

MIL-S-55286E(CR)

11 October 1983

SUPERSEDING

MIL-S-55286D(CR)

5 December 1979

MILITARY SPECIFICATION

SHELTER, ELECTRICAL EQUIPMENT S-280()/G

This specification is approved for use by Communications and Electronics Command, 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, by rail, ship, and landing craft, designated as Shelter, Electrical Equipment S-280()/G (See 6.6).

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

MILITARY

MIL-W-6858	Welding, Resistance: Aluminum, Magnesium, Non-Hardening Steels or Alloys, Nickel Alloys, Heat-Resisting Alloys, and Titanium Alloys; Spot and Seam
MIL-W-8604	Welding of Aluminum Alloys: Process for
MIL-M-13231	Marking of Electronic Items

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, 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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MIL-F-14072	Finishes for Ground Electronic Equipment
MIL-S-55507	Shelter, Electrical Equipment, (Empty), Packaging of

STANDARDS

MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-169	Extreme-Temperature Cycle
MIL-STD-170	Moisture Resistance Test Cycle for Ground Signal and Electronic Test Equipment
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-252	Classification of Visual and Mechanical Defects for Equipment, Electronic, Wired and Other Devices
MIL-STD-285	Attenuation Measurements for Enclosures, Electromagnetic Shielding, for Electric Test Purposes, Method of
MIL-STD-810	Environmental Test Methods
MIL-STD-1235	Single and Multilevel Continuous Sampling Procedures and Tables for Inspection by Attributes

DRAWINGS

ELECTRONICS COMMAND

SC-D-36423	Hold Down Assembly
SC-C-36424	Cable Assembly
SC-C-200154	Keeper
SM-D-450462	Panel Assembly, Emergency Exit
SM-C-450466	Air Filter
SM-C-555515	Shock Mount
SM-B-563756	Sealer
SC-D-595509	Cover, Emergency Exit
SM-D-615264	Intake Louver Assembly
DL-SC-A-621051	Modification Kit, Radio Frequency Interference, MK-1079/G
SM-D-781242	Door Fixture (S-280) Construction Tightness Test

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SM-D-781243	Drain Fixture (S-280) Construction Tightness Test
SM-D-781244	S-280 Construction Tightness Test
DL-SM-D-947080	Shelter, Electrical Equipment S-280C/G
SM-D-947080	Shelter, Electrical Equipment S-280C/G
SM-D-947081	Panel Assembly, Front
SM-D-947082	Panel Assembly, Rear
SM-D-947083	Panel Assembly, Roof
SM-D-947084	Panel Assembly, Floor
SM-D-947085	Panel Assembly, Side
SM-D-947141	Corner, Lifting Eye (Machining)
SM-D-947142	Corner, Towing Eye (Machining)
SM-D-947143	Casting, Lifting & Towing Eye
SM-D-947160	Door Jamb Assembly
SM-D-947166	Door Assembly
SM-D-947235	Mounting Bracket, Skid
SM-D-947238	Skid Assembly
SM-C-947237	Shock Mount
SM-B-947179	Bonding Procedure
SM-B-947180	Cleaning Procedure
SM-D-947181	Flatness & Squareness Measurements
SM-B-947182	Core Material-Urethane, Heavy
SM-B-947183	Core Material-Urethane, Light
SM-B-947184	Adhesive
SM-D-947186	Test Weight Installation
SM-C-947230	Shock Mount

(Copies of specification, standards, and 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 date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING MATERIALS

C272-53	Water Absorption of Core Materials for Structural Sandwich Constructions
C273-61	Shear Test in Flatwise Plane of First Sandwich Constructions or Sandwich Cores
D1621-64	Compressive Strength of Rigid Cellular Plastics

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D1622-63	Apparent Density of Rigid Cellular Plastics
D1692-68	Flammability of Plastic Sheeting and Cellular Plastics
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)

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.

3. REQUIREMENTS

3.1 Classification of requirements.— The requirements for this item are classified herein as follows:

Requirement	Paragraph
Materials	3.3
Construction	3.4
Environmental	3.5
Structural integrity	3.6
Tightness	3.7
Other requirements	3.8

3.2 First article.— When specified (see 6.1.b), the contractor shall furnish sample items for first article inspection and approval (see 4.4).

3.3 Materials.— Materials used in the construction of this item shall be in accordance with the following requirements:

3.3.1 Core material.— Core material density, compressive strength, shear strength, flammability, and water absorption properties shall be in accordance with Drawing SC-B-595564, SM-B-947182, and SM-B-947183, as applicable (see 4.5.1.1, 4.6.1, Table I, Table III).

3.3.2 Adhesive.— The shear strength of the cured adhesive and its bond to aluminum shall be in accordance with Drawing SM-B-947184. This requirement shall apply to the low temperature, room temperature, and high temperature conditions and after the humidity exposure and salt spray exposure conditions required by

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SM-B-947184 (see 4.5.1.2, 4.5.1.3, 4.6.2, 4.6.2.2, Table I, Table III).

3.3.3 Sealer.-- The shear strength of the cured sealer and its bond to aluminum shall be in accordance with the following (see 4.6.2, 4.6.2.2, Table I, Table III):

3.3.3.1 Low temperature.-- 200 psi when tested at -65 degrees F \pm 5 degrees F (see 4.5.1.2, Table III).

3.3.3.2 Room temperature.-- 200 psi when tested at 80 degrees F \pm 10 degrees F (see 4.5.1.3, Table III).

3.3.3.3 High temperature.-- 75 psi when tested at 200 degrees F \pm 0 degrees F \pm 5 degrees F (see 4.5.1.2, Table III).%

3.3.3.4 Humidity exposure.-- 75 psi when tested at 160 degrees F \pm 5 degrees F after exposure to 100 percent relative humidity at 160 degrees F \pm 5 degrees F for 2 weeks.

3.3.3.5 Salt spray exposure.-- 200 psi when tested at 80 degrees F \pm 10 degrees F after exposure to a salt spray of 20 percent NaCl solution at 95 degrees F \pm 5 degrees F in accordance with MIL-STD-202 for two weeks.

3.3.4 Shock mounts.-- Shelter skid shock mounts shall be in accordance with Drawing SM-C-555515, SM-C-947237, and SM-C-947230. (see 4.5.1.4, 4.6.3, 4.6.3.1, 4.6.3.2, Table I, Table III).

3.4 Construction.-- (see 3.8.2)

3.4.1 General.-- All piece-parts, sub-assemblies, and the final assembly of Shelter, Electrical Equipment, S-280()/G shall be constructed in accordance with the drawings listed on Data List DL-SM-B-947080 (see 6.1.c). When DL-SM-B-947080 is specified, all piece-parts, sub-assemblies, and final installation of any and all Modification Kits, RFI, MK-1079()/G shall be in accordance with the drawings listed on Data List DL-SC-A-621051. These kits will be used to inspect for electromagnetic interference suppression. (see 4.6.13, Table II, Table IV).

3.4.2 Cleaning.-- (see 4.5.1.5, 4.6.4, Table II, Table III).

3.4.2.1 Welding and bonding.-- All aluminum parts to be welded or bonded shall be cleaned in accordance with Drawing SM-B-947180. The inspection and records maintenance requirements of SM-B-947180 shall be met. Arc welded assemblies shall be cleaned to remove any scale, oxidation products, and excess flux. Any acid used in cleaning shall be completely neutralized and removed.

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3.4.2.2 Other.— All aluminum parts to be sealed at a sub-assembly or at final assembly shall be cleaned in accordance with SM-B-947180. Part drawings which cite a specific finish in accordance with MIL-F-14072 shall be cleaned as required therein. After assembly the shelter shall be free from particles or scale, flux, excess adhesive, excess sealer, and other foreign material. The shelter shall be cleaned prior to application of finish.

3.4.3 Welding.— All welds shall have thorough penetration and good fusion and shall be free from splatter, scabs, blisters, abnormal pock marks, cracks, voids, slag inclusions, and other defects. Inert gas shielded arc welding shall be used for welding of aluminum in accordance with the drawings, except where resistance welding is specified (see 4.5.1.6, 4.6.5, Table II, Table III).

3.4.3.1 Arc welding.— Inert gas shielded arc welding shall be in accordance with MIL-W-8604. Except where required on the shelter drawings, welded joints shall not require grinding of the finished weld and shall not be ground. Welding to repair castings shall not be permitted.

3.4.3.2 Resistance welding.— Resistance welding shall be in accordance with MIL-W-6858, Class B. Qualification of welding machines and certification of welding schedules in accordance with MIL-W-6858 is required prior to first article and production welding. Failure of any production specimen or any production part to meet the requirements of MIL-W-6858 shall be cause for rejection of the production quantity represented by that specimen or part.

3.4.4 Lamination.— The roof, floor, door, and each wall of the shelter shall be bonded without voids or delaminations (see 6.5.4, 6.5.5) to the inner and outer skins and other adjacent surfaces. No voids shall exist between the inner and outer surfaces of the panels due to foam breaks, misfits, or lack of adhesive. Bonding shall be in accordance with SM-B-947179 (see 4.5.1.7, 4.6.6, Table II, Table III).

3.4.4.1 Impact resistance.— The floor, door, and each wall of the shelter shall be capable of withstanding impact by a foreign object. To determine compliance with this requirement, specimens shall be fabricated and tested in accordance with 4.6.7. Each specimen shall not suffer rupture or fracture of either of the skins and shall not result in denting of the lower skin (see Table I, Table VI).

3.4.4.2 Delaminations and voids.— The shelter may be considered acceptable if it contains less than 12 distinctly individual delaminations or unbond type voids (see 6.5.4, 6.5.5), provided no one is greater than 2 inches across measured in any direction, and provided the shelter meets all other requirements (see 4.6.6).

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3.4.5 Vapor seal.-- Except for the breather holes required for the construction tightness test, and in accordance with the shelter drawings, the inner and outer skins and all joints shall be sealed to provide a vapor barrier against the entrance of moisture to the core material and to the interior of the shelter (see 3.4.11, 4.6.30, 4.6.31).

3.4.6 Interchangeability.-- Like units, sub-assemblies, assemblies, and replaceable parts shall be physically and functionally interchangeable without modification of the items or the shelter. Individual items shall not be hand-picked for fit or performance. Reliance shall not be placed on any dimension, rating, characteristic, etc. not specified on the drawings. To determine compliance with this requirement, the items listed in 4.6.8 shall be measured and shall be in accordance with the dimensions and tolerances specified on the applicable drawing (see 4.5.1.8, Table II, Table III).

3.4.7 Riveting.-- No more than one rivet or rivnut in ten and no more than two adjacent rivets or rivnuts shall exhibit any of the defects specified below. (See 4.5.1.9, 4.6.9, Table II, Table III).

3.4.7.1 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 or rivnuts not being tightly seated.

3.4.7.2 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 (see 4.6.9).

3.4.7.3 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. The term foreign material does not include material required by and applied in accordance with the shelter drawings.

3.4.8 Finish.-- The shelter shall be finished in accordance with the drawings and the paint finishes requirements of MIL-F-14072 (see 4.6.11, 4.6.14, Table II).

