



# Standard Specification for Shelter, Electrical Equipment S-250/G<sup>1</sup>

This standard is issued under the fixed designation E1974; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

*This standard has been approved for use by agencies of the Department of Defense.*

## 1. Scope

1.1 This specification covers one type of lightweight field and mobile rigid wall shelter designed for transport by cargo truck, fixed or rotary winged aircraft, by rail, and ship, designated as Shelter, Electrical Equipment S-250/G.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 The following safety hazards caveat refers only to the test methods portion of this specification. *This standard does not purport to address the safety concerns, if any, associated with its use. It is the responsibility of the user of the standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

- C273 Test Method for Shear Properties of Sandwich Core Materials
- D1621 Test Method for Compressive Properties of Rigid Cellular Plastics
- D1622 Test Method for Apparent Density of Rigid Cellular Plastics
- D2842 Test Method for Water Absorption of Rigid Cellular Plastics
- E1370 Guide for Air Sampling Strategies for Worker and Workplace Protection
- E1749 Terminology Relating to Rigid Wall Relocatable Shelters
- E1773 Practice for Sealing Rigid Wall Tactical Shelters with Polysulfide Based Sealants

- E1800 Specification for Adhesive for Bonding Foam Cored Sandwich Panels (160°F Elevated Humidity Service), Type I Panels
- E1801 Practice for Adhesive Bonding of Aluminum Facings in Foam and Beam Type Shelters
- E1851 Test Method for Electromagnetic Shielding Effectiveness of Durable Rigid Wall Relocatable Structures
- E1925 Specification for Engineering and Design Criteria for Rigid Wall Relocatable Structures
- 2.2 Commercial Standards:<sup>3</sup>
  - SAE AMS-W-6858 Welding, Resistance: Spot and Seam
- 2.3 Federal Air Regulation (FAR):<sup>4</sup>
  - FAR 25.853 Compartment Interior
- 2.4 Military Standards:<sup>5</sup>
  - MIL-F-14072 Finishes for Ground Based Electronic Equipment
  - MIL-DTL-55507 Shelter, Electrical Equipment (With or Without Equipment), Packaging of
  - MIL-STD-252 Wired Equipment, Classification of Visual and Mechanical Defects
  - MIL-STD-810 Environmental Engineering Considerations and Laboratory Tests
  - MIL-STD-2219 Fusion Welding for Aerospace Applications
  - MIL-STD-13231 Marking of Electronic Items
- 2.5 Drawings:<sup>6</sup>
  - DL-SM-B-563500 Shelter, Electrical Equipment, S-250/G
  - DL-SM-B-649950 Modification 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 Keeper
  - SM-C-435937 Nameplate
  - SM-B-563559 Adhesive

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.53 on Materials and Processes for Durable Rigidwall Relocatable Structures.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from AMS Publications, Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, <http://www.sae.org>.

<sup>4</sup> Available from Flight Standards Service, Federal Aviation Administration (FAA), 800 Independence Ave., SW, Washington, DC 20591, <http://www.faa.gov>.

<sup>5</sup> Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://www.dodssp.daps.mil>.

<sup>6</sup> Available from US Army Natick Soldier Center, ATTN: AMSRD-NSC-CP-CS, Kansas Street, Natick, MA 01760-5018.

[SM-B-563655](#) Foam, Rigid, Plastic  
[SM-D-563754](#) Diagram, Flatness and Squareness  
[SM-C-564839](#) Gasket, Silicone  
[SC-C-595537](#) Padlock and Key  
[SC-B-595538](#) Bonding Procedure  
[SC-B-595539](#) Cleaning Procedure  
[SC-B-595564](#) Core Material Urethane, Light  
[SC-B-595565](#) Core Material Urethane, Heavy  
[SM-D-649951](#) Modification Kit EMI MK-1092/G  
[SM-D-649952](#) Sling Assembly  
[SM-D-649953](#) Shelter, Electrical Equipment S-250/G  
[SM-C-650082](#) Skid Assembly  
[SM-D-650085](#) Test Weight Installation  
[SM-C-650125](#) Nameplate  
[SC-D-781228](#) Door Fixture Construction Tightness Test  
[SC-D-781235](#) Drain, Fixture, Construction Tightness Test  
[SC-D-781236](#) Test Fixture Installation Construction Tightness Test  
[SC-B-964240](#) Nameplate, S-250 Shelter (With Rivnuts)

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *delaminations*—for 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.

