

MIL-S-55541G(CR)

01 August 1984

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Superseding  
MIL-S-55541F(CR)  
30 August 1982

## MILITARY SPECIFICATION

## SHELTER, ELECTRICAL EQUIPMENT S-250( )/G

This specification is approved for use by Communications and Electronics Command and Fort Monmouth, Department of the Army and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope.— This specification covers one type of lightweight field and mobile shelter designed for transport by cargo truck, fixed or rotary winged aircraft, rail, and ship, and designated Shelter, Electrical Equipment, S-250( )/G (See 6.2). This shelter is approximately a cubic box configuration with under cut side walls and an entrance in one end. The shelter is formed by panels which are comprised of one piece seamless aluminum skins laminated to a foamed plastic core material and wood thermal barriers with internal mounting members welded to the outside skin.

## 2. APPLICABLE DOCUMENTS

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

## SPECIFICATIONS

## FEDERAL

FF-P-101

Padlocks

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Communications and Electronics Command and Fort Monmouth ATTN: DRSEL-ED-SS, Fort Monmouth, New Jersey 07703, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5411

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QQ-S-766 Steel Plates, Sheets, and Strip Corrosion  
Resisting.  
ZZ-R-765 Rubber, Silicone: Low and High-Temperature  
and Tear Resistant

## MILITARY

MIL-S-6855 Synthetic Rubber Sheets, Strips, Molded  
or Extruded Shapes  
MIL-W-6858 Welding Aluminum Magnesium, Non-hardening  
Steels or Alloys and Titanium, Spot, Seam  
and Stitch  
MIL-W-8604 Welding of Aluminum Alloys: Process for  
MIL-M-13231 Marking of Electronic Items  
MIL-F-14072 Finishes for Ground Electronic Equipment  
MIL-C-46168 Coating, Aliphatic Polyurethane, Chemical  
Agent Resistant  
MIL-S-55507 Shelter, Electrical Equipment (Empty)  
Packaging of

## STANDARDS

## FEDERAL

FED-STD-595 Colors

## MILITARY

MIL-STD-169 Extreme-Temperature Cycle  
MIL-STD-252 Classification of Visual and Mechanical Defects  
for Equipment, Electronic, Wired, and Other  
Devices  
MIL-STD-1235 Single and Multilevel Continuous Sampling  
Procedures and Tables for Inspection by  
Attributes  
MIL-STD-285 Attenuation Measurements for Enclosures, Electro  
Magnetic Shielding, for Electronic Test  
Purposes, Methods of  
MIL-STD-810 Environmental Test Methods

## DRAWINGS

## ELECTRONICS

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
SC-D-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-563754	Diagram, Flatness and Squareness
SM-C-564839	Gasket, Silicone
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
SC-D-781235	Drain Fixture, Construction Tightness Test
SC-D-781236	Installation Construction Tightness Test
SC-B-964240	Nameplate, S-250 Shelter (with Rivnuts)
SM-C-994176	Painting Procedure

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

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

## AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

C273-61	Shear Test in Flatwise Plane of Flat Sandwich Construction or Sandwich Cores
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D1621-64	Compressive Strength of Rigid Cellular Plastics
D1622-63	Apparent Density of Rigid Cellular Plastics
D1692-68	Flammability of Plastics, Foams and Sheeting
D2842	Water absorption of Rigid Cellular Plastics

(Application for copies should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103)

### 3. REQUIREMENTS

3.1 Construction.— All parts, sub-assemblies, and the final assembly of Shelter, Electrical Equipment, S-250( )/G shall be constructed in accordance with the drawings listed on DL-SM-B-563500 or DL-SM-B-650123. Shelters shall not be fork lifted at anytime during or after construction. (See 3.1.9, 3.2, 3.4, 4.6, 6.7)

3.1.1 Lamination.— During the laminating process the mating of all panel constituents shall be bonded without delaminations, i.e. discontinuities 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. (See 3.2.1, 3.4, 4.29, Table III).

3.1.2 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. (See 3.2.2, 3.4, 3.10.3, 3.10.4, 3.10.5, 4.24, 4.25, 4.26).

3.1.3 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 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 SC-B-595538. (See 4.6.7)

3.1.4 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 reserves the right to perform any of the inspections where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements. (See 4.6.6)

3.1.4.1 Arc Welding.- Inert gas shielded arc welding shall be in accordance with MIL-W-8604 except as follows:

a. In lieu of para 4.1 all welded items in accordance with MIL-W-8604 shall be inspected by the supplier in accordance with paragraphs 4 and 5. All reference to radiographic examination/inspection shall not apply to this solicitation/contract.

b. In paragraphs 4.2.1 and 4.2.2.1 of MIL-W-8604 the supplier representative shall replace the Government representative.

3.1.4.2 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 (7.1), External defects (7.1.1), sheet separation, (7.1.2.d), Surface Identification, (7.1.3.a) and Weld location (8.3).

a. Test specimens shall be used to represent the manufacturing practice (8.1). Three single-spot shear specimens shall be used for checking purposes per 8.4.1(b), (c), and (d). These single shear specimens shall be tested for ultimate strength per 8.7.2. Variation in shear strength shall be per 8.7.4.

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.

3.1.5 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. (See 4.5.1.8, 4.11)

3.1.5.1 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 rivnuts not being tightly seated.

3.1.5.2 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.

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3.1.5.3 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.

3.1.6 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 3.8.1 and shall show no evidence of corrosion or damage which in any way impairs the specified performance of the individual part. (See 4.13)

3.1.6.1 Padlocks and keys.- All padlocks and keys shall be in accordance with SC-C-595537 and shall be interchangeable to the extent determined by 4.6.2. (See 4.6.2)

3.1.7 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 Table VIII of MIL-F-14072. (See 4.6.4, Table II, Table V)

3.1.8 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. (See 3.9.2, 4.6.5, Table II)

3.1.9 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. (See 3.1, 4.5.2, 4.6.2, 4.5.1.7, Table II, Table III).

3.1.10 Facsimiles.- When specified (see 6.1.d), 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 (see 6.1.c). 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 drawing. (See 4.6.1)

3.2 Basic materials.- The following materials shall be in accordance with 3.1:

3.2.1 Adhesive.- (See 4.4.1, 4.7, Table I, Table III, Table VI). The adhesive used to laminate per 3.1.1 shall meet the physical properties required by

drawing SM-B-563559.

3.2.2 Sealer.- (See 4.5.1.2, 4.7, Table I, Table III, Table VI). Sealer used to meet the requirement of 3.1.2 shall have the following properties:

3.2.2.1 Sealer shear, ambient.- The sealer and its bond to the aluminum shall have a minimum average shear strength of 200 psi when tested at  $80^{\circ} \pm 10^{\circ}\text{F}$ . (See 4.5.1.3)

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

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

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

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

3.2.2.4 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 percent NaCl solution at  $95^{\circ} \pm 5^{\circ}\text{F}$  for a period of fourteen days and after exposure have a minimum average shear strength of 200 psi when tested at  $80^{\circ}\text{F} \pm 10^{\circ}\text{F}$ .

3.2.3 Core material.- (See 4.4.1, 4.8) 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, shear strength, flammability, and water absorption properties shall be in accordance with Drawing SC-B-595564, SC-B-595565, and SM-B-563655, as applicable (see 4.5.1.1, Table I, Table III, Table VI)

3.3 Impact panel.- The shelter panels shall withstand the test of 4.9.2 without fracture or rupture of either aluminum skin. (See 3.1, 4.4.1, 4.6.3, 4.9, Table I, Table VI).

3.4 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 3.1.2 shall remain intact. All dimensions shall 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

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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. (See 3.1, 3.8, 3.9, 4.5)

3.5 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 (See 4.5.2.3.3, 4.10, Table I, Table V).

3.6 Shelter weight.- (See 3.1.8, 3.10.4, 3.10.5, 4.5.2.1, 4.12, Table IV) Excluding the lift and tie down device, the gross weight of the shelter shall be:

(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.