3.4.9 Marking.-- Marking shall be in accordance with the drawings and MIL-M-13231. Classification of defects in MIL-M-13231 is applicable. Serial numbers shall be marked in accordance with the drawings on the shelter and on the nameplate in the space provided (see 4.6.12, 4.6.14, Table II).

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3.4.9.1 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-D-947080. (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 4.6.14).

3.4.10 Shelter weight.— The gross weight of the shelter, excluding the hold down assembly, SC-D-36423, shall be as follows (see 4.6.15, Table II, Table IV):

- a. 1390 + 80 pounds maximum without MK-1079()/G installed.
- b. 1400 + 80 pounds with MK-1079()/G installed.

3.4.11 Service integrity.— Unless otherwise specified, all inspections required herein shall not result in any of the defects listed below. This service integrity requirement shall apply to the shelter both with and without Modification Kit, RFI, MK-1079()/G installed, as required by the individual inspections specified herein, (see 3.5, 3.6, 3.7, 4.6, 4.6.17, 4.6.18, 4.6.19.1, 4.6.21, 4.6.21.1, 4.6.22.2, 4.6.23, 4.6.24.1, 4.6.25, 4.6.26, 4.6.27).

a. There shall be no delamination, buckling, splitting, or other deformation or structural weakening of the shelter.

b. The vapor seal of 3.4.5 shall remain intact at all cross sectional openings of the shelter and at all fillets and fasteners.

c. Brackets, lugs, flanges, inserts, bolts, and any other mounting arrangement shall securely retain test loads, the door, and all hardware.

d. There shall be no corrosion of any parts.

e. There shall be no growth of the core material.

f. Unless otherwise specified, all shelter dimensions shall remain in accordance with the drawings.

g. Any deformation of any mounting arrangement shall be within drawing tolerances and shall not cause degradation of its retaining ability or of specified shelter performance.

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h. The door and the emergency exit cover shall open and close to their full extent without binding in the hinge(s) or interfering against any portion of the door or cover jamb or gasket bearing areas.

i. There shall be no malfunction of the door latch mechanism.

j. There shall be no binding in the door brace pivot points or interference between brace components.

k. When a tiedown is required, it shall not be damaged as a result of the test.

3.4.12 Construction Tightness Preconditioning.— Prior to submission for the specified Qualification inspection each shelter shall show no evidence of air leakage through sealed seams, joints, rivets, mounting bolts etc. when tested and corrected in accordance with 4.6.10.1.

3.5 Environmental.— The shelter shall meet the following environmental service conditions. Where a test is referenced, meeting the test shall be considered as compliance with the requirement (see 3.4.11).

3.5.1 Moisture resistance.— Daily exposure up to 97 percent relative humidity for 20 hours and exposure at 100 percent relative humidity with condensation for 4 hours (see 4.6.17, Table II).

3.5.2 Temperature.— The shelter shall withstand rapid temperature changes and exposure to the following (see 4.6.18, Table II):

3.5.2.1 Operating.— Ambient temperature in the range of -65 degrees F to +125 degrees F plus a solar load such that the outside skin reaches a minimum temperature of 200 degrees F. Exposure at the high extreme is not to exceed 4 hours and at the low temperature extreme is not to exceed 72 hours at any one time.

3.5.2.2 Nonoperating.— Exposure in the range of -80 degrees F to + 160 degrees F. Exposure at the high temperature extreme is not to exceed 4 hours and at the low temperature extreme is not to exceed 24 hours at any one time.

3.5.3 Thermal differential.— (see 4.16.19, Table II).

3.5.3.1 Thermal deformation.— The shelter shall withstand exposure to a temperature differential of 100 degrees F between the inside and outside of the shelter (see 4.6.19.1).

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3.5.3.2 Heat transfer.— When specified (see 6.1.e), the overall coefficient of heat transfer of the shelter shall not exceed 0.28 British Thermal Units (BTU's) per hour per square foot per degree Fahrenheit. This overall coefficient shall apply to the shelter with the door and the emergency exit cover closed and with no additional thermal sealing (see 4.6.19.2).

3.6 Structural integrity.— The shelter shall be capable of complying with the following requirements. Unless otherwise specified when a payload is required the shelter shall be loaded with 5,000 pounds in accordance with DL-SM-B-947186. Where a test is referenced, meeting the test shall be considered as compliance with the requirement (see 3.4.11, 4.6.21, 4.6.22, 4.6.23).

3.6.1 Transportability.— The shelter, with payload, shall be capable of being picked up by a crane using the hold down assembly, SC-D-36423, 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:

3.6.1.1 Rail transport.— The shelter, with payload, shall be capable of being loaded and braced on a flatcar for shipment by rail (see 4.6.21, Table II, Table VI).

3.6.1.2 Air transport.— The shelter shall have adequate strength to secure 5,000 pounds of equipment mounted in the shelter when exposed to 3.0 G's acceleration with the shelter suspended by its lifting eyes (see 4.6.25, Table II, Table VI).

3.6.2 Drops, flat and rotational.— The shelter, with a 5,000 pound payload, shall be capable of withstanding drops of 18 inches onto concrete during handling. After all drops of 4.6.22, the inside dimensions of the shelter shall remain in accordance with Drawing SM-D-947080. There shall be no permanent deformation, buckling, delamination (see 6.5.2), sealer separation or structural weakness to any part of the shelter except deformation in the skids and skid mounting brackets shall not exceed 1/4 inch. The door and cover shall open and close to the full extent specified on the applicable drawing on DL-SM-D-947080 without binding in the hinge(s) or interfering against any portion of the jamb and/or bearing areas. (See 4.5.2.3.1, 4.6.22.1, 4.6.22.2, Table II, Table VI).

3.6.3 Towing, simulated.— The shelter shall be capable of withstanding a 3,000 pound shear force applied to the plane of the skid attachment without damage to any part of the shelter, skid assemblies or skid mounting brackets (see 4.6.23, Table II, Table VI).

3.6.4 Lifting and towing eyes.— (see 4.6.24)

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3.6.4.1 Eye pulls.— Each lifting and towing eye assembly, installed on the shelter, shall be capable of withstanding loads in accordance with 4.6.24.1 with no damage to the eye assemblies or shelter. (see Table II, Table V).

3.6.4.2 Eye Casting Hardness.— Each Lifting and Towing Eye Casting in accordance with SM-D-947143 shall be properly aged and hardened to a hardness of 75 Brinell Standard Type (10 mm ball, 500 kilogram load) prior to machining (see 4.5.1.10, 4.6.24.2, Table I, and Table III).

3.6.5 Static door load.— The door, door frame, and door hardware shall be capable of supporting a vertical load of 200 pounds applied in accordance with 4.6.26. There shall be no damage and the door shall seal properly, as determined by inspecting in accordance with 4.6.10.3 (see Table II, Table V).

3.6.6 Roof access steps.— Each roof access step installed on the shelter shall be capable of supporting a vertical load of 400 pounds applied in accordance with 4.6.27. There shall be no damage and the step shall open and close without binding (see Table II, Table V).

3.7 Tightness.— The shelter shall be capable of meeting the following tightness requirements. Except for 3.7.4, these requirements apply both with and without MK-1079()/G installed (see 3.4.11).

3.7.1 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 4.6.10 (see 4.5.1.11, Table II, Table III, Table IV, Table VI).

3.7.2 Door latch torque.— When tested in accordance with 4.6.16, the door latch torque shall not exceed the following (see Table II, Table IV, Table VI):

- a. 15 foot-pounds maximum when MK-1079()/G is not installed.
- b. 30 foot-pounds maximum when MK-1079()/G is installed.

3.7.3 Light tightness.— No direct rays of light shall be visible through the intake louver assembly when tested in accordance with 4.6.28 and viewed by an observer from the darkened shelter interior (see Table II, Table V).

3.7.4 Electromagnetic interference (EMI) suppression.— The shelter shall be capable of being shielded, by the addition of Modification Kit, RFI, MK-1079()/G, to provide at least 60db attenuation to electric and magnetic fields and to plane waves in the frequency range from 0.15 MHz to 10,000 MHz when tested in accordance with MIL-STD-285 (see 4.5.2.3.2, 4.6.29, Table II, Table VI).

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3.7.5 Water tightness.-- The shelter shall be watertight when tested and inspected in accordance with 4.6.30. This requirement shall be met without the use of any external or internal sealing, caulking, taping, etc. not specified on the drawings (see Table II, Table VI)

3.7.6 Fording.-- The shelter shall be capable of being immersed in water to a depth of 21 inches measured from the bottom of the shelter skids. There shall be no leakage or damage to the structure or finish when tested and inspected in accordance with 4.6.31. This requirement shall be met without the use of any external or internal sealing, caulking, taping, etc. not specified on the drawings and without the use of a special fording kit (see Table II, Table VI).

3.8 Other requirements.--

3.8.1 Hold down assembly.-- A combination lift and tiedown device shall be provided as part of each shelter. This device will be used for lifting the shelter and for tying down the shelter in military trucks. The device shall be in accordance with Drawing SC-D-36423, Hold Down Assembly. Each cable assembly in accordance with Drawing SC-C-36424 shall be capable of withstanding the tensile load specified on SC-C-36424 (see 4.5.2.3.3, 4.6.25, 4.6.32, Table I, Table VI).

3.8.2 Workmanship.-- The shelter shall be manufactured with the degree of workmanship normally considered appropriate for each of the areas listed under 3.4 (see 4.6.14, Table II, Table IV).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.-- Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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

- a. First article inspection (see 4.4).

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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).

d. Quality conformance inspection of packaging (see 4.7).

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 4.5.2).

4.4 First article inspection.— Unless otherwise specified (see 6.1.b, 6.2), all first article test and inspections shall be performed by the contractor and shall consist of the following (see 3.2):

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 (see 6.2, Table II).

TABLE I FIRST ARTICLE SPECIMENS

Inspection	Quantity	Req't Para	Test Para
Core material:		3.3.1	4.6.1
Density	5 for every grade or type	3.3.1	4.6.1.1
Compressive strength	5 for every grade or type	3.3.1	4.6.1.2
Shear strength	5 for every grade or type	3.3.1	4.6.1.3
Flammability	5 for every grade or type	3.3.1	4.6.1.4
Water absorption	3 for every grade or type of urethane	3.3.1	4.6.1.5

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TABLE I. First Article Specimens Cont'd

Inspection	Quantity	Req't para	Test para
Adhesive	50 coupons	3.3.2	4.6.2
Sealer	50 coupons	3.3.3	4.6.2
Shock mounts	SM-C-555515: 3 per -3	3.3.4	4.6.3.1
	SM-C-947237: 3 each		
	SM-C-947230: 3 each		
Impact panel	1 from wall, 1 from floor	3.4.4.1	4.6.7
Hold down assembly	1 complete	3.8.1	4.6.32
Eye Casting Hardness	1 casting per SM-D-947143	3.6.4.2	4.6.24

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 inspections listed in Table II. Inspection shall be in the sequence listed in Table II.

4.5 Quality conformance inspection.— The contractor shall perform the inspections specified under this paragraph. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification and drawing requirements.