3.1.2 *examination*—examination consists of simple, generally nondestructive determinations of compliance, without the use of special testing equipment.

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

3.1.4 *testing*—testing consists of determinations of compliance using technical means.

3.1.5 *voids*—for the purpose of this specification, a void is defined as any unauthorized separation or space within a shelter panel or section, that is, 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.

NOTE 1—All other terminology related to this specification is defined in Terminology [E1749](#).

### 4. Materials Requirements

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

4.2 *Adhesive*—The adhesive used to laminate in accordance [5.2](#) shall meet the requirements of Specification [E1800](#) and the physical properties required by Drawing [SM-B-563559](#) when tested in accordance with [10.1](#).

4.3 *Sealer*—The sealer, when tested in accordance with [10.1](#), used to meet the requirements of [5.3](#), shall have the following properties:

4.3.1 *Sealer Shear, Ambient*—The sealer and its bond to the aluminum shall have a minimum average shear strength of 200 psi (1.4 MPa) when tested at  $80 \pm 10^\circ\text{F}$  ( $27 \pm 6^\circ\text{C}$ ).

4.3.2 *Sealer Shear, Temperature Extreme*—The sealer and its bond to the aluminum shall have a minimum average shear strength of:

4.3.2.1 200 psi (1.4 MPa) when tested at  $-65 \pm 5^\circ\text{F}$  ( $-54 \pm 3^\circ\text{C}$ ), and

4.3.2.2 75 psi (520 KPa) when tested at  $200 + 0 - 5^\circ\text{F}$  ( $93 + 0 - 3^\circ\text{C}$ )

4.3.3 *Sealer Shear, Humidity Exposure*—The sealer and its bond to the aluminum shall withstand exposure to 95 % relative humidity  $\pm 5\%$  at  $160 \pm 5^\circ\text{F}$  ( $71 \pm 3^\circ\text{C}$ ) for fourteen days. After exposure the sealer shall have a minimum average shear strength of 75 psi (520 kPa) when tested at  $160 \pm 5^\circ\text{F}$  ( $71 \pm 3^\circ\text{C}$ ).

4.3.4 *Sealer Shear, Salt Spray Exposure*—The sealer and its bond to the aluminum shall withstand exposure to the salt spray test, Method 509.4 of MIL-STD-810F using a 20 % NaCl solution at  $95 \pm 5^\circ\text{F}$  ( $35 \pm 3^\circ\text{C}$ ) for fourteen days. After exposure the sealer shall have a minimum average shear strength of 200 psi (1.4 MPa) when tested at  $80 \pm 10^\circ\text{F}$  ( $27 \pm 6^\circ\text{C}$ ).

4.4 *Core Material*—The core material shall be a slab type foamed plastic. All three densities shall be used in the shelter. Disbursement within the shelter shall be in accordance with Specification [E1370](#) and the drawings listed on [DL-SM-B-563500](#). Density, compressive strength, flammability, water absorption, and shear strength properties shall be in accordance with Drawings [SC-B-595564](#), [SC-B-595565](#), and [SM-B-563655](#), as applicable when tested in accordance with [10.2](#).

### 5. Construction Requirements

5.1 *General*—All parts, sub-assemblies, and the final assembly of Shelter, Electrical Equipment, S-250/G shall be constructed as specified herein and in accordance with the drawings listed on [DL-SM-B-563500](#) or [DL-SM-B-650123](#) when electromagnetic interference suppression is required (see [15.2](#)). Shelters shall not be fork lifted at anytime during or after construction.

5.2 *Lamination*—During the laminating (bonding) process the mating of all panel constituents shall be bonded without

delaminations, that is, discontinuation in, or separation between the constituents. Bonding shall be in accordance with Practice E1801 and 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 Fig. 1. The shelter may be considered acceptable if it contains less than twelve distinctly individual delaminations or unbond type voids, provided none is greater than 2 in. (50 mm) across measured in any direction, and provided the shelter meets all other requirements.

