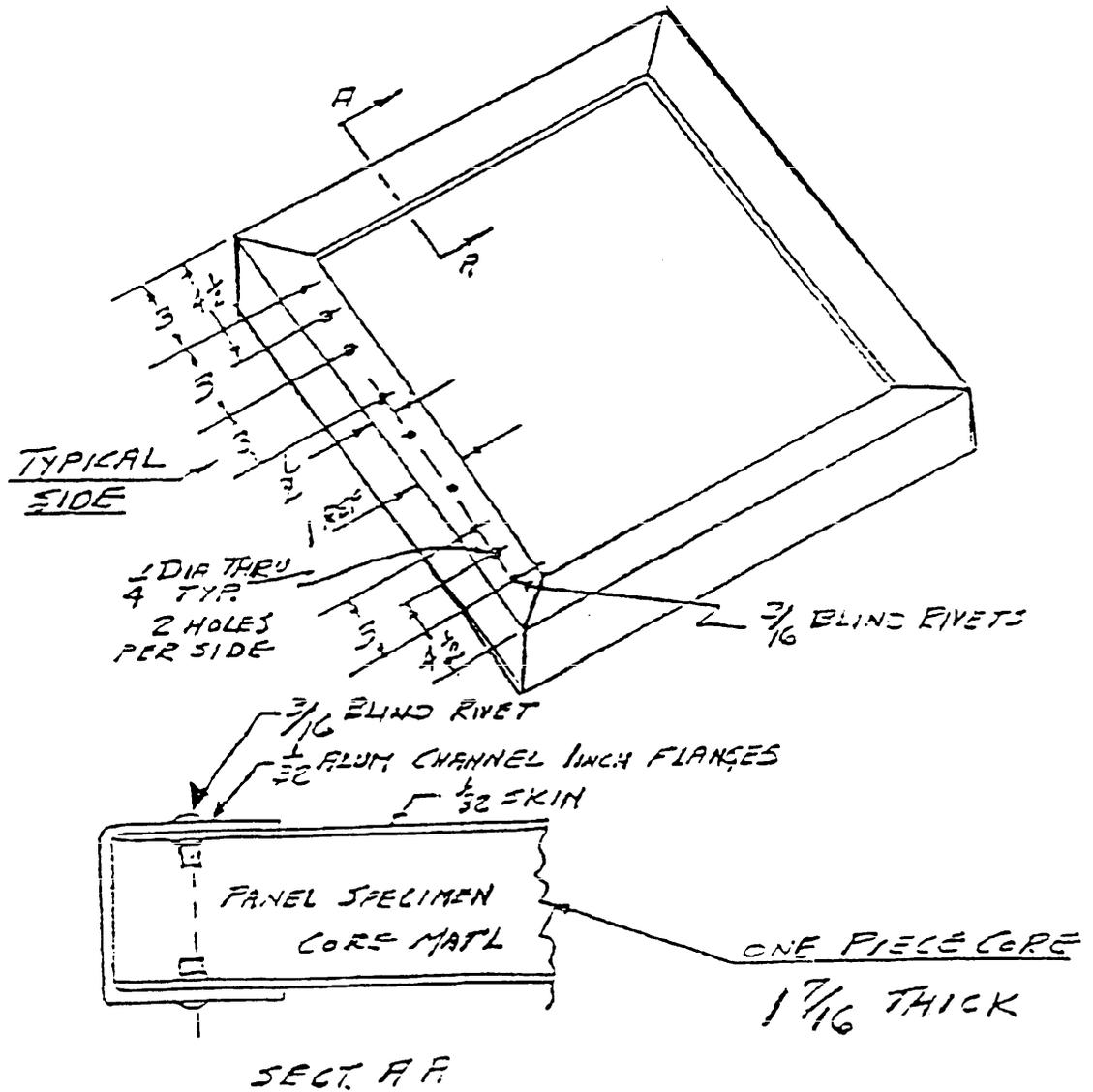
Army - GL

(Project 5411-0034)