TABLE II. Sequence of first article inspection

Inspection	Req't para	Test para
Cleaning	3.4.2	4.6.4
Welding	3.4.3	4.6.5

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TABLE II. Sequence of first article inspection Cont'd

Inspection	Req't para	Test para
Lamination	3.4.4	4.6.6
Interchangeability	3.4.6	4.6.8
Riveting	3.4.7	4.6.9
Construction tightness	3.7.1	4.6.10
Finish	3.4.8	4.6.11
Marking	3.4.9	4.6.12
Dimensional	3.4.1	4.6.13
Visual and Mechanical	3.8.2	4.6.14
Shelter weight	3.4.10	4.6.15
Door latch torque	3.7.2	4.6.16
Moisture resistance <u>1/</u>	3.5.1	4.6.17
Temperature	3.5.2	4.6.18
Thermal differential	3.5.3	4.6.19
Rail transport	3.6.1.1	4.6.21
Drops	3.6.2	4.6.22
Construction Tightness <u>2/</u>	3.7.1	4.6.10.1
Towing, simulated	3.6.3	4.6.23
Eye pulls	3.6.4.1	4.6.24.1
Air transport, simulated	3.6.1.2	4.6.25
Static door load	3.6.5	4.6.26
Roof access steps	3.6.6	4.6.27
Light tightness	3.7.3	4.6.28
Electromagnetic interference suppression	3.7.4	4.6.29
Watertightness	3.7.5	4.6.30
Fording	3.7.6	4.6.31
Door latch torque (second time)	3.7.2	4.6.16

1/ First Article specimen testing shall be completed no later than the end of this test (see 4.4.1).

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

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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:	3.3.1	—	4.6.1
Density	3.3.1	4.5.1.1	4.6.1.1
Compressive strength	3.3.1	4.5.1.1	4.6.1.2
Shear strength	3.3.1	4.5.1.1	4.6.1.3
Adhesive:	3.3.2	—	4.6.2
Low temperature	3.3.2	4.5.1.2	4.6.2
Room temperature	3.3.2	4.5.1.3	4.6.2
High temperature	3.3.2	4.5.1.2	4.6.2
Sealer	3.3.3	—	4.6.2
Low temperature	3.3.3.1	4.5.1.2	4.6.2
Room temperature	3.3.3.2	4.5.1.3	4.6.2
High temperature	3.3.3.3	4.5.1.2	4.6.2
Shock mounts	3.3.4	4.5.1.4	4.6.3.2
Cleaning	3.4.2	4.5.1.5	4.6.4
Welding	3.4.3	4.5.1.6	4.6.5
Lamination	3.4.4	4.5.1.7	4.6.6
Interchangeability	3.4.6	4.5.1.8	4.6.8
Riveting	3.4.7	4.5.1.9	4.6.9
Eye Casting Hardness	3.6.4.2	4.5.1.10	4.6.24.2
Construction tightness, shelter	3.7.1	4.5.1.11	4.6.10.1

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 3.3.1, 4.6.1, 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 3.3.2, 3.3.3.1, 3.3.3.3, 4.6.2, Table III).

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

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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 3.3.2, 3.3.3.2, 4.6.2, 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 shock mounts.— Three shock mounts shall be randomly selected from the first 300 mounts produced, three from the next 900 mounts produced, and three from each additional 1200 mounts or fraction thereof produced (see 3.3.4, 4.6.3.2, Table III).

4.5.1.5 Sampling for cleaning.— Frequency of process inspections for cleaning shall be in accordance with SM-B-947180 (see 3.4.2, 4.6.4, Table III)

4.5.1.6 Sampling for welding.— Frequency of visual inspection of arc welding shall be in accordance with the requirements of maintenance sampling for production of 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 3.4.3, 4.6.5, Table III).

4.5.1.7 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 3.4.4, 4.6.6, Table III).

4.5.1.8 Sampling for interchangeability.— Each shelter shall comply with the inspection of 4.6.8 and meet the requirement of 3.4.6.

4.5.1.9 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 (see 3.4.7, 4.6.9, Table III).

4.5.1.10 Sampling for Eye Casting Hardness.— Lifting and towing eye castings shall be inspected utilizing special inspection level S-4, AQL 6.5% per MIL-STD-105 (see 3.6.4.2, 4.6.24.2, Table III).

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4.5.1.11 Sampling for construction tightness, shelter portion.- All shelters shall be preconditioned in accordance with 4.6.10.1 (see 3.4.12).

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 shelter. Conforming shelters shall then be verified by a Group A Audit utilizing the AQL percents specified (see 4.6.10.4).

TABLE IV. Group A inspection			AQL percent	
Inspection	Req't para	Test para	(audit only)	
			Major	Minor
Construction tightness	3.7.1	4.6.10	-	-
Shelter portion (audit only)	3.7.1	4.6.10.1	1.00	-
Door portion	3.7.1	4.6.10.2	1.00	-
Gasket portion	3.7.1	4.6.10.3	1.00	-
Visual and mechanical	3.8.2	4.6.14	1.00	4.00
Dimensional	3.4.1	4.6.13	1.00	-
*Door latch torque	3.7.2	4.6.16	1.00	-
Shelter weight	3.4.10	4.6.15	1.00	-

* 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 and in accordance with the footnote to 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.

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 6.4)

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TABLE V. Group B inspection

Inspection	Req't para	Test para	AQL percent
Eye pulls	3.6.4.1	4.6.24.1	6.5
Static door load	3.6.5	4.6.26	6.5
Roof access steps	3.6.6	4.6.27	6.5
Light tightness	3.7.3	4.6.28	6.5

TABLE VI. Group C inspection

Inspection	Req't para	Sampling para	Test para
Drops	3.6.2	4.5.2.3.1	4.6.22
Construction tightness <u>6/</u>	3.7.1	-	4.6.10
Watertightness <u>1/</u>	3.7.5	-	4.6.30
Fording <u>1/</u>	3.7.6	-	4.6.31
Door latch torque <u>1/</u>	3.7.2	-	4.6.16
EMI suppression	3.7.4	4.5.2.3.2	4.6.29
Watertightness <u>2/ 3/ 4/</u>	3.7.5	-	4.6.30
Fording <u>2/ 3/</u>	3.7.6	-	4.6.31
Door latch torque <u>2/ 3/</u>	3.7.2	-	4.6.16
Hold down assembly	3.8.1	4.5.2.3.3	4.6.32
Core material:	-	-	-
Flammability	3.3.1	4.5.2.3.4	4.6.1.4
Water absorption	3.3.1	4.5.2.3.4	4.6.1.5
Adhesive:	-	-	-
Humidity exposure	3.3.2	4.5.2.3.4	4.6.2
Salt spray exposure	3.3.2	4.5.2.3.4	4.6.2
Sealer	-	-	-
Humidity exposure	3.3.3.4	4.5.2.3.4	4.6.2
Salt spray exposure	3.3.3.5	4.5.2.3.4	4.6.2
Shock mounts, complete	3.3.4	4.5.2.3.4	4.6.3.1
Impact panel	3.4.4.1	4.5.2.3.4	4.6.7
Environmentals <u>6/</u>	-	4.5.2.3.4	-
Moisture resistance <u>3/</u>	3.5.1	-	4.6.17
Temperature <u>3/</u>	3.5.2	-	4.6.18
Thermal differential <u>3/</u>	3.5.3	-	4.6.19
EMI suppression <u>7/ 8/</u>	3.7.4	-	4.6.29
Water tightness <u>3/ 7/</u>	3.7.5	-	4.6.30
Fording <u>3/ 7/</u>	3.7.6	-	4.6.31
Door latch torque <u>3/ 7/</u>	3.7.2	-	4.6.16
Rail transport <u>3/</u>	3.6.1.1	-	4.6.21
Drops <u>3/ 9/</u>	3.6.2	-	4.6.22
Construction tightness <u>3/5/</u>	3.7.1	-	4.6.10
EMI suppression <u>3/ 5/</u>	3.7.4	-	4.6.29
Water tightness <u>3</u>	3.7.5	-	4.6.30
Fording <u>3/</u>	3.7.6	-	4.6.31
Door latch torque <u>3/</u>	3.7.2	-	4.6.16
Towing, simulated	3.6.3	4.5.2.3.4	4.6.23
Air transport, simulated	3.6.1.2	4.5.2.3.4	4.6.25

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TABLE VI. Group C Inspection Cont'd

- 1/ If the EMI suppression 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-1079()/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.
- 7/ If the 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 test per para 4.5.2.3.1.

4.5.2.3.1 Sampling for drop.- One shelter shall be 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 selected from each additional 150 shelters or fraction therefore (see 3.6.2, 4.6.22, 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 3.7.4, 4.6.29, Table VI).

4.5.2.3.3 Sampling for hold down assembly.- Two complete hold down assemblies in accordance with Drawing SC-D-36423 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 3.8.1, 4.6.32, Table VI).

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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).

4.6 Methods of examination and test.— (see 3.4.11)

4.6.1 Core material.— Core material specimens 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, the requirements of 3.3.1 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).

4.6.1.1 Density.— Five specimens, each 2 x 3 x 3 inches, shall be tested in accordance with ASTM D1622-63 (see Table I, Table III).

4.6.1.2 Compressive strength.— Five specimens, each 2 x 3 x 3 inches, shall be tested in accordance with ASTM D1621-64, Procedure A (see Table I, Table III).

4.6.1.3 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 III).

4.6.1.4 Flammability.— Five specimens, each 1/2 x 2 x 6 inches, shall be tested in accordance with ASTM D1692-68 (see Table I).

4.6.1.5 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:

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

where: W1a = Initial submerged weight of jig and samples (gm)

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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 Coupon specimens.— Coupon specimens for both adhesive and sealer tests shall be lap joints fabricated in accordance with SM-B-947184. Five coupons are required for each of the five test conditions. For first article inspection ten coupons are required for each of the five test conditions (see 3.3.2, 3.3.3, 4.5.1.2, 4.5.1.3, Table I, Table III, Table VI).

4.6.2.1 Compatibility of fabrication and cure.— Two or more part mixes of adhesive shall be verified as being in accordance with SM-B-947184 before coupons are fabricated. Two or more part mixes of sealer shall be verified as being in accordance with SM-B-947184 before coupons are fabricated. Automatic dispensing machines, when used to mix and deliver two or more part adhesive or sealer, shall be calibrated at least once every 4 hours. Coupon specimens shall be fabricated and cured using materials, processes, and conditioners compatible with those used on panels and shelters, including:

- a. Same batch and type of material.
- b. Surface conditions of and method of preparing materials to be bonded or sealed.
- c. Time elapsed between application of adhesive to the first panel in a lot of panels and application of temperature and pressure to the lot of panels.
- d. Time, temperature, and pressure of cure. Sealer coupons shall be cured at a pressure of $5 \pm 1/2$ psi.
- e. Minimum cure time before handling.

4.6.2.2 Shear tests.— Coupons shall be tested at the specified temperature after being subjected to the specified exposure, if applicable. 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.

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Rate of application of force shall be set under no-load conditions and shall be constant at 1 inch per minute \pm 2 seconds. The requirements of 3.3.2 for adhesive and 3.3.3, with subparagraphs, for sealer shall be met by the average of the coupon results, with the lowest result no less than 90% of the required value for adhesive and 70% of the required value for sealer. Failure to meet these requirements shall be cause for rejection of all panels and shelters fabricated using that production quantity of adhesive or sealer represented by that failed coupon or average.