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

3.7 Fabrication and assembly.- Samples 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 this specification, and (c) meet all requirements specified herein. (See 4.7.1)

3.8 Environmental Tests.- (See 3.4, 4.4.2, 4.5.2.3) The shelter shall be capable of meeting the following environmental test requirements with no deleterious effect to any finish or performance capability:

3.8.1 Moisture resistance.- The shelter shall withstand daily exposure of up to 97 percent relative humidity for 20 hours and exposure at 100 percent relative humidity (with condensation) for 4 hours. (See 3.1.6, 4.13, 4.5.2.3, Table II, Table VI)

3.8.2 Temperature.- (See 4.14, Table II, Table VI) The shelter shall be capable of withstanding the following:

3.8.2.1 Operating temperature.- Exposure to an ambient temperature in the range of  $-65^{\circ}\text{F}$  to  $+125^{\circ}\text{F}$  plus a solar load such that the outside skin reaches a minimum temperature of  $195^{\circ}\text{F}$ ; exposure at any one time not to exceed 75 hours at the low temperature extreme and 4 hours at the high temperature extreme. (See 4.14.1, 4.5.2.3)

3.8.2.2 Non-operating temperature.- Exposure to an ambient temperature in the range of  $-80^{\circ}\text{F}$  to  $160^{\circ}\text{F}$ ; exposure at any one time not to exceed 24 hours at the low temperature extreme and 4 hours at the high temperature extreme. (See 4.14.2, 4.5.2.3)

3.8.3 Heat transfer.- The thermal characteristics of the shelter shall be such that the overall coefficient of heat transfer of the shelter shall not exceed 0.40 British Thermal Units (BTU's) per hour per square foot per degree Fahrenheit when tested in accordance with 4.15. (See 4.5.2.3, Table II, Table VI)

3.9 Structural Integrity Tests.- The shelter shall be capable of complying with the requirements of 3.9.1 thru 3.10.6. When a payload is required, 1,900 pounds in accordance with SM-D-650085 shall be used. The requirements of 3.4 are applicable to all tests. (See 4.4.2)

3.9.1 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:

3.9.1.1 Rail transport.- The shelter, with payload, shall be capable of being transported by railroad. Compliance with 4.16 shall constitute compliance with this requirement. (See 4.5.2.3, Table II, Table VI)

3.9.1.2 Lift Transport, simulated.- The shelter, with payload, shall be capable of being suspended by its lifting eyes and exposed to 2.65 g's acceleration. Compliance with 4.17 shall constitute compliance with this requirement. (See 4.5.2.3, Table II, Table VI).

3.9.2 Drop tests.- The shelter, with payload, shall be capable of being dropped as specified in 4.18. Every shelter subjected to drop tests shall be shipped only to a depot and shall have nameplate S-250 Shelter (with Rivnuts) drawing SC-B-964240 attached with rivets over the shelter nameplate SM-C-435937 (SM-C-650125 if shielded) prior to shipment. Shipping document annotated (FOR DEPOT USE ONLY). (See 4.5.2.3.1, Table II, Table VI)

3.9.3 Towing, simulated.- The shelter, with payload, shall withstand a force of at least 2,000 pounds applied to each of the skid assemblies, and their attachment to the shelter, as specified in 4.19. (See 4.5.2.3, Table II, Table VI)

3.9.4 Lifting and towing eye tests.- Each lifting and towing eye assembly, as attached to the shelter, shall withstand a minimum load of 5,000 pounds applied per 4.20. (See 4.5.2.2, Table II, Table V)

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3.9.5 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 4.21. (See 4.5.2.2, Table II, Table V)

3.10 Tightness tests.- (See 4.4.2) The shelter shall be capable of complying with the following:

3.10.1 Torque door latches.- Torques shall be as specified on SM-D-649951 and SM-D-649953. (See 4.6.3, 4.22, Table II, Table IV, Table VI)

3.10.2 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 4.23 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. (See 4.5.2.3, 4.23, Table II, Table VI)

3.10.3 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 4.24.(See 4.5.1.9, 4.5.2.1, 4.5.2.2, 4.5.2.3, 4.24, Table II, Table III, Table VI)

3.10.4 Watertightness.- The shelter shall be watertight when tested in accordance with 4.25. Shelter weight after testing shall be as specified in 3.6 after allowing 2 lbs for the test weight mounting hardware of drawing SM-D-650085, if applicable (See 3.1.2, 4.5.2.3, 4.25, Table II, Table VI)

3.10.5 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 of 3.1.2 or damage to the structure. Shelter weight after testing shall be as specified in 3.6 after allowing two pounds for the test weight mounting hardware of drawing SM-D-650085 if applicable. (See 4.5.2.3 and 4.26, Table II, Table VI)

3.10.6 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 4.27. (See 4.5.2.2, Table II, Table V)

#### 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 as specified herein. Except as otherwise specified

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in the contract or purchase order, the contractor may utilize 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 specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements. The Government may photograph any item associated with the contract at any location at any time throughout the life of the contract except for proprietary tooling, fixtures, or processes.

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)
  - (1) In-process (see 4.5.1)
  - (2) Completed items (see 4.5.2)
- c. Methods of examination and test (see 4.6 thru 4.27)
- d. Quality conformance inspection of packaging (see 4.28)

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.- Unless otherwise specified (see 6.1.b, 6.2) all phases of First Article Inspection shall be performed by the contractor and witnessed by the Government technical activity designated in the contract. First Article Inspection shall consist of the following:

4.4.1 First Article specimens.- In accordance with Table I where more than one type or grade of material is used in the shelter, samples of each shall be furnished. Failure of any of the specimens within a group shall be cause for rejection of all the specimens within that group. All specimens shall reflect material and conditions which will be used in production (see 3.7, 6.2)

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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 be in the sequence specified in Table II.

4.5 Quality conformance inspection of equipment before packaging.- The contractor shall perform the inspections specified under this paragraph before preparing the end item for delivery. The contractor is not, however, relieved of his responsibility for performing any additional inspection which may be necessary to control the quality of the product and to assure compliance with all specification requirements.

TABLE I FIRST ARTICLE SPECIMENS

Inspection	Quantity	Req't Para	Test Para
Core Material:			4.8
Density	5 for every grade or type	3.2.3	4.8.1
Compressive strength	5 for every grade or type	3.2.3	4.8.2
Shear strength	5 for every grade or type	3.2.3	4.8.5
Flammability	5 for every grade or type	3.2.3	4.8.3
Water absorption	3 for every grade or type of urethane	3.2.3	4.8.4
Adhesive	50 coupons	3.2.1	4.7
Sealer	50 coupons	3.2.2	4.7
Impact panel	1 for every type core	3.3.2	4.9
Lift and Tie down device	1 complete	3.5	4.10

TABLE II SEQUENCE OF FIRST ARTICLE INSPECTION <sup>4/</sup>

Inspection	Req't Para	Test Para
Cleaning	3.1.3	4.6.7
Welding	3.1.4	4.6.6
Lamination	3.1.1	4.29
Interchangeability	3.1.9	4.6.2
Riveting	3.1.5	4.11
Construction tightness	3.10.3	4.24
Finish	3.1.7	4.6.4
Marking	3.1.8	4.6.5
Dimensional	3.1	4.6.3
Visual and Mechanical	3.1	3.6.1
Shelter weight	3.6	4.12
Door latch torque	3.10.1	4.22
Moisture resistance <sup>1/</sup>	3.8.1	4.13
Temperature	3.8.2	4.13
Heat transfer	3.8.3	4.15
Rail transport	3.9.1.1	4.16
Drops <sup>3/</sup>	3.9.2	4.18
Construction tightness <sup>2/</sup>	3.10.3	4.24
Towing, simulated	3.9.3	4.19
Eye pulls	3.9.4	4.20
Lift transport, simulated	3.9.1.2	4.17
Steps, roof access	3.9.5	4.21
Light tightness	3.10.6	4.27
Electromagnetic interference shielding	3.10.2	4.23
Watertightness	3.10.4	4.25
Fording	3.10.5	4.26
Door latch torque (second time)	3.10.1	4.22

<sup>1/</sup> 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 (7) days after final finish application including touch-up paint.

<sup>2/</sup> For correlation data purposes only. CTT test results are not to be used as accept/reject criteria for the drop test.

<sup>3/</sup> See Note 10 of Table VI

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TABLE II SEQUENCE OF FIRST ARTICLE INSPECTION Cont'd

4/ First Article sample testing and shelter testing shall not begin until at least seven (7) days after the sealer application, including application of touch-up sealer.

4.5.1 In-process.- The inspections specified in Table III shall be performed during the shelter manufacturing process and at the frequency specified below.

TABLE III In-process inspection

Inspection	Req't para	Sampling para	Test para
Core material:	3.2.3	-	4.8
Density	3.2.3	4.5.1.1	4.8.1
Compressive strength	3.2.3	4.5.1.1	4.8.2
Shear strength	3.2.3	4.5.1.1	4.8.5
Adhesive:	3.2.1	-	4.7
Low temperature	3.2.1	4.5.1.2	4.7
Room temperature	3.2.1	4.5.1.3	4.7
High temperature	3.2.1	4.5.1.2	4.7
Sealer	3.2.2	-	4.7
Low temperature	3.2.2.2	4.5.1.2	4.7
Room temperature	3.2.2.1	4.5.1.3	4.7
High temperature	3.2.2.2	4.5.1.2	4.7
Cleaning	3.1.3	4.5.1.4	4.6.7
Welding	3.1.4	4.5.1.5	4.6.6
Lamination	3.1.1	4.5.1.6	4.29
Interchangeability	3.1.9	4.5.1.7	4.6.2
Riveting	3.1.5	4.5.1.8	4.11
Construction tightness, shelter	3.10.3	4.5.1.9	4.24.1

4.5.1.1 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 (see 3.2.3, 4.8, Table III).

4.5.1.2 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 (see 3.2.1, 3.2.2.2, 4.7, Table III.)

a. When automatic mixing and dispensing processes are used: once each calendar week.

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

4.5.1.3 Sampling for adhesive and sealer, room temperature.- Inspection of adhesive and sealer coupons at the room temperature condition shall be at the following frequencies (see 3.2.1, 3.2.2.1, 4.7, Table III):

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.