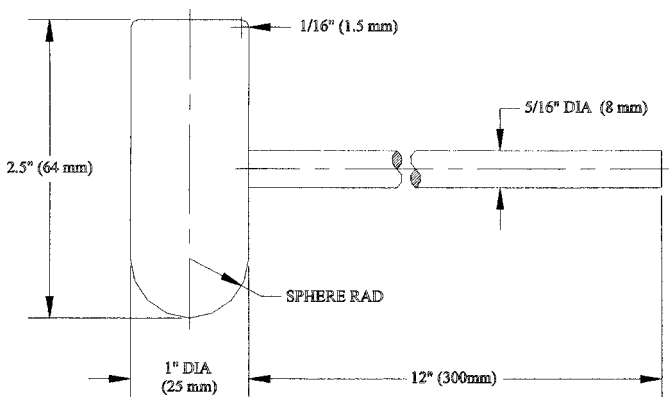
5.3 *Seal*—All inner and outer skins, joints, edges, and hardware shall be sealed in a manner that will prevent collection and retention of water and provide a barrier against the entrance of water into any panel or the interior of the shelter. Unless otherwise specified on the shelter drawings, all exterior rivets, rivnuts, screws, and bolts shall be dipped in sealer prior to installation and the heads of rivets shall be covered with sealant after installation. (See Practice E1773).

5.4 *Cleaning*—All metal parts shall be cleaned at that stage of assembly indicated on the applicable drawing listed on DL-SM-B-563500 or DL-SM-B-650123, by a process in accordance with Practice E1773 and Drawing SC-B-595539 or as specified in the applicable portion of MIL-F-14072. All foam and wood parts shall be cleaned in accordance with the applicable portions of Practice E1801 and Drawing SC-B-595538.

5.5 *Welding*—Arc and spot welding shall be applied as specified by the drawings. No grinding of welds shall be required except as specified by the drawings. The purchaser reserves the right to perform any of the inspections where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

5.5.1 *Arc Welding*—Inert gas shielded arc welding shall be in accordance with MIL-STD-2219.

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



NOTE 1—Material—Aluminum 6061-T6 or equivalent.

NOTE 2—Tolerance— $\pm 1/32$  (1 mm).

FIG. 1 Tap Hammer

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

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

5.6 *Riveting*—No more than one rivet/rivnut in ten and no more than two adjacent rivets/rivnuts shall exhibit any of the defects specified below, when inspected as specified in 10.6.

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

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

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

5.7 *Hardware*—All locks, latches, hinges, hinge pins, fasteners, bolts lifting and towing eyes, steps and other shelter hardware shall be made corrosion resistant in accordance with the applicable drawings listed on DL-SM-B-563500 or DL-SM-B-650123. The hardware shall be subjected to the test of 10.7 and shall show no evidence of corrosion or damage which in any way impairs the specified performance of the individual part.

5.7.1 *Padlocks and Keys*—All padlocks and keys shall be in accordance with SC-C-595537 and shall be interchangeable to the extent determined by 10.10.

5.8 *Finish Protective*—Protective finishes shall be in accordance with the applicable drawings listed on DL-SM-B-563500 or DL-SM-B-650123 and shall be free of the defects cited in the classification of visual finish defects of MIL-F-14072 when inspected as specified in 10.8 and 10.12.

5.9 *Marking*—Member centerline, punch marks, nameplates, instruction and data plates, and other markings shall be in accordance with MIL-STD-13231 and the applicable drawings listed on DL-SM-B-563500 or DL-SM-B-650123. Marking shall be inspected as specified in 10.9 and 10.12.

5.10 *Interchangeability*—Like units, subassemblies, assemblies and replaceable parts shall be physically and functionally interchangeable without modification of such items or of the shelter. Dimensions shall be within the limits specified on the applicable drawings listed on DL-SM-B-563500 or DL-SM-B-650123. Reliance shall not be placed on any unspecified dimension, rating, characteristic, etc. Individual items shall not be hand picked for fit or performance. To determine compliance with this requirement the items listed in 10.10 shall be measured and shall be in accordance with the dimensions and tolerances specified on the applicable drawings.