4.6.3 Shock mounts.— Compliance with 3.3.4 shall be determined by the following inspections:

4.6.3.1 Complete inspection.— The shock mount material shall be inspected by subjecting it to all tests specified on Drawing SM-C-555515, SM-C-947237, or SM-C-947230. Where possible, test specimens shall be fabricated from actual shock mounts furnished for the shelter. Three shock mounts in accordance with each shock mount drawing shall be subjected to the depression-deflection test of its respective drawing. The requirements of 3.3.4 shall be met (see Table I).

4.6.3.2 Abbreviated inspection.— The shock mounts shall be inspected by subjecting them to the hardness, resilience, and depression-deflection tests in accordance with SM-C-555515, SM-C-947237, and SM-C-947230. The requirements of 3.3.4 shall be met (see 4.5.1.4, Table III).

4.6.4 Cleaning.— Inspection of the cleaning process shall be in accordance with SM-B-947180. Any noncompliance shall require recleaning of the parts processed since the last acceptable inspection. The requirements of 3.4.2, with subparagraphs, shall be met (see 4.5.1.5, Table II, Table III).

4.6.5 Welding.— Arc welding shall be visually inspected in accordance with the requirements of maintenance sampling for production of 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 3.4.3, with subparagraphs, shall be met (see 4.5.1.6, Table II, Table III).

4.6.6 Lamination.— Panels and shelters shall be inspected for lamination using a tap hammer in accordance with Figure 1. Inspection shall be accomplished by tapping the panel skins with the spherical end of the hammer. The flat end of the hammer shall be used for tapping into corners. Tapping force shall be approximately equal to that produced when the head is raised approximately 1 inch above the panel and allowed to fall against the panel and with the center of arc 12 inches from the head. 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 extent of interrogation of each side of each panel shall be at least 4 hammer impacts per square foot of

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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. The requirements of 3.4.4 and 3.4.4.2 shall be met (see 4.5.1.7, Table II, Table III).

4.6.7 Impact resistance.— An impact resistance specimen shall be fabricated in accordance with Figure 2. The specimen shall contain only 1 continuous piece of core material bonded with adhesive, without voids or delaminations, to 2 aluminum skins. For testing, the specimen shall be supported along its 4 edges by a framework backed by concrete. The framework shall be made of 4 pieces of 2 by 4 inch (nominal) lumber. The frame shall be rigidly bolted together to form a square 24 inches on a side (outside dimension) and 4 inches high. The frame shall rest on the 2 inch face. The specimen shall be bolted to the frame with two 1/4 inch diameter bolts per edge. A gap of .010 inch shall be left under each bolt. The specimen shall then be impacted with a 70 pound steel cylinder 3 inches in diameter and hemispherical at one end. The cylinder shall be dropped vertically 30 inches so that the hemispherical end of the cylinder strikes the center of one skin of the specimen on a horizontal plane. After impact the specimen shall meet the requirements of 3.4.4.1. The specimen shall then be cut open and examined for conformance with Figure 2 and the requirements specified herein (See Table I).

4.6.8 Interchangeability.— To determine compliance with the interchangeability requirement of 3.4.6, the following dimensions and characteristics shall be measured and checked in process (see 4.5.1.8, Table II, Table III):

a. Overall dimensions, squareness, parallelism, flushness of the corner miter joints, and flatness at the gasket seating and contact surfaces of the items listed below. Flatness shall be inspected by measuring the flatness of the 4 sides and the flatness at the corners along the diagonals using a straight edge with a center rest point.

i. Door in accordance with SM-D-947166.

ii. Emergency exit opening in the door in accordance with SM-D-947166.

iii. Emergency exit panel in accordance with SM-D-450462.

iv. Emergency exit cover in accordance with SM-D-595509.

b. Overall dimensions, squareness, parallelism, and location of mounting holes of the louver assembly in accordance with SM-D-615264.

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- c. Dimensions of air filter in accordance with SM-C-450466.
- d. Locations of center marks for mounting members in accordance with SM-D-947083, SM-D-947084, SM-D-947085, SM-D-947081 and SM-D-947082.
- e. Mounting dimensions of hinges in accordance with SM-D-947080 and of latches in accordance with SM-D-947166.
- f. Overall dimensions of skids and location of mounting holes in accordance with SM-D-947238, SM-D-947080 and SM-D-947235.
- g. Overall dimensions and location of mounting holes of the lifting eyes in accordance with SM-D-947141 and of the towing eyes in accordance with SM-D-947142.
- h. Padlocks and keys shall be checked for proper operation. Four keys shall be checked against three different padlocks.

4.6.9 Riveting.— Rivets and rivnuts shall be visually examined to determine compliance with 3.4.7. Countersunk rivet and rivnut heads which appear to project above or below the mating surface shall be removed and replaced after the noncompliance has been recorded. All replacement rivets or rivnuts shall be subjected to this inspection (see 4.5.1.9, Table II, Table III).

4.6.10 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 (see 3.7.1, Table II, Table IV, and Table VI).

4.6.10.1 Shelter Portion.— The shelter shall be placed in a position which allows access to all exterior joints and fasteners on all surfaces and shall be tested as follows (see 4.5.1.11, Table III, Table IV).

4.6.10.1.1 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 mounting bracket (SM-D-947235) and related shims and the latch keepers (SC-C-200154) and related shims shall not be installed. The door assembly (SM-D-947166) 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 test. For Group A Audit testing the shelter shall be completely assembled and finished.

4.6.10.1.2 Test Fixtures and Equipment.— This test requires the use of the following:

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- a. Door fixture per drawing SM-D-781242.
- b. Drain fixture per drawing SM-D-781243.
- 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 ± 0.2 degrees 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.

4.6.10.1.3 Performance of Test.— Test fixtures and equipment shall be installed and/or assembled as required by drawing SM-D-781244. Testing shall then proceed as follows:

a. 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 degrees 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. The inspection of 4.6.10.1.3.b shall be performed, regardless of the pressure and SCFM achieved, to locate the leak(s). Rework shall be accomplished. The reworked area(s) shall then be reinspected per 4.6.10.

b. 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 Table IV. In any event, the reworked area(s) shall be reinspected per 4.6.10 after rework.

c. Inspection of the skid attachment areas shall not be performed on Group A Audit units. Also, latch keepers shall not be removed.

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4.6.10.2 Door Portion.-- After successful completion of the shelter portion per 4.6.10.1, the shelter shall be tested as follows (see Table IV):

4.6.10.2.1 Assembled Conditions.-- 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 7 on drawing SM-D-947080 and the tightening instruction on sheet 2 of drawing SM-D-450462 shall be met before proceeding with this test.

4.6.10.2.2 Test Fixtures and Equipment.-- This test requires the use of the items in 4.6.10.1.2.b, c, d, e, and g.

4.6.10.2.3 Performance of Test.-- The test fixture and equipment shall be installed and/or assembled as required by drawing SM-D-781244. Testing shall then proceed as follows:

a. 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 degrees 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 4.6.10.2.3.b 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 4.6.10.2.

b. 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 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 Table IV. In any event, the reworked area(s) shall be reinspected per 4.6.10.2 after rework.

4.6.10.3 Gasket Portion.-- After successful completion of the door portion per 4.6.10.2, the gasket seating on the door and the emergency exit cover shall be tested as follows (see 3.6.5, Table IV):

4.6.10.3.1 Assembled Condition shall be as required in 4.6.10.2.1.

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

4.6.10.3.3 Performance of Test.-- The center of the top and bottom of the door, 3 places along each side of the door, the center of the bottom of the cover, and 2 places along each side of the cover shall be inspected as follows: The door or cover shall be closed so that the paper is between the weathergasket and its bearing surface (but not under the RFI 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 in the appropriate manner and this inspection shall be repeated. If a gasket(s) is unable to meet this inspection requirement without exceeding the requirements stated in 4.6.10.3.1 the shelter shall be considered as having failed this test. Rework shall be accomplished. The reworked area(s) shall then be reinspected per 4.6.10.2 and 4.6.10.3.

4.6.10.4 Construction Tightness Test Records.-- The contractor shall maintain records of all construction tightness tests performed, including any reinspections and tests performed in compliance with Group A Audit requirement of 4.5.2.1. Records shall contain, as a minimum, the shelter serial number and the following:

4.6.10.4.1 Shelter Portion:

- a. An indication of compliance with 4.6.10.1.1 and drawing SM-D-781244.
- b. Temperature differential, interior differential pressure, and air flow per 4.6.10.1.3.a.
- 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.

4.6.10.4.2 Door Portion:

- a. An indication of compliance with 4.6.10.2.1 and drawing SM-D-781244.
- b. Temperature differential and interior differential pressure per 4.6.2.3.a.

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- 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.

4.6.10.4.3 Gasket Portion:

- a. An indication of compliance with 4.6.10.3.1 and the 13 inspection location points per 4.6.10.3.3.
- b. If the shelter was equipped with RFI 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.

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

4.6.11 Finish.— Finish shall be inspected in accordance with the quality assurance provisions of MIL-F-14072 and 4.6.14 (see 3.4.8, Table II).

4.6.12 Marking.— Marking shall be visually inspected to determine compliance with 3.4.9 (see 4.6.14, Table II).

4.6.13 Dimensional.— To determine compliance with the drawings (see 3.4.1), the shelter shall be measured and checked in the following areas (see Table II, Table IV):

- a. Overall dimensions, squareness, parallelism, flushness of the corner miter joints, and flatness of the gasket contact surface of the door opening in accordance with SM-D-947160 and note 38 per SM-D-947080. Flatness shall be inspected by measuring the flatness of the 4 sides and the flatness at the corners along the diagonals using a straight edge with a center rest point.

- b. Overall interior dimensions in accordance with SM-D-947080.

- c. Flatness: 83 measurements in accordance with SM-D-947181: 3 deviations is acceptable, 4 deviations is cause for rejection of the shelter.

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d. Squareness: 64 measurements in accordance with SM-D-947181: 7 deviations is acceptable, 8 deviations is cause for rejection of the shelter.

e. Visibility of center marks for mounting members.

4.6.14 Visual and mechanical.— The shelter shall be visually inspected for type 4, 5, 7, 8, 9, 11 defects in accordance with MIL-STD-252 and to determine compliance with the requirements of 3.4.8, 3.4.9, 3.4.9.1, and 3.8.2 (see 4.6.11, 4.6.12, Table II, Table IV).

4.6.15 Shelter weight.— The shelter shall be weighed on a scale with an accuracy of + 1 pound or one tenth of one percent, whichever is smaller. The scale shall be calibrated, at least once every 2 weeks, using standard weights traceable to the National Bureau of Standards. The requirements of 3.4.10 shall be met (see Table II, Table IV).

4.6.16 Door latch torque.— Torque measurements shall be made using a torque wrench fitted with an adapter which seats over the outside door handle and in line with the shaft centerline. The door shall then be opened and closed using the torque wrench. Measurements shall be made over the entire working range of the latch in both cases. Both maximum readings shall be recorded and shall meet the requirements of 3.7.2 (see Table II, Table IV, Table VI).