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

4.5.1.4 Sampling for cleaning.- Frequency of process inspections for cleaning shall be in accordance with SC-B-595538 and SC-B-595539 (see 3.13, 4.6.7, Table III)

4.5.1.5 Sampling for welding.- Frequency of visual inspection of arc welding shall be in accordance with the requirements of maintenance sampling for production per MIL-W-8604. 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 (see 3.1.4, 4.6.6, Table III)

4.5.1.6 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 (see 3.1.1, 4.29, Table III)

4.5.1.7 Sampling for interchangeability.- Each shelter shall comply with the inspection of 4.6.2 and meet the requirement of 3.1.9.

4.5.1.8 Sampling for riveting.- One shelter shall be randomly selected from each 10 shelters produced. Selection and inspection shall be prior to applica-

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tion of paint finish (see 3.1.5, 4.11, Table III)

4.5.1.9 Sampling for construction tightness, shelter portion.- All shelters shall be preconditioned in accordance with 4.24.1 (see 3.10.3)

4.5.2 Completed items.- Completed 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.

4.5.2.1 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. (See 4.24.4)

TABLE IV. Group A inspection

Inspection	Req't para	Test para	AQL percent (audit only)	
			Major	Minor
Construction tightness	3.10.3	4.24	-	-
Shelter portion (audit only)	3.10.3	4.24.1	1.00	-
Door portion	3.10.3	4.24.2	1.00	-
Gasket portion	3.10.3	4.24.3	1.00	-
Visual and mechanical	3.1	4.6.1	1.00	4.00
Dimensional	3.1	4.6.3	1.00	-
*Door latch torque	3.10.1	4.22	1.00	-
Shelter weight	3.6	4.12	-	-

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

4.5.2.2 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

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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 (7) 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	3.9.4	4.20	6.5
Roof access steps	3.9.5	4.21	6.5
Light tightness	3.10.6	4.27	6.5
Finish	3.1.7	4.6.4	6.5

4.5.2.3 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. (see 6.6)

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TABLE VI Group C inspection

Inspection	Req't para	Sampling	Test
Drops <u>10/</u>	3.9.2	4.5.2.3.1	4.18
Construction tightness <u>6/ 11/</u>	3.10.3	-	4.24
Watertightness <u>1/</u>	3.10.4	-	4.25
Fording <u>1/</u>	3.10.5	-	4.26
Door latch torque <u>1/</u>	3.10.1	-	4.22
EMI shielding	3.10.2	4.5.2.3.2	4.23
Watertightness <u>2/ 3/ 4/</u>	3.10.4	-	4.25
Fording <u>2/ 3/</u>	3.10.5	-	4.26
Door latch torque <u>2/ 3/</u>	3.10.1	-	4.22
Lift and tiedown device	3.5	4.5.2.3.3	4.10
Core material:	-	-	-
Flammability	3.2.3	4.5.2.3.4	4.8.3
Water absorption	3.2.3	4.5.2.3.4	4.8.4
Adhesive	-	-	-
Humidity exposure	3.2.1	4.5.2.3.4	4.7
Salt spray exposure	3.2.1	4.5.2.3.4	4.7
Sealer	-	-	-
Humidity exposure	3.2.2.3	4.5.2.3.4	4.7
Salt spray exposure	3.2.2.4	4.5.2.3.4	4.7
Impact panel	3.3.2	4.5.2.3.4	4.9
Environmentals <u>6/</u>	-	4.5.2.3.4	-
Moisture resistance <u>3/</u>	3.8.1	-	4.13
Temperature <u>3/</u>	3.8.2	-	4.14
Heat transfer <u>3/</u>	3.8.3	-	4.15
EMI shielding <u>7/ 8/ 3/</u>	3.10.2	-	4.23
Water tightness <u>3/ 7/</u>	3.10.4	-	4.25
Fording <u>3/ 7/</u>	3.10.5	-	4.26
Door latch torque <u>3/ 7/</u>	3.10.1	-	4.22
Rail transport <u>3/</u>	3.9.1.1	4.5.2.3.4	4.16
Drops <u>3/ 9/ 10/</u>	3.9.2	-	4.17
Construction tightness <u>3/</u>	3.10.3	-	4.24
EMI shielding <u>3/ 5/</u>	3.10.2	-	4.23
Water tightness <u>3/</u>	3.10.4	-	4.25
Fording <u>3/</u>	3.10.5	-	4.26
Door latch torque <u>3/</u>	3.10.1	-	4.22
Towing, simulated	3.9.3	4.5.2.3.4	4.19
Lift transport, simulated	3.9.1.2	4.5.2.3.4	4.17

TABLE IV Group C inspection Cont'd

- 1/ If the EMI shielding test is to follow the drop test on the same shelter, these tests shall be done after EMI.
- 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 water tightness 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 (7) 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 para 4.5.2.3.2.
- 9/ This inspection may also satisfy sampling for drop tests per para 4.5.2.3.1.
- 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 (6in. H<sub>2</sub>O) 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 watertightness 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.

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4.5.2.3.1 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 (see 3.9.2, 4.18, Table VI)

4.5.2.3.2 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 (see 3.10.2, 4.23, Table VI).

4.5.2.3.3 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 (see 3.5, 4.10, Table VI).

4.5.2.3.4 Sampling for remainder of Group C Inspection.- These inspections shall be performed once during production on a shelter/specimen randomly selected from 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 (see Table VI).

4.5.2.3.5 Group C Failure.- Actions required relative to Group C failures shall be as specified in the contract or purchase order.

4.6 Drawing conformance.- Compliance with the requirements of 3.1 shall be determined by the following inspections:

4.6.1 Visual and Mechanical Inspection.- Equipment shall be examined for the requirements of construction (See 3.1). 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 3.6) shall be classified as a major defect.

4.6.2 Inspection for interchangeability.- The dimensions listed below shall be gaged or measured to determine compliance with the physical interchangeability requirements of 3.1.9. 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.

4.6.3 Dimensional Inspection.- The shelters and panels shall be inspected for conformance with the drawings (See 3.3) in the following areas:

- 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.

TABLE VII - DIMENSIONAL INSPECTION  
(See 4.6.3a)

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>

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TABLE VII - DIMENSIONAL INSPECTION Cont'd

- 1/ Check list shall be maintained (Indicate Serial Number of Shelter)
- 2/ Record actual and required measurements.
- 3/ 4 deviations out of the 36 interior measurements on any one sample shall be cause for rejection of the shelter.
- 4/ 7 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.

4.6.4 Finish.- Finish shall be inspected in accordance with the quality assurance provisions of MIL-F-14072 and 4.6.1 (see 3.1.7, Table II, Table V).

4.6.5 Marking.- Marking shall be visually inspected to determine compliance with 3.1.8 (see 4.6.1, Table II)

4.6.6 Welding.- Arc welding shall be visually inspected in accordance with the requirements of maintenance sampling for production per MIL-W-8604. For resistance welding, fabrication and inspection of production specimens and inspection of production parts shall be in accordance with MIL-W-6858. The requirements of 3.1.4, with subparagraphs, shall be met (see 4.5.1.5, Table II,

Table III)

4.6.7 Cleaning.- 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. The requirements of 3.1.3 shall be met (see 4.5.1.4, Table II, Table III).

4.7 Coupon samples.- Coupon samples for both adhesive and sealer tests shall be fabricated in accordance with Paragraph 2.3 of SM-B-563559. Ten coupons are required for each of the five conditions for First Article samples (See 3.2.1, 3.2.2, Table I). Five coupons are required for each of the test conditions for production inspection (see 4.5.1.2, 4.5.1.3, Table III, Table VI)

4.7.1 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 tests are 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 (5) psi.

4.7.2 Shear strength tests.- Coupons shall be tested after being subjected to specified exposure (see 3.2.1 and 3.2.2), 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 coupon 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. The requirements of 3.2.1 for adhesive

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and 3.2.2 for sealer shall be met.

4.8 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  $\pm 0.015$  inch. Except for flammability, the requirements of 3.2.3 shall be met by the average of the specimen results, with the lowest result no less than 90% of the required value (see 4.5.1.1, Table I, Table III, Table VI).

4.8.1 Apparent density, core material.- Five specimens, each 2 x 3 x 3 inches, shall be tested in accordance with ASTM-D-1622-63. Each specimen shall meet the requirements of 3.2.3.

4.8.2 Compressive strength, core material.- Five specimens each 2 x 3 x 3 inches, shall be tested in accordance with ASTM-D-1621-64, Procedure A, with the load applied to the 3 x 3 inch faces. Each specimen shall meet the requirements of 3.2.3.

4.8.3 Flammability, core material.- Five specimens, each 1/2 by 2 x 6 inches, shall be prepared and tested in accordance with ASTM-D-1692-68. The requirements of 3.2.3 shall be met.