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FIGURE 1

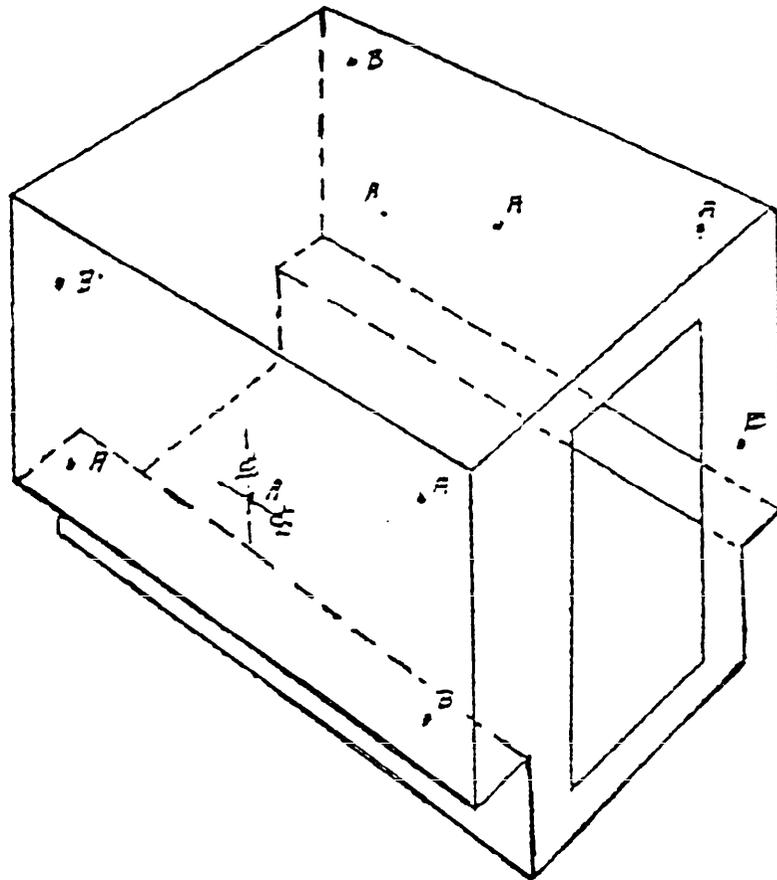
IMPACT TEST PANEL PARA. 4.6.29



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FIGURE 2

THERMOCOUPLE LOCATION FOR TEST 4.6.14 & 4.6.15



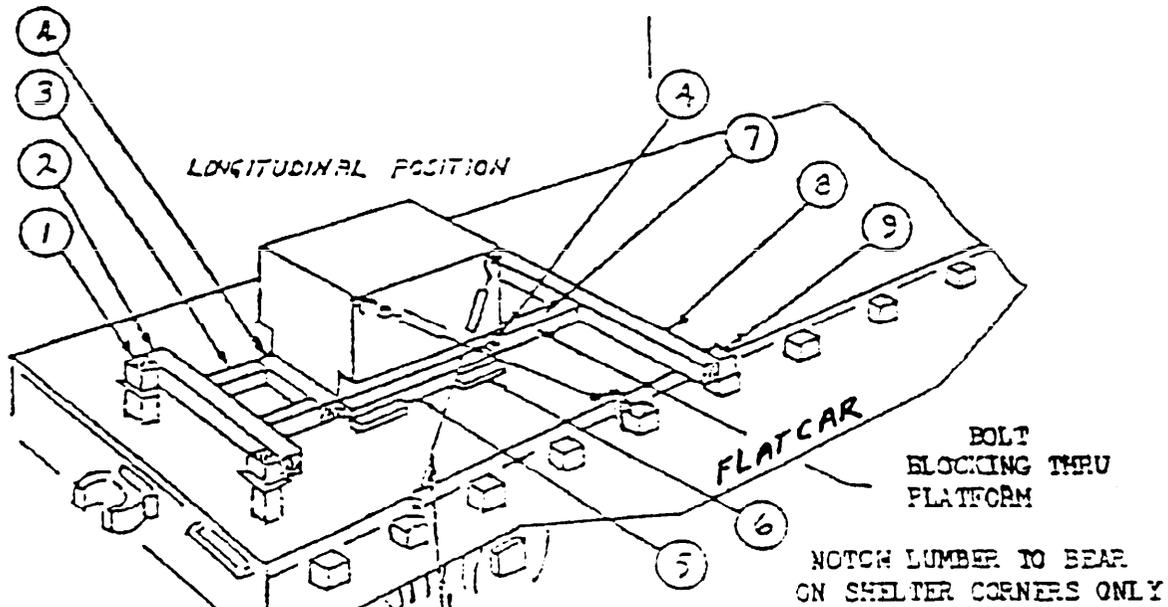
THERMOCOUPLE LOCATION ON SIDEWALLS