5.11 *Facsimiles*—When specified (see 15.2), the contractor shall provide facsimiles of the nameplate and all data and instruction plates required by DL-SM-B-563500 and DL-SM-B-650123. Each facsimile shall be in accordance with its drawing and shall include any and all information required to be inserted, except shelter serial number. Artwork shall be of a quality at least comparable to the drawings.

5.12 *Shelter Weight*—When inspected as specified in 10.12 and 10.13, the gross weight of the shelter, excluding the lift and tie-down device, (Drawing SM-D-649952) shall be as follows:

5.12.1 770 ± 20 lb (350 ± 9kg) without Mod Kit, EMI, MK-1092/G, and

5.12.2 782 ± 20 lb (355 ± 9 kg) with Mod Kit, EMI, MK-1092/G installed.

5.12.3 *Records*—Records shall be maintained of Serial numbers and actual weight of shelters and shall indicate if EMI Kit MK-1092/G is installed.

5.13 *Service Integrity*—Unless otherwise specified, tests specified herein shall not result in any discontinuity in the bond between the aluminum, foam, or wood thermal barriers, or all of these (that is, a delamination), or in any bulking, splitting, or any other deformation or structural weakening, or both of the shelter. The seal of 5.3 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 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.

## 6. Environmental Requirements

6.1 *General*—The shelter shall be capable of meeting the following environmental test requirements with no harmful effect to any finish or performance capability (see 5.13).

6.2 *Moisture Resistance*—The shelter shall withstand daily exposure of up to 97 % relative humidity for 20 h and exposure at 100 % relative humidity (with condensation) for 4 h when tested as specified in 10.7.

6.3 *Temperature*—The shelter shall be capable of withstanding the following operating temperatures when tested as specified in 10.14:

6.3.1 *Operating Temperature*—Exposure to an ambient temperature in the range of –65 to 125°F (–54 to 52°C) plus a solar load such that the outside skin reaches a minimum temperature of 195°F (90°C); exposure at any one time not to exceed 75 h at the low temperature extreme and 4 h at the high temperature extreme.

6.3.2 *Non-Operating Temperature*—Exposure to an ambient temperature in the range of –80 to 160°F (–62 to 71°C); exposure at any one time not to exceed 24 h at the low temperature extreme and 4 h at the high temperature extreme.

6.4 *Heat Transfer*—The thermal characteristics of the shelter shall be such that the overall coefficient of heat transfer of the shelter shall not exceed 0.50 BTUs per hour per square foot per degree Fahrenheit (2.9 Watts per square metre per degree Kelvin) when tested accordance with 10.15.

## 7. Structural Integrity Requirements

7.1 *General*—The shelter shall be capable of complying with the requirements of 7.2-7.6. When a payload is required, 1900 lb (860 kg) in accordance with Drawing SM-D-650085 shall be used. The requirements of 5.13 are applicable to all tests.

7.2 *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:

7.2.1 *Rail Transport*—The shelter, with payload, shall be capable of being transported by railroad. Compliance with 10.16 shall constitute compliance with this requirement.

7.2.2 *Lift Transport Simulated*—The shelter, with payload, shall be capable of being suspended by its lifting eyes and exposed to 3.5 g’s acceleration. Compliance with 10.17 shall constitute compliance with this requirement.

7.3 *Drop*—The shelter, with payload, shall be capable of being dropped as specified in 10.18. Every shelter subjected to drop tests shall be shipped only to a depot and shall have its nameplate “S-250 Shelter” (with rivnuts) in accordance with Drawing SC-B-964240 attached with rivets over the shelter nameplate, Drawing SM-C-435937 (SM-C-650125 if shielded) prior to shipment. Shipping document annotated (FOR DEPOT USE ONLY).

7.4 *Towing Simulated*—The shelter, with payload, shall withstand a force of a least 2000lb (900 kg) applied to each of the skid assemblies, and their attachment to the shelter, as specified in 10.19.

7.5 *Lifting and Towing Eye Assembly*—Each lifting and towing eye assembly, as attached to the shelter, shall withstand a minimum load of 5000 lb (2270 kg) applied in accordance with 10.20.

7.6 *Steps, Roof Access*—Each of the two recessed folding steps installed to provide access to the shelter roof shall withstand a load of 400 lb (180 kg) applied in accordance with 10.21.