4.8.4 Water absorption.- Three specimens, each 6 x 6 x 3 inches, shall be tested in accordance with ASTM D2842-69 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, Table VII).

$$1b \text{ water /ft}^2 = \frac{(W2a-W1a)-(W2-W3)}{A} \times \frac{2.048 \text{ lb/ft}^2}{\text{gm/cm}^2}$$

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 (cm<sup>2</sup>)

4.8.5 Shear strength.- Five specimens, each 1/2 x 1 1/2 x 6 inches, shall be tested in accordance with ASTM C273-61, except that the load shall be applied at

a constant rate such that the maximum load will occur in one minute or more (see Table I, Table IV).

4.9 Impact panel.— 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" x 4" (nominal) lumber, rigidly bolted together to form a square 24 inches on a side (outside dimension), 4" (nominal) high, so that the frame rests on the 2" (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 meet the requirements of 3.3.2 and the specimen shall be opened for examination for conformance with drawings.

4.10 Lift and tie-down device (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. (See 3.5, 4.5.2.3.3, Table I, Table VII).

4.11 Riveting.— Riveted joints shall be examined for tightness, the joined parts for damage and for the rivet heads to be properly seated and tight against their bearing surfaces. (See 3.1.5 and 4.5.1.8). Rivets not meeting the requirements of 3.1.5 shall be replaced with properly installed rivets. (See Table II, Table III).

4.12 Shelter weight Compliance with 3.6 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 dial 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 National Bureau of Standards.

4.13 Moisture resistance test.— The shelter with doors open shall be subjected to the Moisture Resistance Test of MIL-STD-810, Method 507, 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 (See 3.8.1, 3.1.6 and FF-P-101).

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4.14 Temperature.- 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 4.14.1 and 4.14.2. 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 3.8.2 shall be conducted after completion of each test.

4.14.1 Operating temperature.- The air temperature inside and outside the shelter shall be stabilized at  $120^{\circ}\text{F}$  to  $125^{\circ}\text{F}$  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  $195^{\circ}\text{F}$  (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 1000T3, 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  $120^{\circ}\text{F}$  to  $125^{\circ}\text{F}$  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  $160^{\circ}\text{F} - 0^{\circ}\text{F} + 5^{\circ}\text{F}$  (as measured by the 10 thermocouples of Figure 3) 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  $60^{\circ}\text{F}$  and  $85^{\circ}\text{F}$ .

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

4.14.2 Non-operation temperature.- The shelter shall be subjected to 3 cycles of steps 5, 6a, 7 and 10 of MIL-STD-169. At step 7 all doors and latches shall operate freely without binding.

4.15 Heat Transfer.- 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 dia 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  $15^{\circ}$ . A stabilized temperature inside the shelter of not less than  $100^{\circ}\text{F}$  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  $2\frac{1}{2}^{\circ}\text{F}$  while maintaining the minimum differential of  $100^{\circ}\text{F}$  located per Figure 3. 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 3.8.3.

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 drainhole.

4.16 Rail transport, impact test.- The shelter shall be loaded with a 1,900 pound load per Drawing SM-D-650085 and shall be loaded on a railroad flatcar with standard (draft gear) couplings in accordance with Figure 4. The test shall be conducted on a flat and straight section of track free from switches and/or cross overs. A  $165,000 \pm 2,000$  pound car traveling at  $9 \pm \frac{1}{2}$  miles per hour (or equivalent impact energy conditions approved by the Government) and having standard (draft gear) couplings, shall be impacted against the test flat car coupled to two other empty cars. These cars shall be stationary with brakes off. Four impacts shall be performed as follows: With the shelter positioned longitudinally on the flatcar, two impacts, one from each end of the shelter; with the shelter positioned laterally on the flatcar, two impacts, one from each end of the flatcar. The direction of each impact shall be selected by the Government. Each cable shall be in tension between 600 - 800 pounds and blocking holding the shelter in place shall be tight at the start of each impact run. If the cable or blocking is torn loose by the impact with impact car at less than maximum velocity the run shall be repeated. A damage survey shall be made after each impact. The shelter shall have sustained no deformation. (See 3.9.1.1)

4.17 Lift transport, simulated.- The shelter shall be loaded with  $6,250 \pm 5$  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. (See 3.9.1.2, 4.5.1.5)

4.18 Drop test.- All drop tests shall be performed in an environment at a temperature between  $50^{\circ}\text{F}$  and  $95^{\circ}\text{F}$ . The shelter with 1,900 pound payload, shall be lifted from the ground as specified in 4.18.2.1 and 4.18.2.2, quick released and allowed to fall freely (i.e. dropped such that skid(s) impact onto a hard concrete flat surface) and shall meet the requirements of 3.9.2. All drop

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heights shall be measured perpendicular to the concrete surface and from the surface to the bottom of the raised skid(s). The shelter shall be thoroughly inspected after each specified drop and shall meet the requirements of 3.9.2.

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

4.18.2 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.

4.19 Towing, simulated.— The shelter shall be positioned such that the outboard vertical surface of the roadside skid is against the 2 inch side of a 2" x 4" (nominal) x 7' 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 requirements of 3.9.3 shall be met.

4.20 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. (See 3.9.4)

4.21 Steps, roof access.— Compliance with 3.9.5 shall be determined by applying a vertical load of 400 (-0, +5) pounds to the center of the outer section and maintaining the load for 30 seconds.

4.22 Torque, door latches.— Torque of each door shall be measured and shall be as specified on drawings SM-D-649951 and SM-D-649953. The door latches shall be examined for the requirements for construction per 3.1. (See 3.10.1 and 4.6.1)

4.23 EMI shielding.— The shelter shall be tested for shielding in accordance with methods of MIL-STD-285 and shall meet the requirements of 3.10.2. The EMI shields and EMI filter shall be installed in accordance with drawings as

listed in DL-SM-B-649950 for the test. No other modification will be made. Tests shall be performed at the following frequencies with air louver cover secured in the full open position:

- a. One frequency in the 150 to 200 KHz range for low impedance magnetic field.
- b. 200 KHz, 1.0 MHz, 18.0 MHz, for high impedance electric field.
- c. 400 MHz, 1.0 GHz, and 10.0 GHz for plane waves.

4.24 Construction Tightness .- This test shall be performed in 3 portions as follows: shelter, door, and gasket. All portions shall be conducted indoors and in still air. Any leaks found during any portion of this test shall be corrected before proceeding with the next portion of this test.

4.24.1 Shelter Portion.- The shelter shall be placed in a position which will allow access to all exterior joints and fasteners on all surfaces and shall be tested as follows:

4.24.1.1 Assembled Condition.- No sealant, caulking, tape, etc. shall be used on the shelter except as detailed on the drawings. The shelter shall be complete except the skid assemblies (SM-C-650082) and the latch keepers (SM-C-435904) shall not be installed and the inner and outer door assemblies (SM-D-208682 and SM-D-208679) need not be installed. The rivnuts used to connect these parts, however, shall be installed in the shelter. The shelter exterior need not be painted before the second portion, para 4.24.2 of the test is performed.

4.24.1.1.1 Group A Audit Test.- The shelter shall be completely assembled and finished.

4.24.1.2 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  $\pm 0.2$  °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  $\pm 0.05$  SCFM or less.

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g. Miscellaneous rubber tubing and fittings, as required.

4.24.1.3 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:

4.24.1.3.1 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 2.0°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 reworked area(s) shall then be reinspected per 4.24. (See 4.5.1) The inspection of 4.24.1.3.2 shall be performed, regardless of the pressure and SCFM achieved to locate any leak(s).

4.24.1.3.2 While the interior differential pressure is maintained, every joint, rivet, rivnut, bolt, and any other area on the shelter 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 4.5.1. In any event, the reworked area(s) shall be inspected per 4.24 after rework.

4.24.2 Door Portion.— After successful completion of the shelter portion per 4.24.1, the shelter shall be tested as follows:

4.24.2.1 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, shall be 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.

4.24.2.2 Test Fixtures and Equipment.— This test requires the use of the items in 4.24.1.2.b, c, d, e and g.

4.24.2.3 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:

4.24.2.3.1 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 2.0°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 4.24.2.3.2 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 4.24.2. (See 4.5.1)

4.24.2.3.2 While the interior differential pressure is maintained, every joint, rivet, rivnut, bolt, hinge assembly, and any other area on the 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 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 4.5.1. In any event, the reworked area(s) shall be reinspected per 4.24.2 after rework.

4.24.3 Gasket Portion.— After successful completion of the outer door portion per 4.24.2, the gasket seating on the inner and outer doors and the louver cover shall be tested as follows:

4.24.3.1 Assembled Condition shall be as required in 4.24.2.1.

4.24.3.2 Test Equipment.— This test requires the use of a piece of paper 0.005 inch maximum thickness by 2 1/2 inches wide.

4.24.3.3 Performance of Test.— The following inspection shall be performed on both doors and the louver cover, once at the center of the top (except on the louver cover), once at the center of the bottom, and at 3 places along each side: 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 4.24.3.1 the shelter shall be considered as having failed this test. Rework shall be accomplished. The reworked area(s) shall then be reinspected per 4.24.2 and 4.24.3 (See 4.5.1).