- A = OUTSIDE T.C.s APPROXIMATELY 10 INCHES FROM CORNERS
- B = INSIDE T.C.s AS SHOWN

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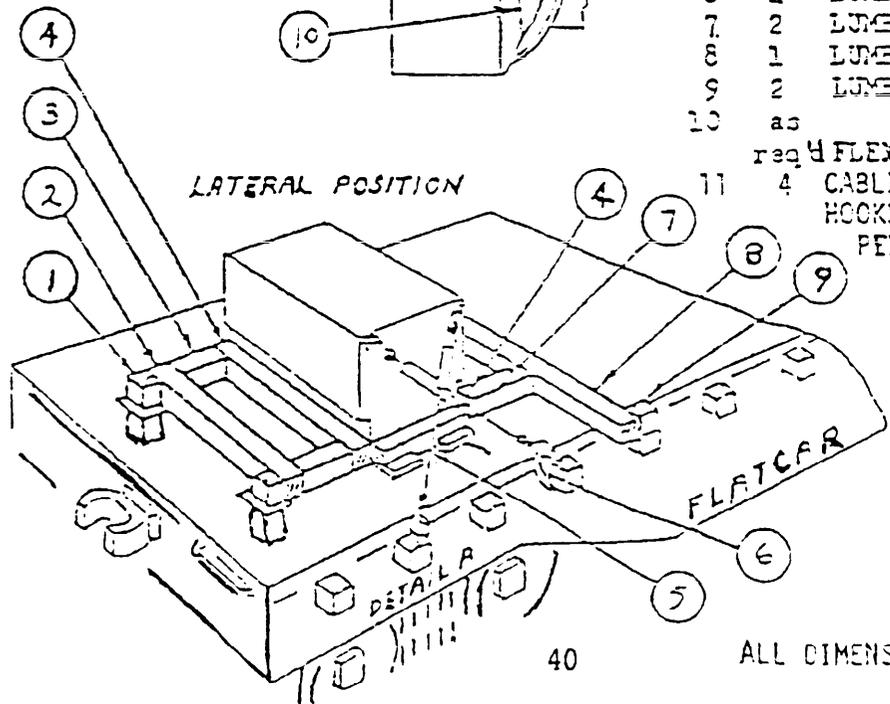
FIGURE 4

TIE DOWN FOR RAILROAD TEST (SEE 4.6.16)



Position 2 same as 8
if no pockets in platform
DOUBLE CABLE LOOP
APPROX 12"
(3/8 DIA 7 x 19 WIRE)
DETAIL "A"