4.6.17 Moisture resistance.— The shelter, with the door closed and the emergency exit cover fully open, shall be placed in a chamber in accordance with 4.6.20 and shall be subjected to 5 continuous 48 hour cycles of the moisture resistance test in accordance with MIL-STD-170. After cycling has been completed, the requirements of 3.4.11 and 3.5.1 shall be met (see Table II).

4.6.18 Temperature.— The shelter, with door and cover closed, shall be subjected to the following tests (see 3.5.2, Table II):

a. The shelter, in the upright position, shall be placed in a chamber in accordance with 4.6.20. The velocity of the ambient air outside the shelter shall not exceed 15 miles per hour near the shelter surfaces. The ambient temperature inside and outside the shelter shall be stabilized at 120 degrees F to 125 degrees F as measured by 8 thermocouples. The inside shelter temperature shall be measured by 4 thermocouples: 2 in each of 2 diagonally opposite corners, 6 inches from the shelter walls, and at levels 12 inches and 60 inches above the shelter floor. The outside temperature shall be measured by 4 thermocouples: 1 at each side and end panel, approximately midway along the panel, with each thermocouple located 44 inches above the bottom of the skids and between 9 and 24 inches from the panel. No thermocouple shall be within 9 inches of a chamber wall. After ambient stabilization is achieved, a solar load

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shall be applied to the shelter roof as rapidly as possible. The solar load shall be applied using at least 28 lamps, type 1000 T3, 230 volts, as made by General Electric or Sylvania, or equal. The lamps shall be arranged in 4 rows of 7 each (or more) and shall be operated with 10 percent of rated voltage. There shall be no obstruction between the lamps and the shelter panel. The temperature of the roof outer skin shall be measured by 15 thermocouples arranged as shown in Figure 3 and mounted in contact with the painted skin surface. The solar load shall be applied to produce a temperature of 200 degrees F to 230 degrees F as measured by the 15 thermocouples. The following are permissible and may be required in order to meet this temperature requirement: (1) vertical movement of lamp(s), (2) geometric projection of lamp(s) is beyond the shelter panel, (3) variation of voltage to lamp(s) within 10 percent. The solar load shall be maintained for 4 hours, during which time the ambient temperature outside the shelter shall be maintained between 120 degrees F and 130 degrees F. After the 4 hour period the solar load shall be removed and the ambient temperature, both inside and outside the shelter, shall be increased to between 160 degrees F and 166 degrees F, as indicated by all 23 thermocouples described above. An electrical resistance heat source shall be used inside the shelter to assist in achieving this temperature distribution. The solar lamps shall not be used to achieve or assist in achieving this rise in temperature. The shelter door shall then be opened and the ambient temperatures reduced as rapidly as possible to 65 degrees F to 95 degrees F. After this test the requirements of 3.4.11 shall be met.

c. The shelter, in the upright position, shall be placed in a chamber in accordance with 4.6.20. The velocity of the ambient air outside the shelter shall not exceed 7 miles per hour near the shelter surfaces. The shelter shall be subjected to 3 cycles of steps 5, 6a, 7 and 10 of MIL-STD-169. The temperature shall be measured by 1 thermocouple located inside the shelter, approximately 6 inches below the center of the roof panel. At step 7 the door, latches, and cover shall operate freely without binding. After this test the requirements of 3.4.11 shall be met. Inspections shall be conducted during and after each cycle.

4.6.19 Thermal differential.- (see 3.5.3, Table II). The shelter shall be placed in a chamber in accordance with 4.6.20 and which shall maintain a constant temperature environment of -40 degrees F outside the shelter. An electrical resistance heat source shall be placed inside the shelter. The heat source shall have sufficient power to maintain a stabilized temperature inside the shelter of not less than 100 degrees F above the outside temperature. Air circulation shall be sufficient to provide temperature uniformities inside and outside the shelter within 5 degrees F as measured by 12 thermocouples placed 6 inches from the shelter walls at two diagonally opposite corners. Six thermocouples, 3 in each corner, shall be placed inside, 2 at 6 inches, 2 at 38

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inches, and 2 at 67 inches above the shelter floor. Six thermocouples, 3 in each corner, shall be placed outside, 2 at 12 inches, 2 at 49 inches, and 2 at 94 inches above the bottom of the skids. The temperature conditions shall be considered stable when, for 1/2 hour, the 6 inside and the 6 outside thermocouple readings remain within 5 degrees F each and the average inside temperature remains not less than 100 degrees above the average outside temperature. To minimize any pressure differential between the inside and outside of the shelter, a form of pressure relief shall be incorporated into the drain hole. Rapid changes in temperature shall be avoided during and after the test.

4.6.19.1 Thermal deformation.— After exposure to the environmental conditions of 4.6.19, the shelter shall meet the requirements of 3.4.11 and 3.5.3.1.

4.6.19.2 Heat transfer.— Under the conditions of 4.6.19, the electrical power input shall be considered stabilized. All electrical power supplied to apparatus within the shelter (heaters, fans, lights etc.) during this test shall be considered in the calculation of the overall coefficient of heat transfer. Voltmeters and ammeters shall not be used in place of a wattmeter for computing power inputs. Four sets of temperature and power readings shall be recorded during the 1/2 hour period. The power shall not be changed. Power reading may vary as much as 5% to allow for normal fluctuations during this period. All electrical apparatus inside the shelter shall operate continuously during this period and shall not be cycled off and on. The overall coefficient of heat transfer shall be calculated using the electrical power input, the average inside and outside temperatures, and the nominal inside surface area. The requirements of 3.5.3.2 shall be met.

4.6.20 Test chamber.— The test chamber used for environmental testing of the shelter shall be in accordance with the following (see 4.6.17, 4.6.18, 4.6.19):

a. The volume of the test chamber shall be such that the bulk of the shelter will not interfere with the generation and maintenance of the test conditions. The minimum distance from any shelter panel to the adjacent wall of the chamber shall be 24 inches.

b. The conditioned air flow shall be suitably baffled to provide free circulation between the shelter and the chamber walls and ceiling and to provide uniform air flow around the shelter. Air velocity near the shelter surfaces shall be in accordance with the specific test paragraph.

c. The heat or cold source of the chamber shall be so located that the heat or cold from the source will not fall directly on the shelter, except where application of radiant heat is one of the test conditions.

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d. Thermocouples shall be baffled or otherwise protected against radiation effects.

e. For moisture resistance testing: The chamber and accessories shall be constructed and arranged in such a manner as to avoid condensate dripping on the shelter. The chamber shall be trap-vented to the atmosphere to prevent the buildup of total pressure. Relative humidity shall be determined from the dry bulb-wet bulb thermometer comparison method or an equivalent method approved by the government. When readout charts are used, they shall be capable of being read with a resolution within 1 degree F. When the wet bulb control method is used, the wet bulb and tank shall be cleaned and a new wick installed before starting the test. The air velocity flowing across the wet bulb shall be not less than 900 feet per minute. Provisions shall be made for controlling the flow of air throughout the internal chamber test space where the velocity of air shall not exceed 150 feet per minute. Steam or distilled, demineralized, or deionized water having a pH value between 6.0 and 7.2 degrees F at 73 degrees F shall be used to obtain the specified humidity. No rust or corrosive contaminants shall be imposed on the shelter by the test facility.

4.6.21 Rail transport.- The shelter, with payload (see 3.6) and secured to a railroad flatcar (the test flatcar), shall be impacted by a loaded gondola car. The test shall be performed on a straight and level stretch of track. The test flatcar with its timber blocking and shelter tiedowns (contractor furnished), shall be as specified in Figure 4 and shall meet the provisions of the test as specified in paragraph 4.6.21.1. The test flatcar (less the shelter) and two empty cars coupled to it shall each weigh 45,000 to 55,000 pounds. The loaded gondola car shall meet the provisions of the test as specified in paragraph 4.6.21.2 and shall have a total weight of 165,000 pounds. The loaded gondola car, traveling at $9 \pm 1/2$ miles per hour (or equivalent energy conditions acceptable to the government technical representative), shall be impacted against the stationary loaded test car coupled to the two empty cars, all with brakes off. All cars shall be equipped with standard travel draft gears. The test shall consist of four impacts, two from each end of the shelter. The tiedowns, blocking, and wedges holding the shelter in place shall be tight at the start of each run. If the blocking is torn loose or any of the tiedowns are broken during impact, the run shall be repeated. After each impact the shelter shall be examined for damage. The requirements of 3.4.11 and 3.6 .1.1 shall be met (see Table II, Table VI).

4.6.21.1 Test flatcar.- The wooden planking of the test flatcar bed shall be in good condition. All 6 x 6 inch and 8 x 8 inch blocking shall be secured to the bed of the flatcar using 10 inch spikes on 12 inch centers minimum. The 8 x 8 inch blocking along the door end and front end of the shelter shall be in contact against the towing eye caps and against the full width of the shelter

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between the caps as necessary to clear the towing shackles and rivet heads. This shall be accomplished by means of sawed notches. Oak wedges shall be installed between the towing eyes and the lumber to insure rigid support at these points. The blocking along the other sides of the shelter shall be in contact against the towing eye caps and along the full length of the shelter between the caps. The 4 x 4 inch and 2 x 4 inch blocking shall be nailed to the bed of the flatcar as shown in Figure 4. All other blocking shall be firmly nailed as shown in the figure. The 4 tiedowns shall each consist of 3/8 inch diameter 6 x 19, flexible steel, preformed wire rope (having a breakdown strength of 10,600 pounds minimum), a turnbuckle, two hooks, and thimbles and fasteners as required. The breaking strength of each tiedown shall be 9,000 pounds minimum. Before each impact, each tiedown shall be taut (600 - 800 pounds tension).

4.6.21.2 Loaded gondola car.— The load in the loaded gondola car shall be one of the following;

a. A course size of either coal, crushed stone, gravel, crushed concrete or metal scrap (other than sheet metal, metal shavings or other springy forms of metal).

b. Chunk, slab, block, or plate forms of the preceding acceptable materials, constrained to prevent shifting.

4.6.22 Drops.— The shelter, with payload (see 3.6), shall be subjected to 1 flat drop and 4 rotational drops as described below. All drops shall be in an environment with a temperature between 50 degrees F and 95 degrees F. The drops shall be performed in the following order: (a) flat drop, (b) impact at rear (door) end, (c) impact at front end, (d) impact at roadside, and (e) impact at curbside. (see 3.6.2, 4.5.2.3.1, Table II, Table VI).

4.6.22.1 Flat drop.— The shelter shall be lifted $18 \pm 1/4$ inches from the ground. Measurements shall be taken from the bottom of the skids at the 4 corners of the shelter. The range of the 4 measurements shall not exceed 1/4 inch.. The shelter shall be released and allowed to fall freely such that the skids impact onto a hard concrete surface. The requirements of 3.4.11 and 3.6.2 shall be met.