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4.24.4 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 4.5.1. Records shall contain, as a minimum, the shelter serial number and the following:

4.24.4.1 Shelter Portion.-

- a. An indication of compliance with 4.24.1.1 and drawing SC-D-781236.
- b. Temperature differential, interior differential pressure, and air flow per 4.24.1.3.1.
- 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.

4.24.4.2 Door Portion:

- a. An indication of compliance with 4.24.2.1 and drawing SC-D-781236.
- b. Temperature differential and interior differential pressure per 4.24.2.3.1.
- 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.

4.24.4.3 Gasket Portion:

- a. An indication of compliance with 4.24.3.1 and the 23 inspection location points per 4.24.3.3.
- 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.

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

4.24.5 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 this test 4.24.1 and after compliance with Group A Audit sampling requirements of 4.5.1.

4.25 Watertightness.- 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. 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 paragraph 3.6. The shelter doors shall be opened and closed so that the latching mechanism is completely engaged for a total of ten operations.

4.25.1 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 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.

4.25.2 Door louver cover open (See Figure 6).-The inlet louver shall be tested with the louver cover fully open to the limit of the stop, by spraying water at the door end panel. Five nozzles shall be used directed at the center 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 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

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be drilled in the shelter in accordance with Figure 7. Prior to fording the holes shall be sealed with rivets and sealer per 3.1.2.

4.26 Fording.- 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 requirements of 3.10.5 shall be met.

4.26.1 Weight differential.- To determine compliance with 3.10.5, the shelter shall be weighed in accordance with 4.12 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 the test.

4.27 Light tightness.- 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. (See 3.10.6)

4.28 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 (See 5.1).

4.29 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 (1) 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 tapping 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 accous-

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tic change ("deadening") plus 1/2 inch. The requirements of 3.1.1 shall be met (see 4.5.1.6, Table II, Table III).

4.29.1 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% 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.

4.29.2 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% of the total contract quantity with the total no more than 5% 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 this contract.

4.29.3 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 inches in depth.

#### 4.29.4 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 3.1.1. 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.

## 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.

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## 6. NOTES

### 6.1 Ordering data.- Procurement documents should specify the following:

- a. Title, number, and date of this specification and any amendment thereto.
- b. When a first article is required for inspection and approval (see 4.4, 6.2).
- c. When electromagnetic interference suppression capability is required on all delivered shelters (see 3.1, 3.1.10, 6.3).
- d. If facsimiles are required (see 3.1.10)
- e. Marking and shipping of sample shelters.
- f. Place of final inspection of production shelters.
- g. Actions required relative to Group C failures and reinspection of conforming Group C sample units (see 6.6).
- h. Level A or B preservation and packing (see section 5).
- i. When first article inspection rough handling tests are required.

6.2 First Article.- When a first article is required, it shall be tested and approved under the appropriate provisions of 7-104.55 of the Armed Services Procurement Regulation. 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 include specific instructions in all procurement instruments regarding arrangements for examinations, test and approval of the first article, including test plan and test report requirements, if any (see 6.1.b).

6.3 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 (see 4.5.2.3, 6.1.h).

6.4 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.

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

### 6.6 Definitions.-

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

6.6.2 Examination.- Examination consists of simple, generally nondestructive determinations of compliance, without use of special testing equipment.

6.6.3 Testing.- Testing consists of determinations of compliance, using technical means.

6.6.4 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 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 (see 3.1.1).

6.6.5 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 (see 3.1.1).

6.7 Nomenclature.- The parentheses in the nomenclature will be deleted or replaced by a letter identifying the particular design; for example: S-280X/G (see 1.1). The contractor should apply for nomenclature in accordance with the applicable clause in the contract.

6.8 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.

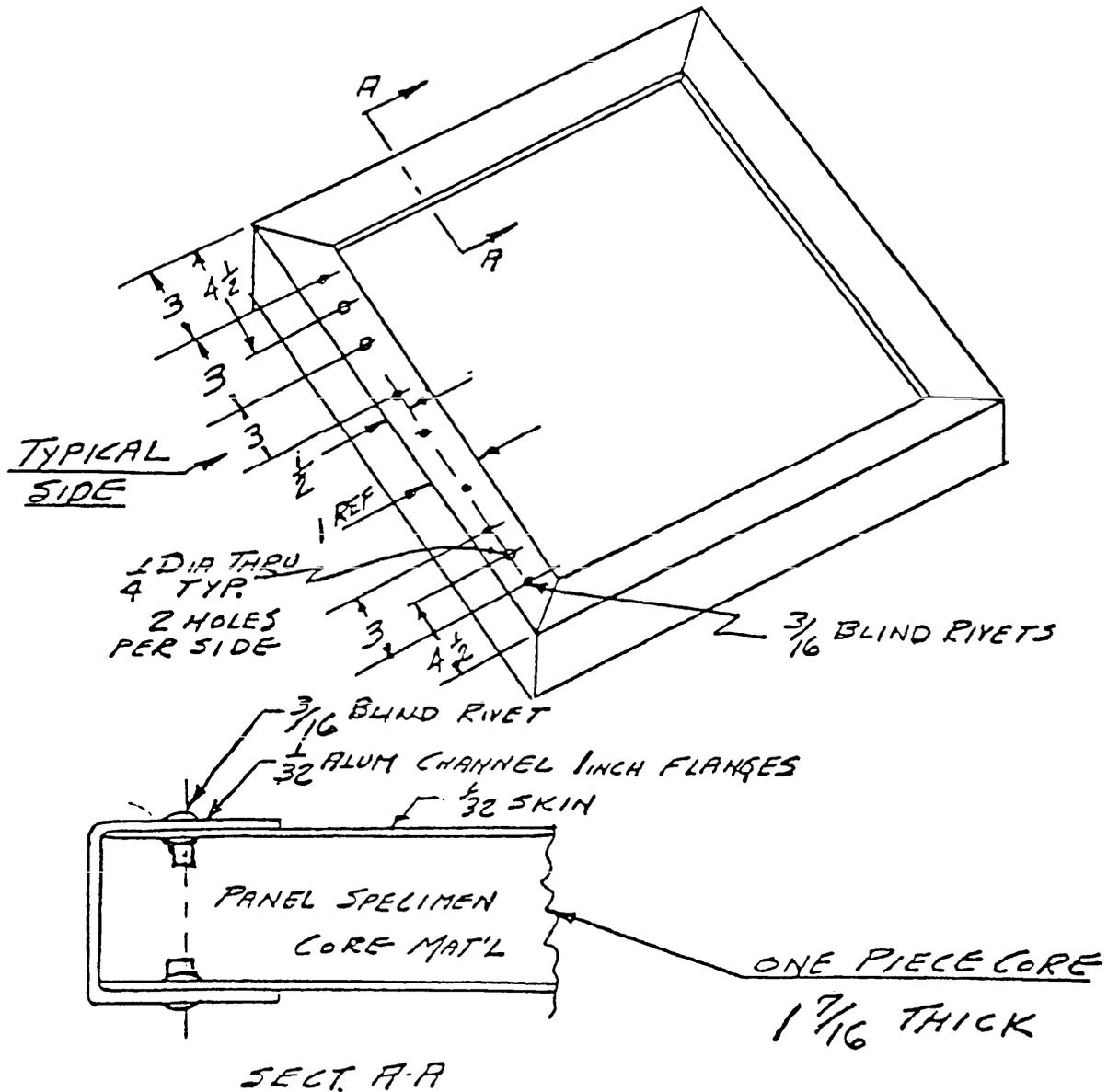
6.9 Specification revision.- Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