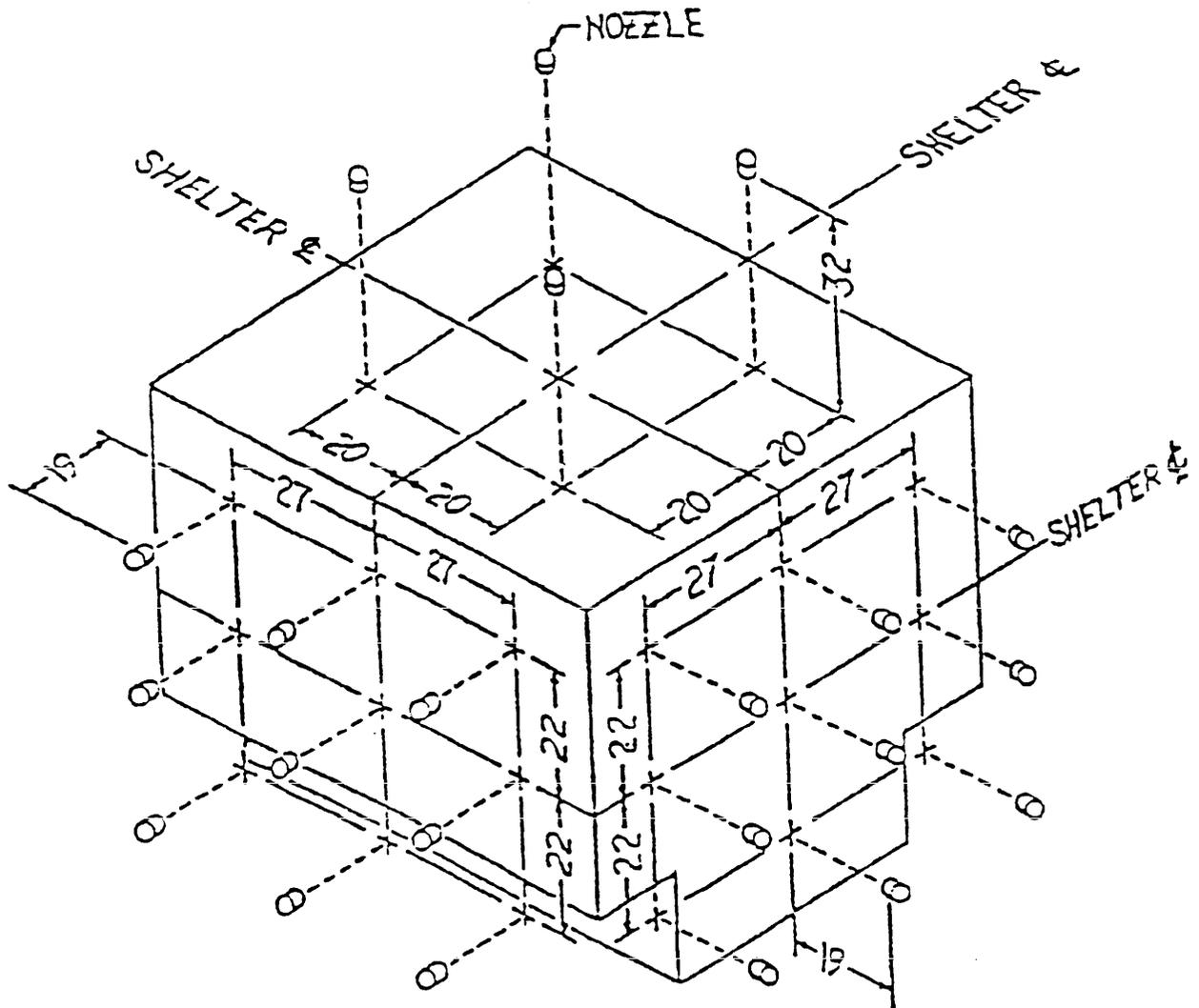
| ITEM | REQ | DESCRIPTION |
|------|----------|---|
| 1 | 2 | LUMBER 1 x 5 x 12 |
| 2 | 1 | LUMBER 6 x 6 TO SUIT |
| 3 | 2 | LUMBER 6 x 6 TO SUIT |
| 4 | 2 | LUMBER 6 x 6 TO SUIT |
| 5 | 2 | LUMBER 1 x 1 TO SUIT |
| 6 | 1 | LUMBER 2 x 4 x 12 |
| 7 | 2 | LUMBER 6 x 6 TO SUIT |
| 8 | 1 | LUMBER 6 x 6 TO SUIT |
| 9 | 2 | LUMBER TO SUIT |
| 10 | as req'd | FLEX METAL SHEETING |
| 11 | 4 | CABLE LENGTH TO SUIT, HOOKS AND TURNBUCKLES PER DWG SM-D-649952 |