## 8. Tightness Requirements

8.1 *General*—The shelter shall be capable of complying with the following:

8.2 *Torque, Door Latches*—Torques shall be measured as specified on Drawings SM-D-649951 and SM-D-649953 and shall be as specified in 10.22.

8.3 *Electromagnetic Interference (EMI) Shielding*—The shelter shall be capable of being shielded from electromagnetic interference (EMI) 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 a minimum attenuation of radiated and induced EMI fields as specified in Specification E1925 within the frequency range of 100 kHz to 10 Ghz when tested in accordance with 10.23. Should a shelter subjected to the EMI test fail to pass, another shelter from the same lot shall be subjected to the EMI test.

8.4 *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 10.24.

8.5 *Watertightness*—The shelter shall be watertight when tested in accordance with 10.25. Shelter weight after testing shall be as specified in 5.12 after allowing 2 lb (1 kg) for the test weight mounting hardware of Drawing SM-D-650085, if applicable.

8.6 *Fording*—The shelter, without the use of special fording kits, shall be capable of being immersed in water to a depth of 30 in. (760 mm), as measured from the bottom of the shelter skids, with no failure of the seal specified in 5.3 or damage to the structure when tested and inspected as specified in 10.26. Shelter weight after testing shall be as specified in 5.12 after allowing 2 lb (1 kg) for the test weight mounting hardware of Drawing SM-D-650085 if applicable.

8.7 *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 10.27.

## 9. Other Requirements

9.1 *First Article*—When specified (see 15.2), a sample shall be subjected to first article inspection (see 15.3) in accordance with 11.1.

9.2 *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 a tensile load of 9500 lb (4300 kg) as specified on the drawing and shall fail before slippage occurs at the sling sleeves when tested as specified in 10.28.

9.3 *Impact Panel*—The shelter panels shall withstand the test of 10.29. After the test, the panel shall be cross sectioned through the impact area and examined. Impact shall not result in rupture to either skin. No delaminations between skin and core or crushing of core is allowed outside a 3 in. (75 mm) radius from the center of impact.

9.4 *Fabrication and Assembly*—Samples (see 10.1.1) shall be assembled using parts, materials (and their amounts), and processes that will be employed in production, be fabricated and assembled in accordance with the specification, and meet all requirements specified herein.

9.5 *Workmanship*—The shelter shall be manufactured with the degree of workmanship normally considered appropriate for each of the areas listed under 5.0 (see 10.12).

## 10. Tests Required

10.1 *Coupon Samples*—Fabricate coupon samples for both adhesive and sealer tests in accordance with the physical properties paragraph of Drawing SM-B-563559. Ten coupons are required for each of the five conditions for first article samples. Five coupons are required for each of the test conditions for production inspection.

10.1.1 *Comparability of Fabrication and Cure*—Fabricate samples and cure using materials, processes, and conditions compatible with those used on panels or shelters, or both, including:

10.1.1.1 Surface conditions of and method of preparing materials to be bonded,

10.1.1.2 Same batch and type of material,

10.1.1.3 Duration of, temperature, and pressure during cure,

10.1.1.4 Minimum cure time before handling, and

10.1.1.5 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. Verify two or more part mixes of adhesive or sealer, or both, as being in accordance with the manufacturer's recommendations before shear tests and range on coupons. Calibrate automatic dispensing machines, when used to mix or deliver, or both, two or more part adhesive or sealer, or both, at least once every 4 h. Cure sealer coupons at ambient temperature and the lap joint shall be under a pressure of approximately 5 psi (34 KPa).

10.1.2 *Shear Strength Tests*—Test coupons after being subjected to the specified exposure, if applicable, and at the specified temperature. Stabilize the temperature of the coupons at the specified level and measure by a thermocouple attached to the coupons over the lap joint. The thermocouple shall not be attached on that side of the lap joint closest to the heat or cold source nor shall the method of attachment impair the application or measurement of the shear force in any way. Apply the shear force to destruction with the rate of application constant at less than or equal to 1 in./min (25 mm/min). Any noncompliance with 4.2 for adhesive and 4.3 for sealer shall constitute failure of this test.