4.6.22.2 Rotational drops.— A 4 inch high (nominal) board shall be placed under the skid(s) at one edge of the shelter. The opposite edge of the shelter shall be lifted $18 \pm 1/4$ inches from the ground. Measurements shall be taken

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from the center of the bottom of the skid(s) at the 2 raised corners of the shelter. The range of the 2 measurements shall not exceed $1/4$ inch. The shelter shall be released and allowed to fall freely such that the skid(s) impacts onto a hard concrete surface. After all 4 rotational drops the requirements of 3.4.11 and 3.6.2 shall be met.

4.6.23 Towing simulated.-- The shelter shall be placed so that the outboard vertical face of the roadside skid is flush against a $1\ 1/4 + 1/8$ inch high face which is rigidly secured to the ground and which runs the full length of the skid. A 3,000 pound force shall be applied to each roadside towing eye. Each force shall be in a direction parallel to the ground and perpendicular to the side of the shelter. The shelter shall be restrained from sliding or rotating. The test shall be repeated on the curbside skid and towing eyes. In both cases the requirements of 3.4.11 and 3.6.3 shall be met (see Table II, Table VI).

4.6.24 Lifting and towing eyes.-- All lifting and towing eye tests shall be performed in an environment with a temperature between 50 degrees F and 95 degrees F (see 3.6.4)

4.6.24.1 Eye pulls.-- Each lifting and towing eye on the shelter shall be subjected to a tensile load 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 of eyes. All pulls shall be to 14,400 pounds. After all pulls the requirements of 3.4.11 and 3.6.4.1 shall be met (see Table II, Table V).

4.6.24.2 Eye casting hardness.-- The lifting and towing eye casting shall be prepared for test by obtaining the proper surface finish in a localized area near the center of the 2.50" dia boss as required for performing the Brinell Hardness Test. The casting hardness shall be tested utilizing a 10 MM ball and a 5,000 kilogram load. The requirements of 3.6.4.2 shall be met (see 4.5.1.10, Table I, Table III).

4.6.25 Air transport, simulated.-- The shelter shall be loaded with 17,500 pounds of water in a waterproof bag. The bag shall rest against the floor and sides of the shelter and against boards placed across the door opening. The shelter shall then be suspended by the 4 lifting eyes using the hold down assembly of 3.8.1 for a period of 30 minutes. The shelter shall be examined within 1 hour after removal of the load. The requirements of 3.4.11 and 3.6.1.2 shall be met (see Table II, Table VI).

4.6.26 Static door load.-- The shelter door shall be open to 90 degrees. A vertical load of 200 pounds shall be applied to the door at 36 inches from the hinge pivot line for 30 minutes. The requirements of 3.4.11 and 3.6.5 shall be

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met (see Table II, Table V).

4.6.27 Roof access steps.— One of the roof access steps on the shelter shall be randomly selected. A vertical load of 400 pounds shall be applied at the center of the opened outer section for a period of 30 seconds. The requirements of 3.4.11 and 3.6.6 shall be met (see Table II, Table V).

4.6.28 Light tightness.— The intake louver assembly, as installed in the shelter, with the emergency exit cover fully open, but with the air filter, SM-C-450466 removed, shall be tested for light tightness as follows: a bare, lighted 100 watt incandescent lamp shall be placed in a plate 1 foot from the outside louver surface. Regardless of the position of the lamp in the plane relative to the louver and the position of an observer in the darkened shelter interior, the requirement of 3.7.3 shall be met (see Table II, Table V).

4.6.29 Electromagnetic interference (EMI) suppression.— Modification Kit, Radio Frequency Interference, MK-1079()/G shall be installed on the shelter in accordance with DL-SC-A-621051. The shelter shall then be tested for EMI suppression in accordance with MIL-STD-285 and this paragraph. The requirements of 3.7.4 shall be met at each of the following conditions (see 4.5.2.3.2, Table II, Table VI):

- a. One frequency in the 150 to 200 KHz range for low impedance magnetic field.
- b. 0.2 MHz, 1.0 MHz, and 18.0 MHz for high impedance electric field.
- c. 400 MHz, 1000 MHz, and 10,000 MHz for plane waves.

4.6.30 Water tightness.— The shelter, without the use of any external sealing, caulking, taping, etc., except as called for on the drawing, shall be subjected to the following two-part test (see 3.4.5, 3.7.5, Table II, Table VI).

- a. Each of the five exposed surfaces of the shelter, with door and covers closed, shall be sprayed with water from nozzles, model G29SQ (or GG29SQ) as made by Spraying Systems Company, Bellwood, Illinois, or equal. Each end panel shall be tested using nine (9) nozzles, each side panel using fifteen (15) nozzles and the roof panel using six (6) nozzles; nozzle locations shall be in accordance with Figure 5. Each nozzle shall operate at a pressure of 40 psig at the nozzle. Each panel shall be sprayed continuously for a period of 40 minutes. (If the watertightness test is followed by the fording test of 4.6.31, the bottom row of nozzles can be eliminated with the exception of the nozzles facing the door end panel). Prior to the performance of the spraying, the door of the shelter shall be fully opened and closed so that the latching mechanism is completely engaged for a total of ten operations.

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b. The inlet louver shall be tested, with the door closed and the louver cover fully open, by spraying water at the door end panel. Five nozzles, as used in (a) above, shall be used; they shall be located in accordance with Figure 6. Each nozzle shall operate at a pressure of 15 psig at the nozzle. The panel shall be sprayed continuously for a period of 20 minutes. After both parts of this test, there shall be no evidence of leakage into the shelter or into the walls, floor, roof, or door. To determine that no water has entered space between the skids, holes shall be made (not less than four, not more than ten) at points to be determined by the Government at the time of testing and the shelter tilted to allow the water to run towards the hole. There shall be no evidence of water. After this determination, the holes shall be sealed with rivets and sealer.

4.6.31 Fording.— The shelter, as prepared for transportation on a military cargo truck, shall be immersed in water to a depth of 21 inches measured from the bottom of the shelter skids. No special fording kits shall be used in the performance of this test. No external caulking, taping, etc., shall be used except as called for on the drawings. The shelter shall be immersed and remain submerged for 1 hour, and shall be restrained by external tiedown. There shall be no evidence of leakage into the shelter, or into the walls, floor, or door. To determine that no water has entered space between the skin, holes shall be made (not less than four, not more than ten) at points to be determined by the Government at the time of testing and the shelter shall be tilted to allow the water to run towards the hole. There shall be no evidence of water. After this determination the holes shall be sealed with rivets and sealer (see 3.4.5, 3.7.6, 4.6.30, Table II, Table VI).

4.6.32 Hold down assembly.— Each of the 4 cable assemblies of the hold down assembly shall be subjected to a destructive tensile load. The cable shall fail before slippage occurs at the sleeves and at a load higher than that required by 3.8.1 (see 4.5.2.3.3, Table I, Table VI).

4.7 Quality conformance of packaging.— Packaging shall be inspected in accordance with MIL-S-55507. The requirements of 5.1 shall be met.

5. PACKAGING

5.1 Packaging requirements.— The packaging requirements shall be in accordance with MIL-S-55507 (see 4.7)

6. NOTES

6.1 Ordering data.— Procurement documents should specify the following:

a. Title, number, and date of this specification and any amendment thereto.

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b. When a first article is required for inspection and approval (see 3.2, 4.4, 6.2).

c. When electromagnetic interference suppression capability is required on all delivered shelters (see 3.4.1, 3.4.9.1, 6.3).

d. If facsimiles are required (see 3.4.9.1).

e. If the overall coefficient of heat transfer is required (see 3.5.3.2).

f. Marking and shipping of sample shelters.

g. Place of final inspection of production shelters.

h. Actions required relative to Group C failures and reinspection of conforming Group C samples units (see 6.4).

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 Definitions.—

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

6.4.2 Examination.— Examination consists of simple, generally nondestructive determinations of compliance, without use of special testing equipment.

6.4.3 Testing.— Testing consists of determinations of compliance, using technical means.

6.4.4 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

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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 3.4.4, 3.4.4.2).

6.4.5 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 3.4.4, 3.4.4.2).

6.5 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.

6.6 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.

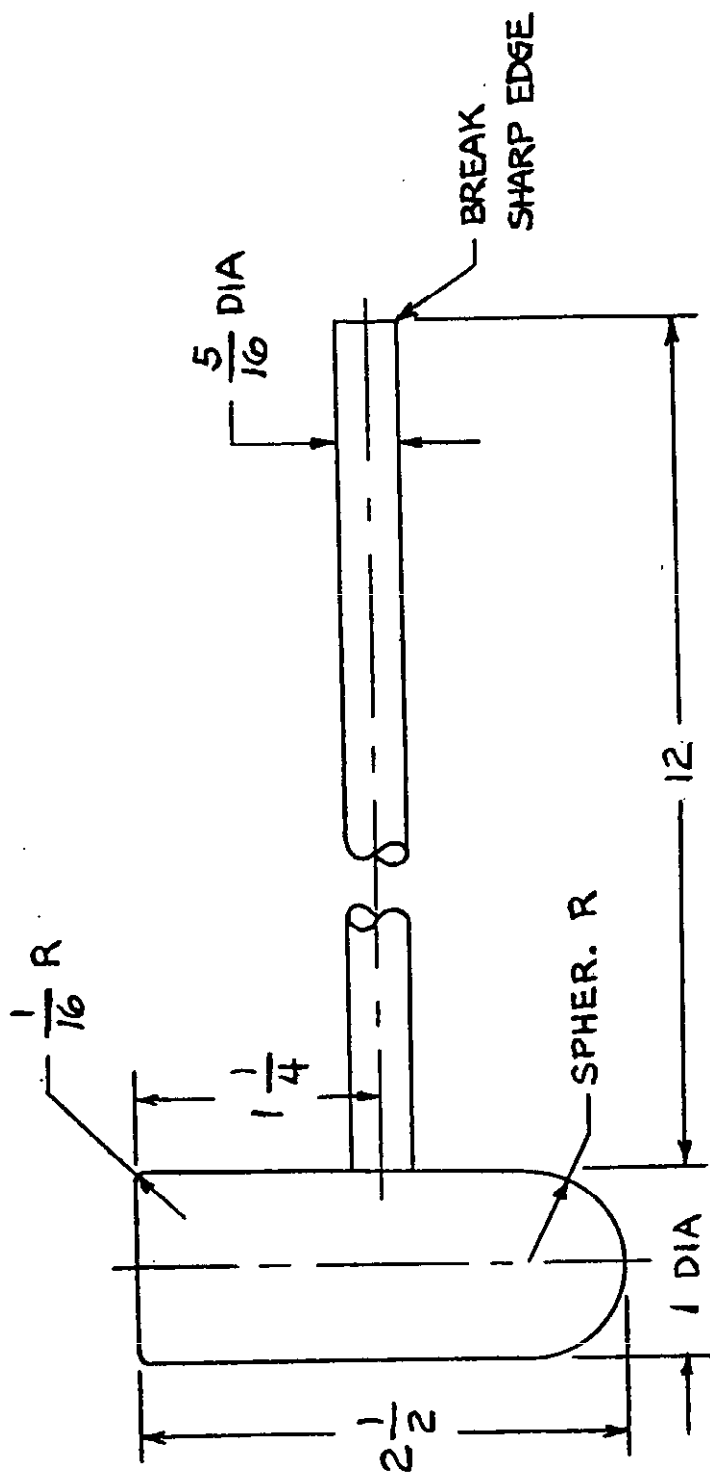
6.7 Specification revision.— Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