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FIGURE 5

NOZZLE LOCATIONS WATER TIGHTNESS FOR 4.6.25.1



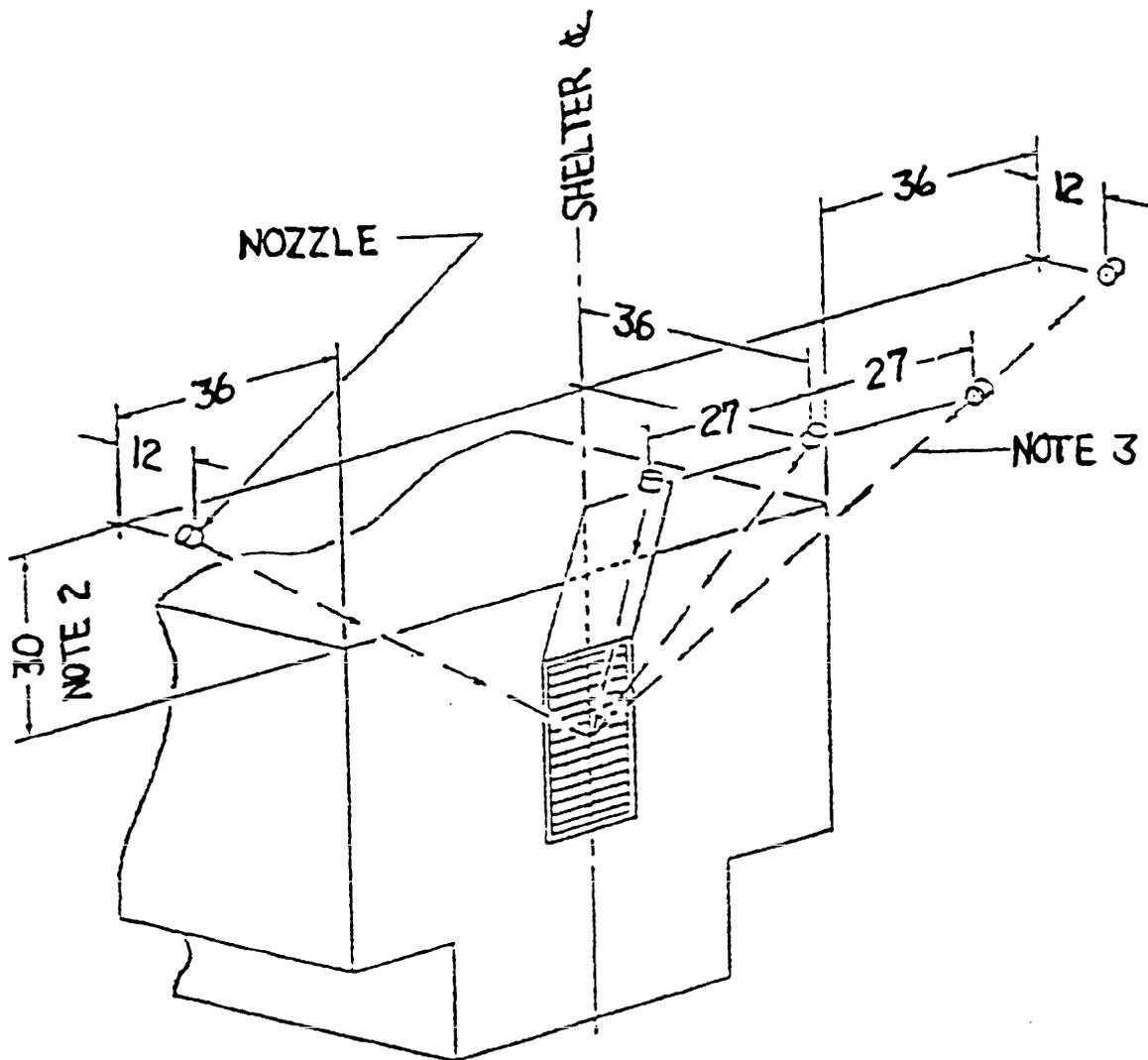
NOTES:

1. DIMENSIONS ARE IN INCHES, TOLERANCE: $\pm 1/2$ INCH
2. NOZZLE LOCATIONS FOR THE REAR END AND ROADSIDE PANELS ARE THE SAME AS FOR THE FRONT END AND CURBSIDE PANELS, RESPECTIVELY, SHOWN ABOVE.

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FIGURE 6

NOZZLE LOCATIONS WATER/TIGHTNESS FOR 4.6.25.2



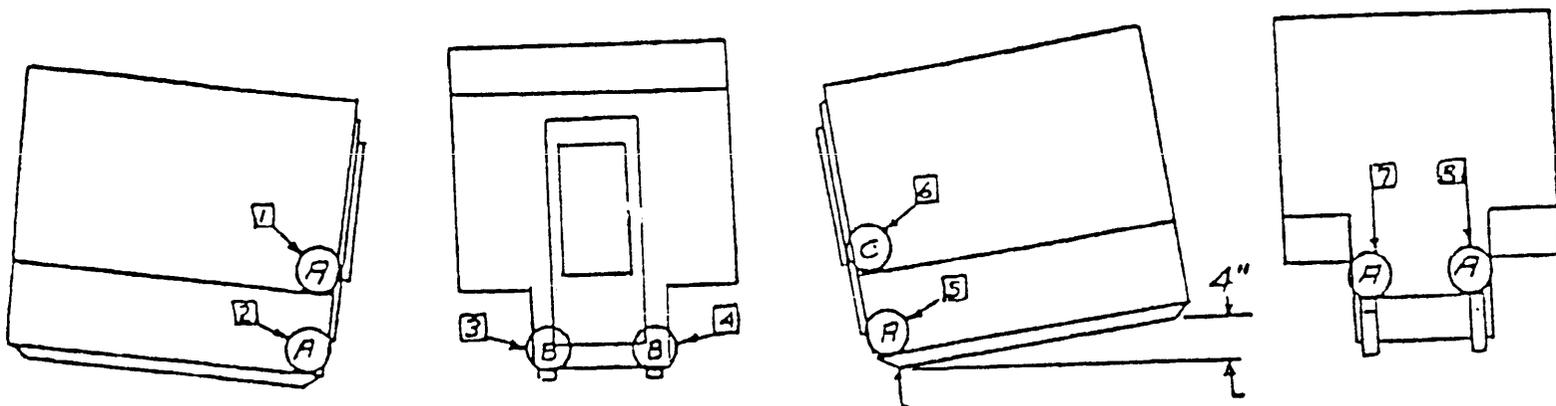
NOTES:

1. DIMENSIONS ARE IN INCHES, TOLERANCE: $\pm 1/2$ INCH
2. ALL 5 NOZZLES ARE LOCATED 30 INCHES ABOVE THE SHELTER ROOF.
3. EACH NOZZLE AXIS SHALL BE DIRECTED TOWARD THE CENTER OF THE LOUVER ASSEMBLY.