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Project No. 5411-A019

FIGURE 1  
IMPACT TEST PANEL PARA 4.9.2



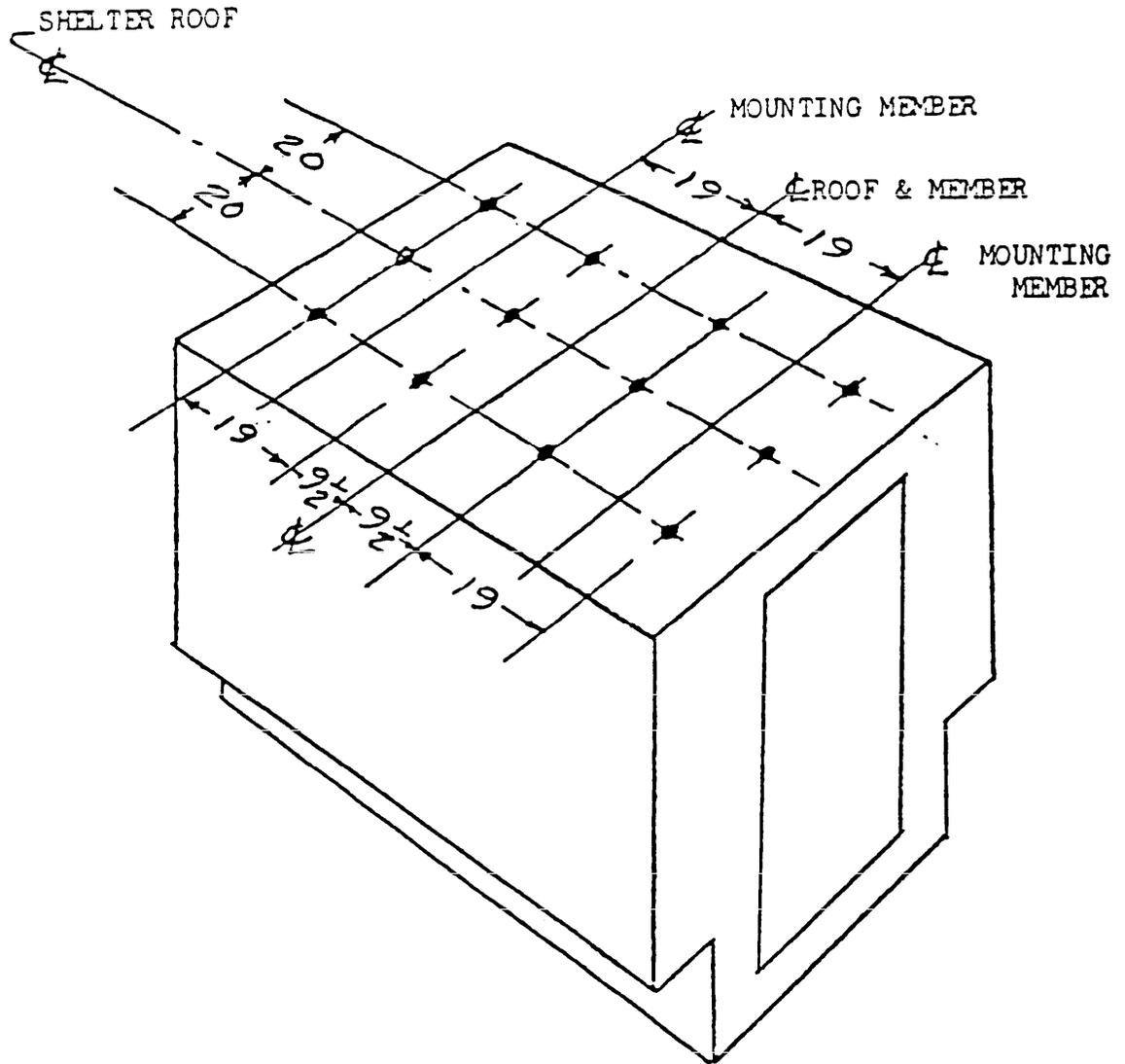
TOLERANCE  $\pm 1/32$   
ALL DIMENSIONS IN INCHES



FIGURE 3

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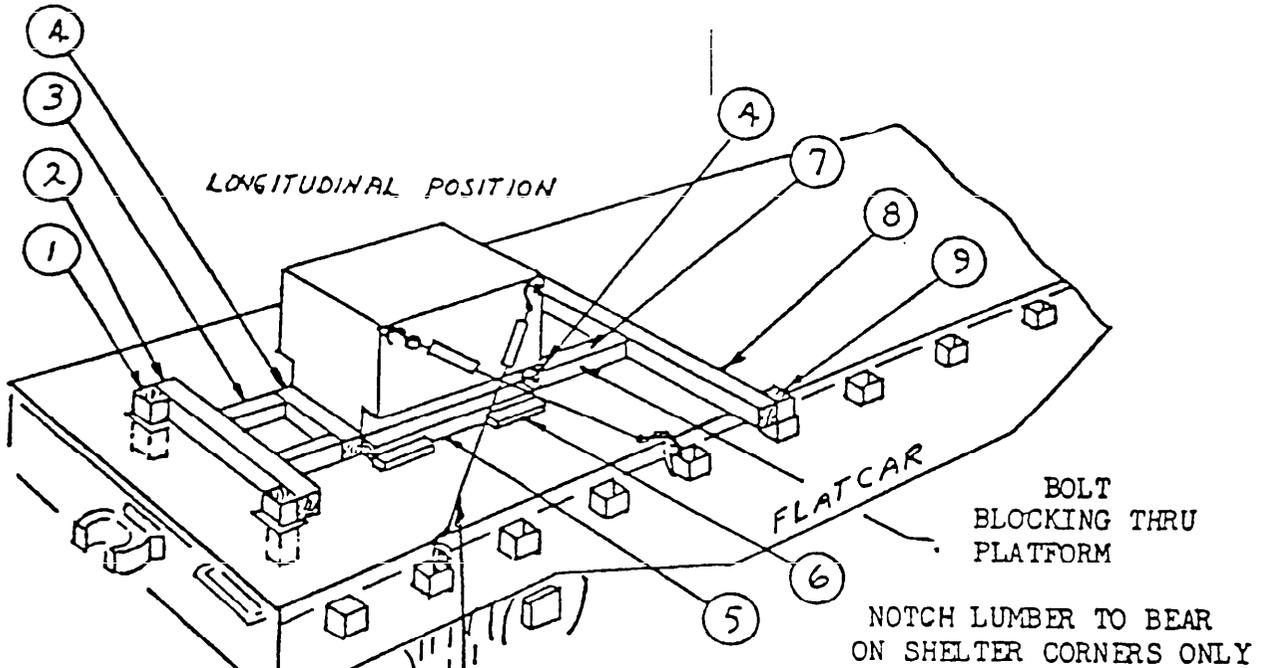
THERMOCOUPLE LOCATION FOR TEST PER 4.14.1



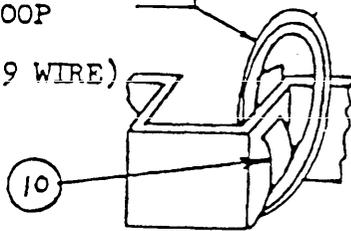
TOLERANCE  $\pm 1/2$   
ALL DIMENSIONS IN INCHES

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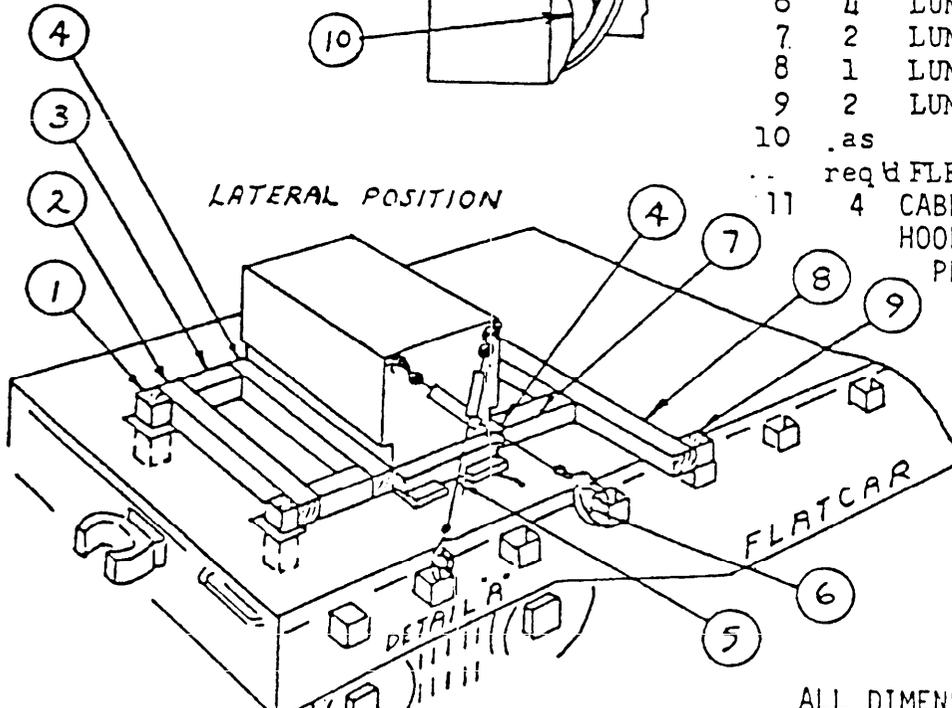
FIGURE 4  
TIE-DOWN FOR RAILROAD TEST (SEE 4.16)