10.2 *Core Material Tests*—Subject core material samples 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. Fabricate specimens from actual shelter core material pieces randomly selected from production core material parts. Specimen dimensions shall be within  $\pm 0.015$  in. ( $\pm 0.40$  mm). Except for flammability, compliance with 4.4 shall be determined by the average of the specimen results, with the lowest result no less than 90 % of the required value. Failure to meet the requirements of 4.4 shall constitute failure of this test.

10.2.1 *Apparent Density, Core Material*—Test five specimens, each 2 by 3 by 3 in. (50 by 75 by 75 mm) in accordance with Test Method D1622.

10.2.2 *Compressive Strength, Core Material*—Test five specimens each 2 by 3 by 3 in. (50 by 75 by 75 mm) in accordance with Procedure A of Test Method D1621, with the load applied to the 3 by 3 in. (75 by 75 mm) faces.

10.2.3 *Flammability*—Determine flame resistance of the five specimens, each  $\frac{1}{2}$  by 2 by 6 in. (13 by 50 by 150 mm), in accordance with Appendix F of FAR 25.853. The average extinguish time shall not exceed 15 s and average burn distance shall not exceed 6 in. (150 mm).

10.2.4 *Water Absorption*—Test three specimens, each 6 by 6 by 3 in. (150 by 150 by 75 mm) in accordance with Test Method D2842 with the following changes: weigh each specimen as it is first submerged; the weighing jig shall also be weighed at this time; for the final weight, the specimens must

**TABLE 1 First Article Specimens**

Inspection	Quantity	Requirements	Test
		Subsection	Subsection
Adhesive	50 coupons	4.2	10.1
Sealer	50 coupons	4.3	10.1
Core material:			
Density	5 for every grade or type	4.4	10.2.1
Compressive strength	5 for every grade or type	4.4	10.2.2
Flammability	5 for every grade or type	4.4	10.2.3
Water absorption	3 for every grade or type of urethane	4.4	10.2.4
Shear strength	5 for every grade or type	4.4	10.2.5
Lift and tie down device	1 complete	9.2	10.28
Impact panel	1 for every type core	9.3	10.29

be weighed and removed from the water in reverse order, the water absorption shall be calculated as follows: (see [Table 1](#)):

$$\text{lb water/ft}^2 = (W_{2a} - W_{1a}) - (W_2 - W_3)/A \times 2.048 \text{ lb/ft}^2/\text{g/cm}^2(1)$$

where:

- $W_{1a}$  = initial submerged weight of jig and samples (gm)
- $W_{2a}$  = initial submerged weight of jig (gm),
- $W_2$  = final submerged weight of jig (gm),
- $W_3$  = final submerged weight of jig and samples (gm), and
- $A$  = specimen surface area ( $\text{cm}^2$ ).

**10.2.5 Shear Strength**—Test five specimens, each 1/2 by 1 1/2 by 6 in. (13 by 38 by 150 mm) in accordance with Test Method [C273](#), except that the load shall be applied at a constant rate such that the maximum load will occur in one minute or more.

**10.3 Delamination Testing and Repair**—Individual panels and shelters shall be tested for delaminations by use of the tap hammer (see [Fig. 1](#)). Accomplish detection by tapping with the spherical end with a force equal to that produced when the head is raised approximately 1 in. (25 mm) 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. Use the flat end of the hammer for tapping into corners. The extent of interrogation of each side of each panel shall be at least four hammer impacts per square foot of panel area between members and at least four hammer impacts per square foot over members on the interior side of the panel. Once a suspect area has been located, interrogate said area in detail by at least one hammer impact per inch in all directions. The delamination boundaries shall be marked as the point of acoustic change (deadening) plus 1/2 in. (13 mm). Failure to meet the requirements of [5.2](#) shall constitute failure of this test.

**10.3.1 Disposition of Delaminated Panels**—Reject all delaminated panels found before assembly into shelter form. Limit the number of rejected panels per calendar month 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 purchaser.