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FIGURE 7

LOCATION OF DRILLED HOLES FOR
 FORDING PER 4.6.26.1 & WATERTIGHTNESS PER 4.6.25.2

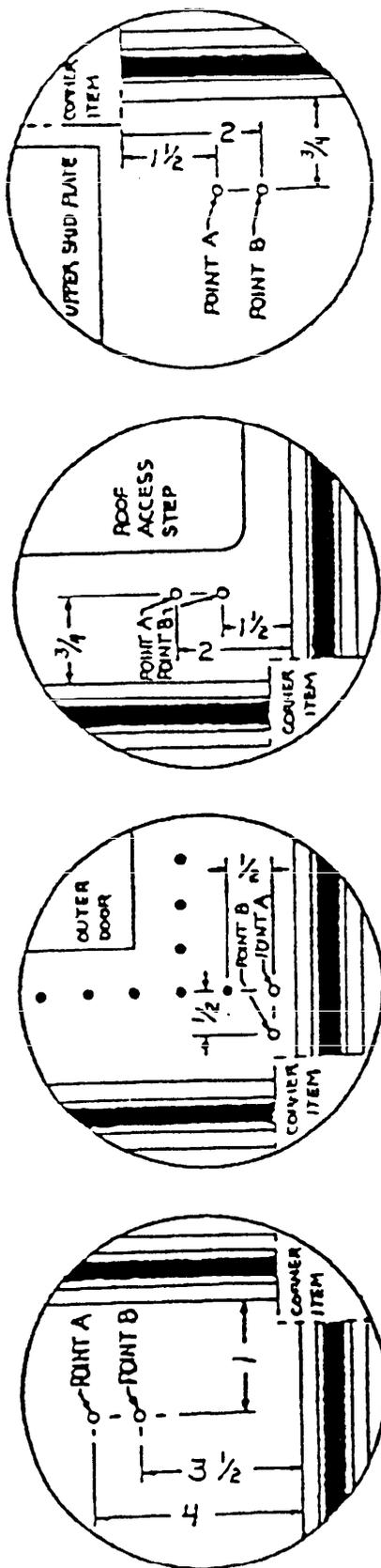


NOTES:

1. LOCATIONS 1, 2, 5, 7, 8: SEE DETAIL A;
 LOCATIONS 3, 4: SEE DETAIL B; LOCATION 6; SEE DETAIL C;
 LOCATIONS 9, 10: SEE DETAIL D
2. SHELTER SHALL REMAIN TIPPED 1/4 HOUR BEFORE DRILLING FIRST HOLE AND 1/4 HOURS AFTER DRILLING LAST HOLE.
3. ALLOW SUFFICIENT CLEARANCE TO DRILL AT LOCATIONS 9 AND 10.
4. AFTER FORDING, THE SHELTER SHALL BE WEIGHED PRIOR TO DRILLING HOLES.
5. HOLE NO. 1 THRU 10 DRILLED AFTER WATERTIGHTNESS; HOLE NO. 11 THRU 20 DRILLED AFTER FORDING.
6. THE GOVERNMENT MAY REQUIRED 3 ADDITIONAL HOLES AFTER WATERTIGHTNESS AND AFTER FORDING AT LOCATIONS TO BE DETERMINED BY THE GOVERNMENT AT THE TIME OF TESTING.
7. HOLES: .128/.132 DIA, X 5/8 DEEP.
8. RIVETS: AD45H AS SUPPLIED BY UNITED SHOE MACHINERY CORP., SHELTON, CT, OR EQUAL.
9. RIVETS SHALL BE DIPPED IN SEALER PRIOR TO INSTALLATION.
10. HOLE SHALL BE DRILLED IN LINE WITH EXISTING RIVETS.
11. INSTALLED RIVETS SHALL NOT BE DISTORTED
12. CORNER ITEM IS A CORNER CAP.
13. CORNER ITEM IS A TOWING EYE BRACKET
14. DETAIL SHOWS UPPER SKID PLATE AND RIVNUTS REMOVED.
15. EXCEPT AS NOTED, DIMENSIONS ARE FROM INBOARD EDGE OF TRIM ANGLE - NOT SEALER FILLET
16. ALL DIMENSIONS $\pm 1/16"$
17. DRAIN NOT SHOWN

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FIGURE 7 (continued)