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

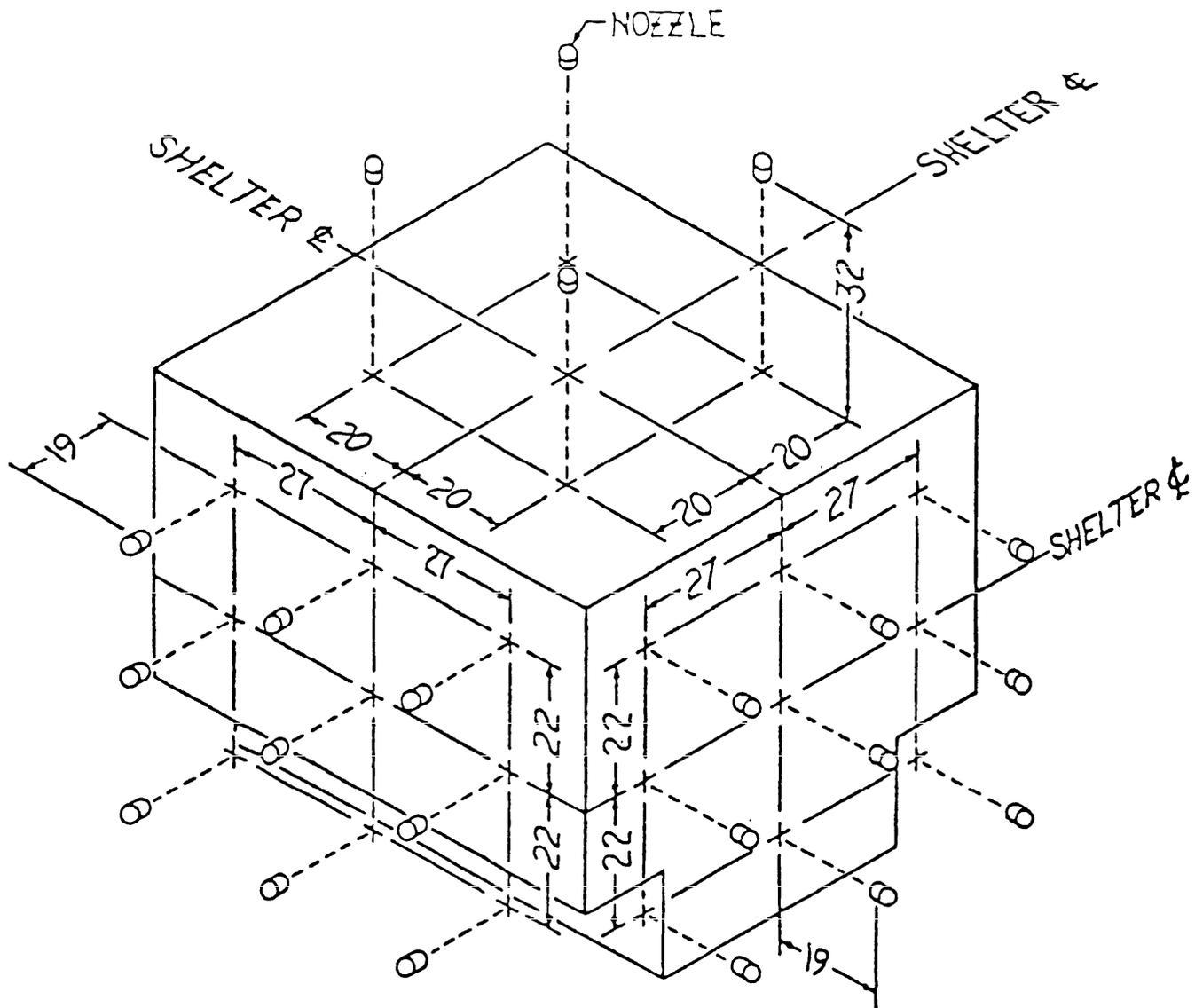


ITEM	REQ	DESCRIPTION
1	2	LUMBER 4 x 5 x 18
2	1	LUMBER 6 x 6 TO SUIT
3	2	LUMBER 6 x 6 TO SUIT
4	2	LUMBER 6 x 6 TO SUIT
5	2	LUMBER 4 x 4 TO SUIT
6	4	LUMBER 2 x 4 x 14
7	2	LUMBER 6 x 6 TO SUIT
8	1	LUMBER 6 x 6 TO SUIT
9	2	LUMBER TO SUIT
10	as req'd	FLEX METAL SHEETING
11	4	CABLE LENGTH TO SUIT. HOOKS AND TURNBUCKLES PER DWG SM-D-649952



ALL DIMENSIONS IN INCHES

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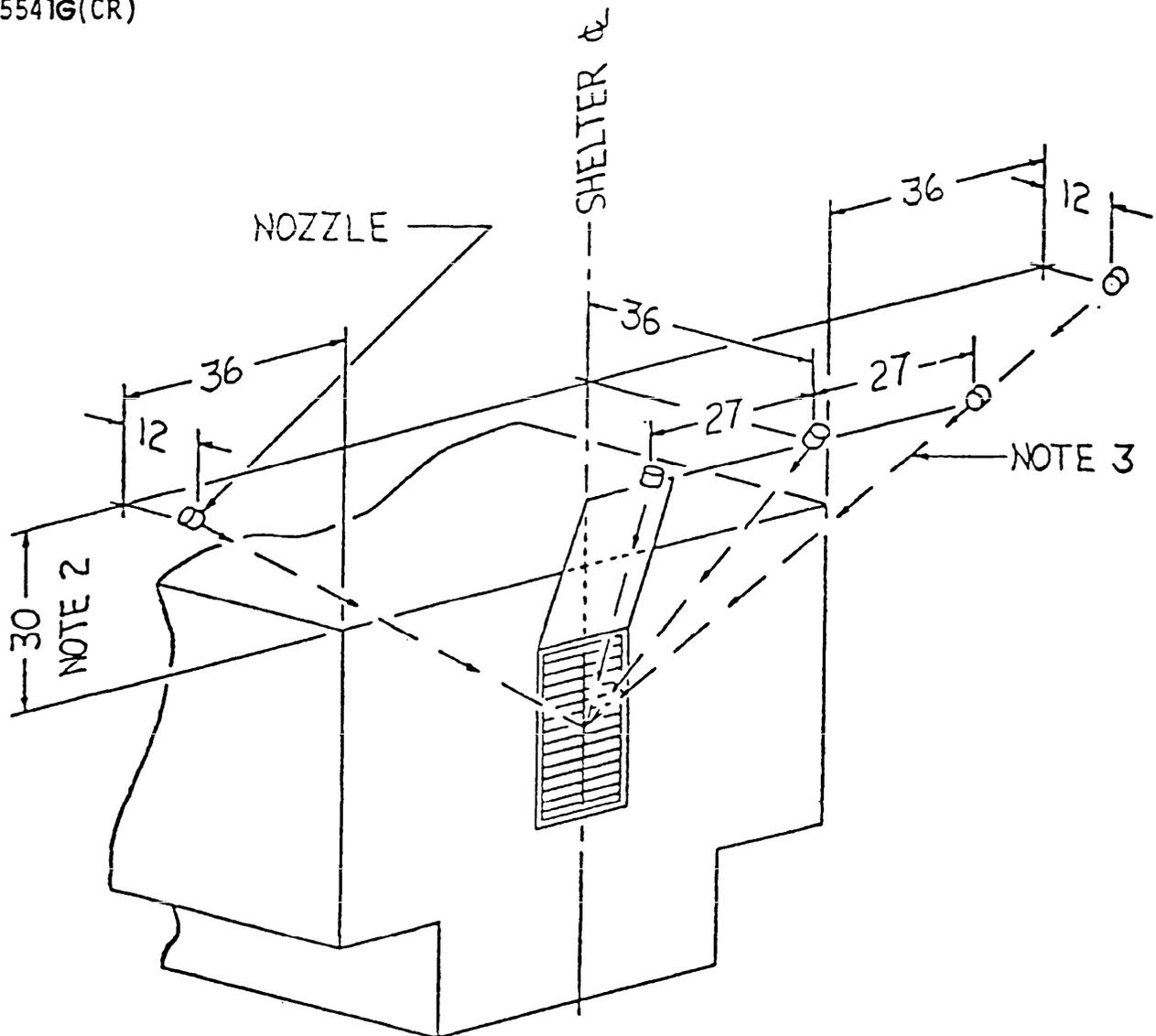