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Project No. A006

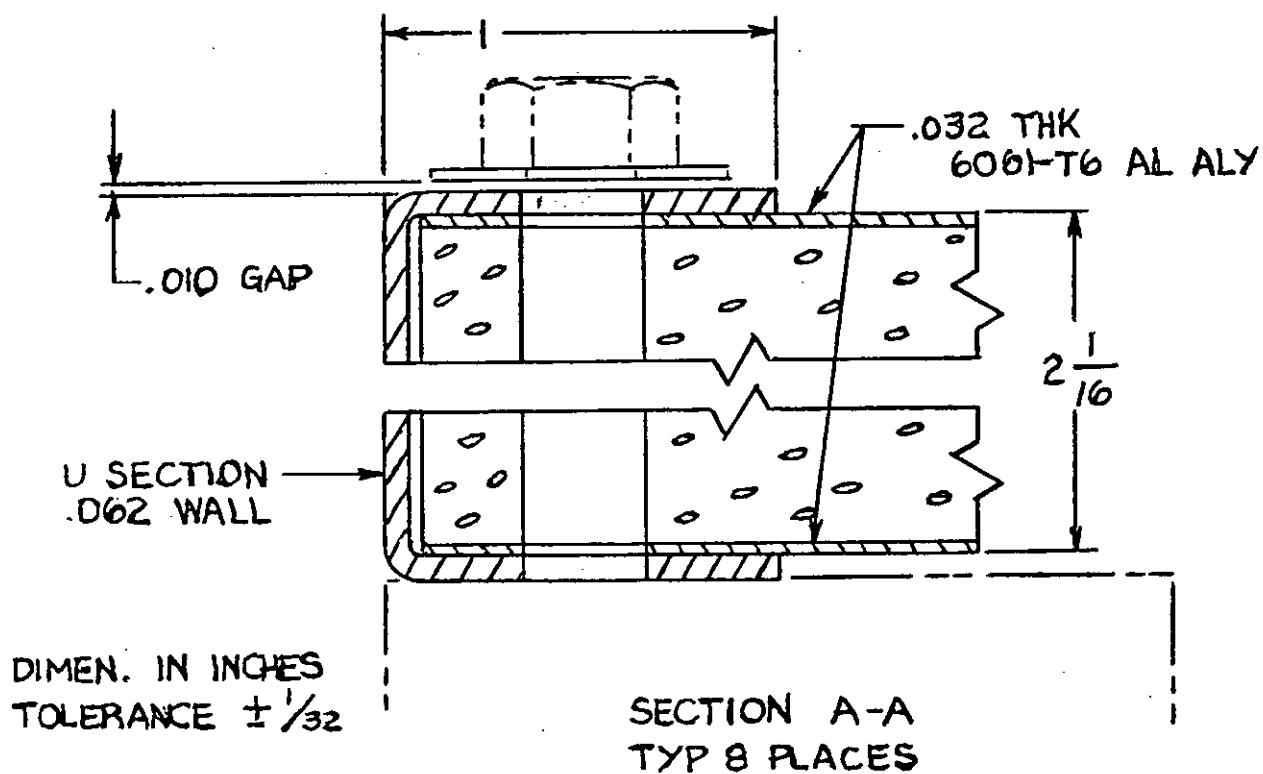
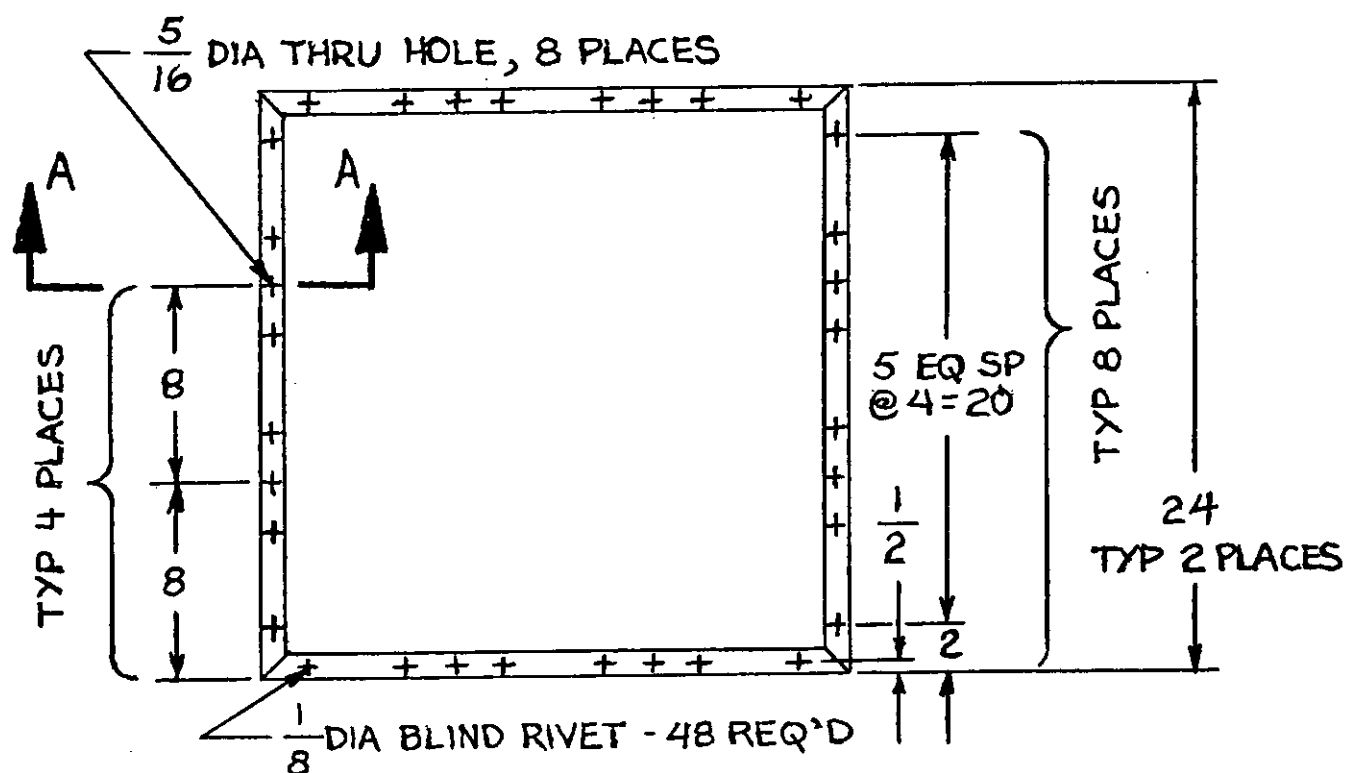
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DIMENSIONS IN INCHES
TOLERANCE : $\pm \frac{1}{32}$
MATERIAL : 6061-T6 AL ALY

FIGURE 1 . TAP HAMMER.

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FIGURE 2 . IMPACT RESISTANCE SPECIMEN.

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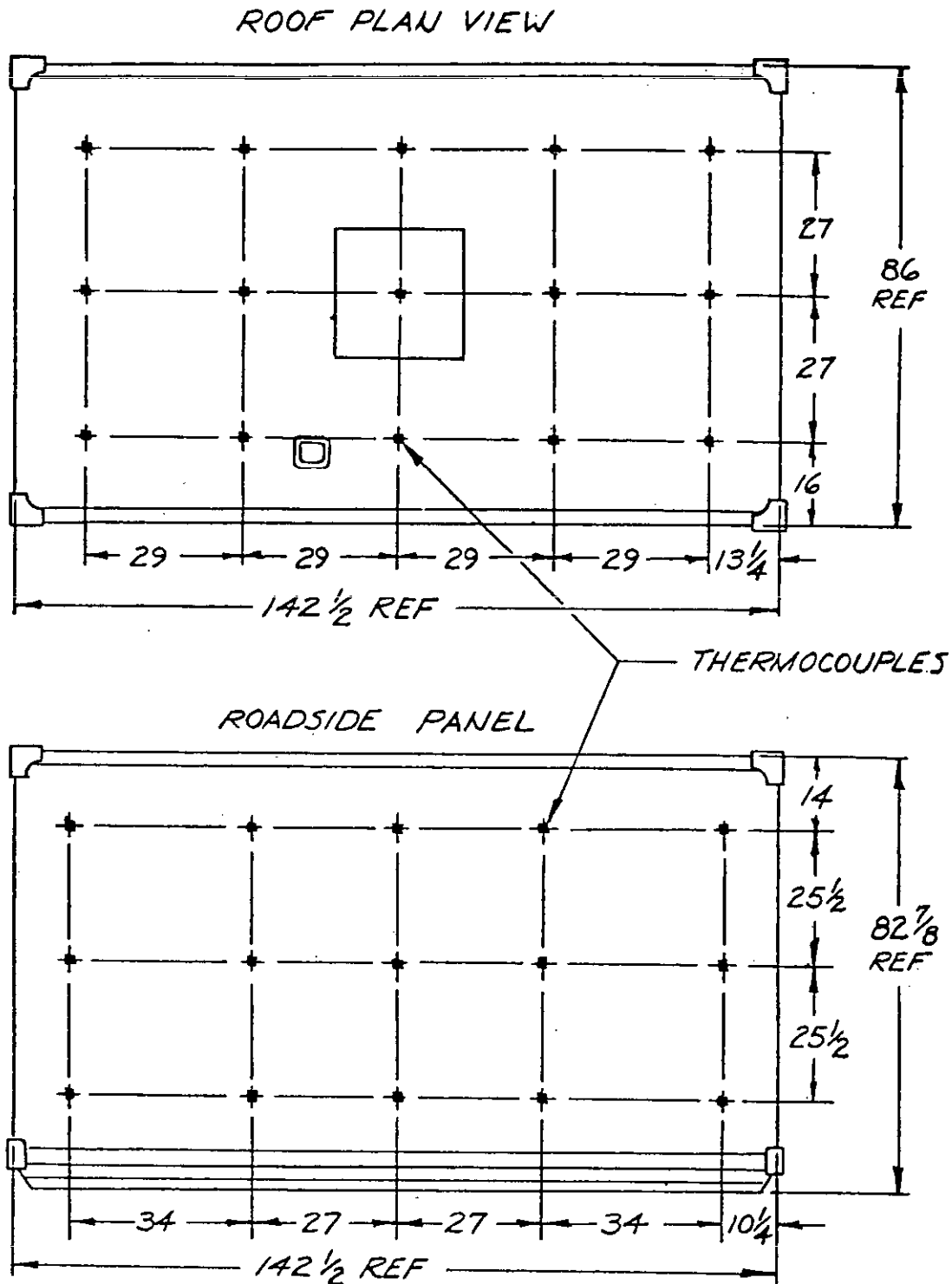