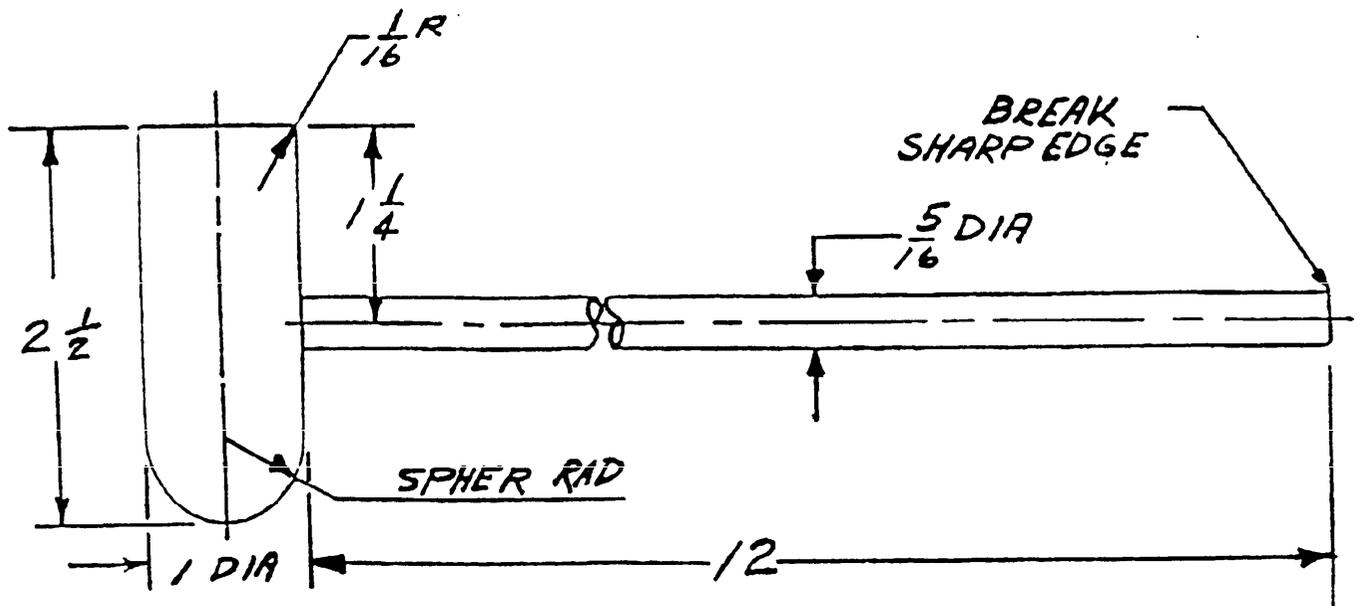
| DETAIL A | | DETAIL B | | DETAIL C | | DETAIL D | |
|-------------|-----------------|----------------|--------------------|----------|----------------|--------------------|----------|
| AT LOCATION | SHOWN IN DETAIL | DRILL HOLE NO. | AT POINT IN DETAIL | SEE NOTE | DRILL HOLE NO. | AT POINT IN DETAIL | SEE NOTE |
| 1 | A (AS SHOWN) | 1 | A | 12 | 11 | B | 12 |
| 2 | A (AS SHOWN) | 2 | A | 13, 14 | 12 | B | 13, 14 |
| 3 | B (AS SHOWN) | 3 | A | 10, 13 | 13 | B | 10, 13 |
| 4 | B (OPPOSITE) | 4 | A | 10, 13 | 14 | B | 10, 13 |
| 5 | A (OPPOSITE) | 5 | A | 13, 14 | 15 | B | 13, 14 |
| 6 | C (AS SHOWN) | 6 | A | 12 | 16 | B | 12 |
| 7 | A (OPPOSITE) | 7 | A | 13 | 17 | B | 13 |
| 8 | A (AS SHOWN) | 8 | A | 13 | 18 | B | 13 |
| 9 | D (AS SHOWN) | 9 | A | 13 | 19 | B | 13 |
| 10 | D (OPPOSITE) | 10 | A | 13, 17 | 20 | B | 13, 17 |

TOLERANCE ± 1/16"
ALL DIMENSION IN INCHES

MIL-S-0055541H(GL)

FIGURE 8

TAP HAMMER (SEE 4.6.3)



MATERIAL - ALUM 6061-T6 OR EQUAL
TOLERANCE $\pm 1/32$
ALL DIMENSIONS IN INCHES