## NOTES:

1. DIMENSIONS ARE IN INCHES, TOLERANCE:  $\pm \frac{1}{2}$  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.

FIGURE 5 - NOZZLE LOCATIONS  
WATERTIGHTNESS, PARA. 4.25.1

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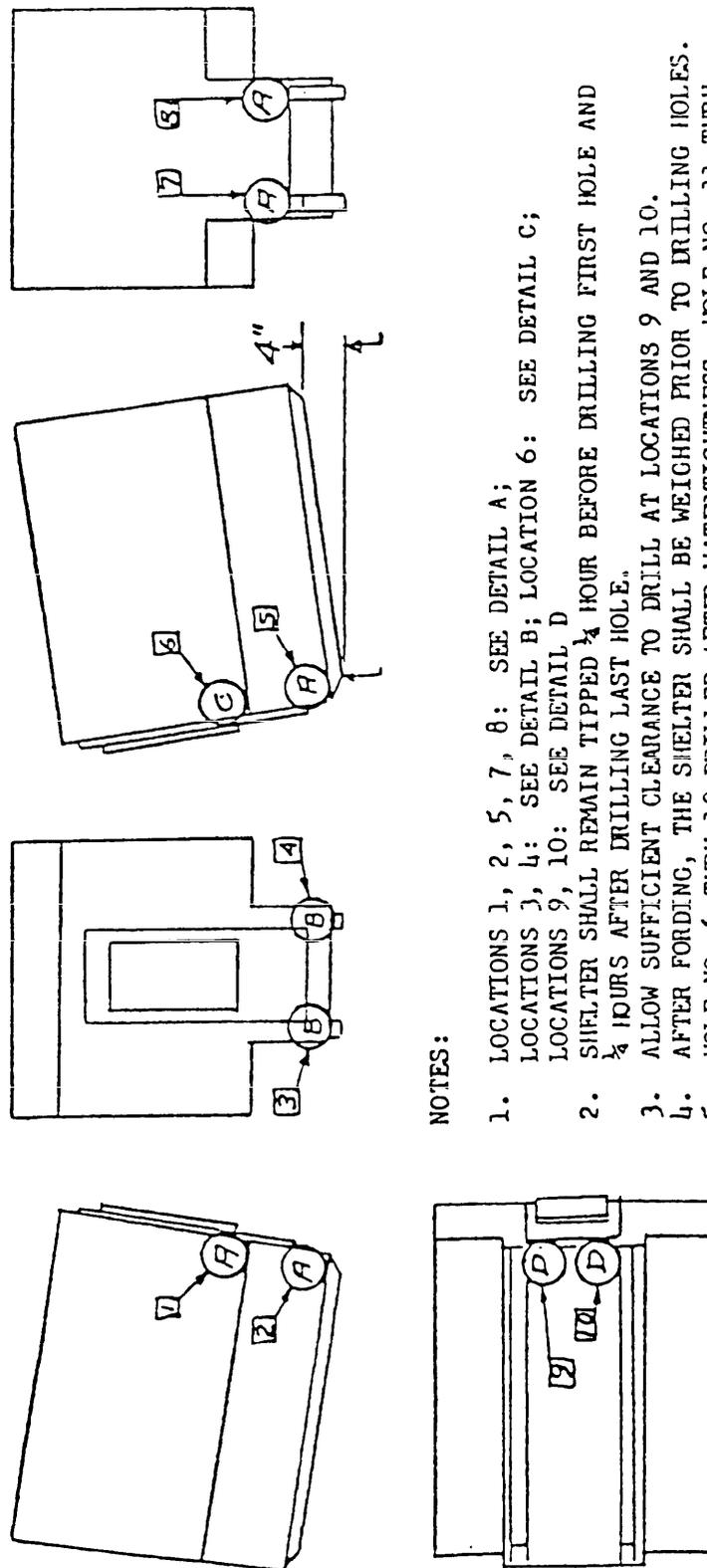


## NOTES:

1. DIMENSIONS ARE IN INCHES, TOLERANCE:  $\pm \frac{1}{2}$  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.

FIGURE 6 - NOZZLE LOCATIONS  
WATERTIGHTNESS, PARA. 4.25.2

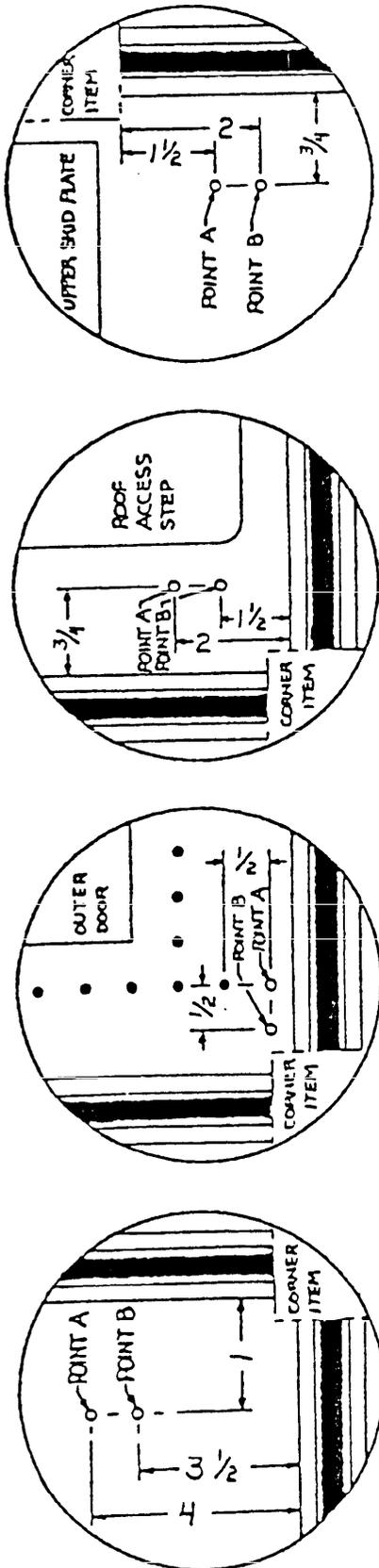
FIGURE 7 LOCATION OF DRILLED HOLES  
 PARA 4.26 FORDING and PARA 4.25 WATERTIGHTNESS



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  $\frac{1}{4}$  HOUR BEFORE DRILLING FIRST HOLE AND  
 $\frac{1}{4}$  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. 4 THRU 10 DRILLED AFTER WATERTIGHTNESS; HOLE NO. 11 THRU  
 20 DRILLED AFTER FORDING.
6. THE GOVERNMENT MAY REQUIRE 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: ADJ5H AS SUPPLIED BY UNITED SHOE MACHINERY CORP., SHELTON,  
 CONN., OR EQUAL.
9. RIVETS SHALL BE DIPPED IN SEALER PRIOR TO INSTALLATION.
10. HOLE SHALL BE DRILLED IN LINE WITH EXISTING RIVETS.

FIGURE 7 (CONTINUED)



DETAIL A

DETAIL B

DETAIL C

DETAIL D

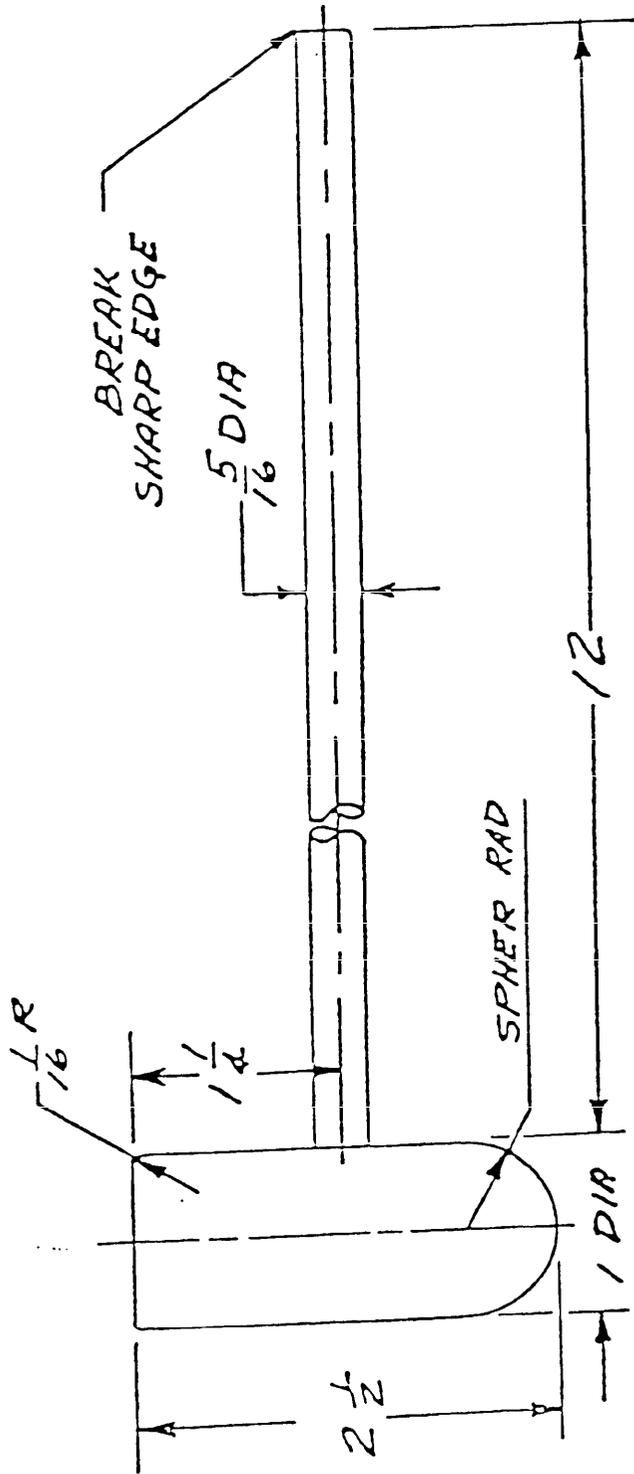
AFTER WATERTIGHTNESS AFTER FORDING AND WEIGHING

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

NOTES; CONTINUED:

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 & RIVNUTS REMOVED.
15. EXCEPT AS NOTED, DIMENSIONS ARE FROM INBOARD EDGE OF TRIM ANGLE - NOT SEALER FILLET.
16. ALL DIMENSIONS + 1/16
17. DRAIN NOT SHOWN.

TOLERANCE + 1/16  
ALL DIMENSIONS IN INCHES



TAP HAMMER (SEE 4:29)  
MAT'L - ALUM 6061-T6 OR EQUAL  
TOLERANCE  $\pm \frac{1}{32}$

MIL-S-55541G(CR)

ALL DIMENSIONS IN INCHES  
FIGURE 8

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

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