FIGURE 3 - THERMOCOUPLE LOCATIONS FOR SOLAR LOAD TESTS

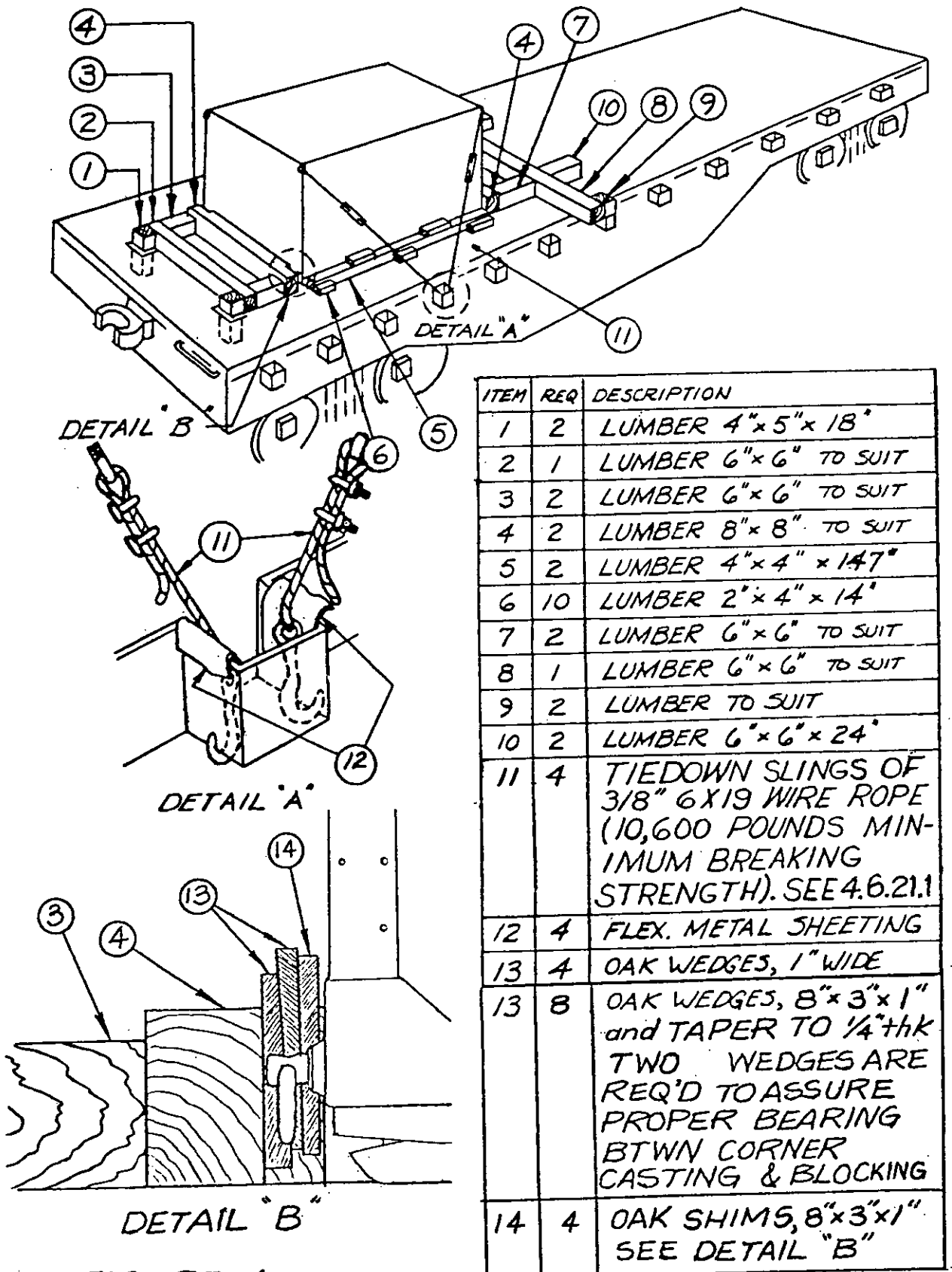
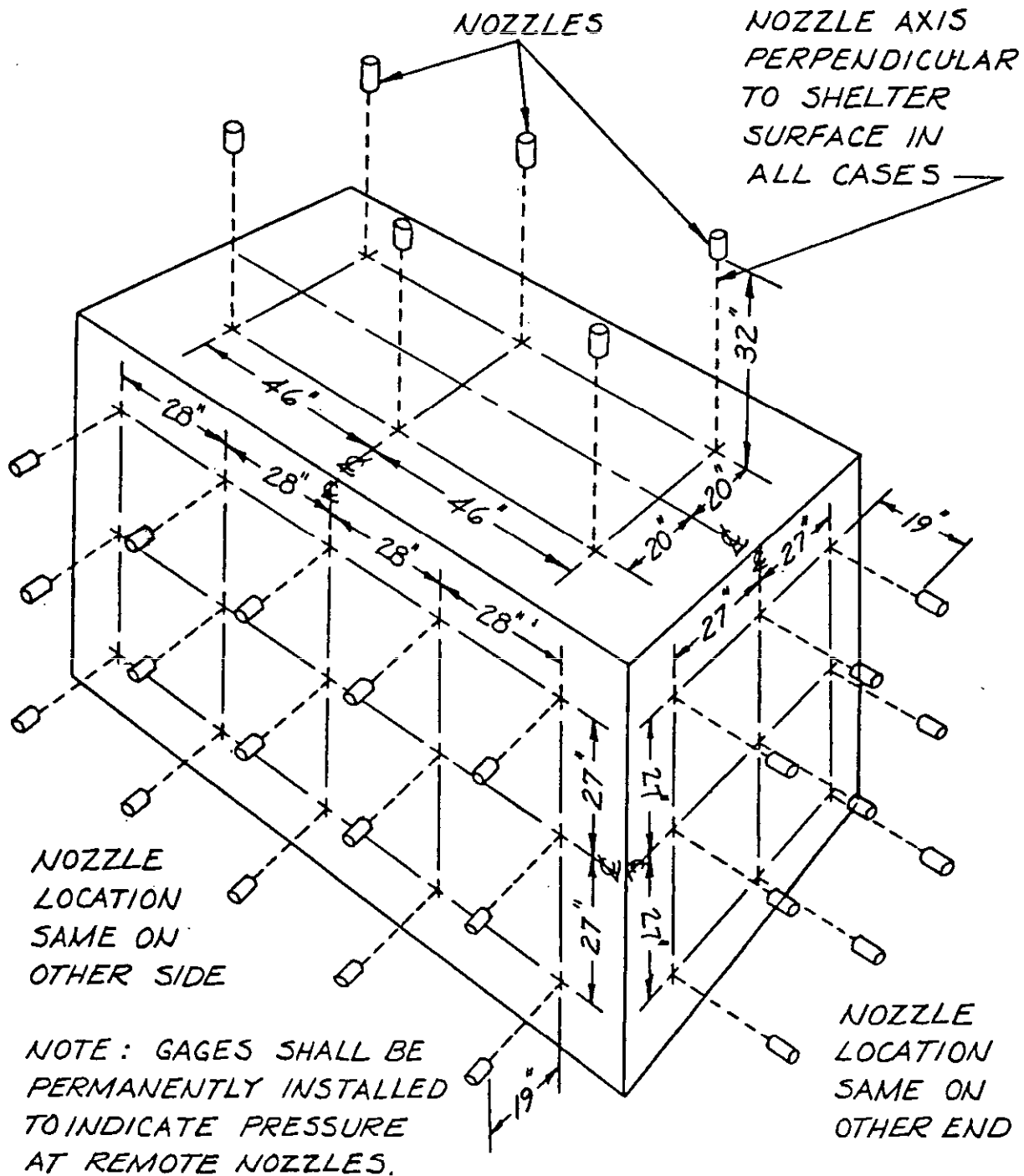
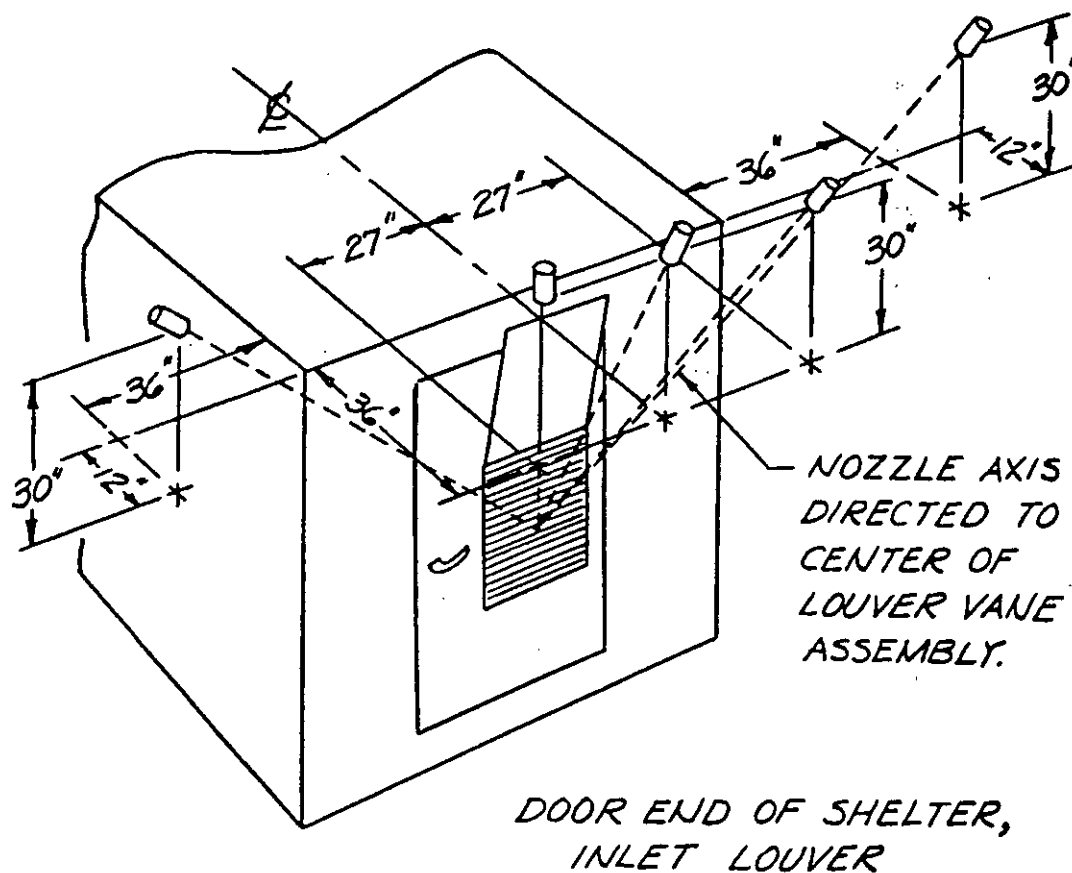


FIGURE 4 -
SHELTER SECURED ON FLATCAR

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**FIGURE 5 - NOZZLE LOCATIONS FOR
WATERTIGHTNESS TEST.**



NOTES:

1. GAGES SHALL BE PERMANENTLY INSTALLED TO INDICATE PRESSURE AT REMOTE NOZZLES.
2. AIR INLET COVER SHALL BE FULLY OPEN.

FIGURE 6 - NOZZLE LOCATIONS FOR
WATERTIGHTNESS TEST (b)

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