**10.3.2 Disposition of Shelters Containing Delaminated Panels**—Reject all shelters found to contain delaminated panels. Limit the number of rejected shelters per calendar month 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, that is, before or after use in the shelter. Shelters not complying with these limitations shall only be accepted by written approval of the purchaser. Maintain a record of the shelters containing a repaired panel, including which panel, location, and extent, and report as required elsewhere in the contract.

**10.3.3 Condition of Shelter Exterior Skins**—The exterior skin of the shelter panels may contain dents between structural members provided the skin is not punctured and provided the maximum depth of the dent does not exceed 1/16 in. (1.5 mm) and no more than one shelter in ten contains one dent not exceeding 1/8 in. (3 mm) in depth.

#### 10.3.4 Delamination Repair:

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

**10.3.4.2 The maximum area of any single delamination and the maximum number of single delaminations per panel allowed is stated in [5.2](#).** Multiple delaminations on a panel shall be separated by a structural member in order for that panel to be considered eligible for repair. A delamination on the interior side of a panel and another delamination on the exterior side of the same panel and with both delaminations being between the same two members shall not be considered separated.

**10.4 Cleaning Inspection**—Inspection of the cleaning process shall be in accordance with Practice [E1773](#) and SC-B-595539. Any noncompliance shall require re-cleaning of the parts processed since the last acceptable inspection.

**10.5 Welding Inspection**—Visually inspect arc welding in accordance with the requirements of maintenance sampling for production in accordance with MIL-STD-2219. For resistance welding, fabrication and inspection of production specimens and inspection of production parts shall be in accordance with SAE AMS-W-6858. Failure to meet the requirements of [5.5](#), with sub-paragraphs, shall constitute failure of this test.

**10.6 Riveting Inspection**—Examine riveted joints or rivnuts for tightness, the joined parts for damage, and for the rivet/rivnut heads to be properly seated and tight against their bearing surfaces. Replace rivets/rivnuts not meeting the requirements of [5.6](#) with properly installed rivets/rivnuts and then reinspect as specified above.

**10.7 Moisture Resistance Test**—Subject the shelter with doors open to the moisture resistance test of MIL-STD-810E, Method 507.3, Procedure II. After cycling has been completed, there shall be no evidence of delamination, cracking, corrosion, or deterioration to any part of the shelter and there shall be no

malfunction of doors, latches, hinges, or any other hardware. Failure to meet the requirements of 5.7 and 6.2 shall constitute failure of this test.

10.8 *Finish Inspection*—Inspect finish in accordance with the quality assurance provisions of MIL-F-14072 including paint adhesion, and 10.12 of this specification. Failure to meet the requirements of 5.8 shall constitute failure of this test.

10.9 *Marking Inspection*—Visually inspect marking to determine compliance with 5.9. Failure to meet the requirements of 5.9 shall constitute failure of this test.

10.10 *Interchangeability Inspection*—Gauge or measure the dimensions listed below to determine compliance with the physical interchangeability requirements of 5.10. When a dimension is not within specified or design limits, it shall be considered a defect:

- 10.10.1 Dimension of doors and door openings,
- 10.10.2 Mounting dimensions of hinges and latches,
- 10.10.3 Size and mounting dimensions of skids,
- 10.10.4 Size and mounting dimensions of towing eyes,
- 10.10.5 Size and mounting dimensions of lifting eyes,
- 10.10.6 Dimensions of drain and drain plug, and
- 10.10.7 Check padlocks and keys for proper operation.

Keys (four) shall be checked against at least three different padlocks.

10.11 *Dimensional Inspection*—Inspect the shelters and panels for conformance with the drawings in the following areas (see Footnotes A and B of Table 2):

- 10.11.1 Items listed in Table 2,
- 10.11.2 Interior and exterior dimensions,
- 10.11.3 Location and visibility of punch marks for mounting members. Verify location at the individual panel stage of fabrication, and
- 10.11.4 Verify locations of holes on painted interior shelter panel surfaces at the shelter assembled stage of fabrication.

**TABLE 2 Dimensional Inspection**

Inspection	Drawing	Flatness Required
Frame flatness <sup>A</sup>		Within 0.03 in. <i>Torque required:</i>
Door handle torque	SM-D-649953	Small door 10 ft-lb (14 j) Large door 15 ft-lb (20 j)
Door handle torque (Shielded shelter)	SM-D-649951	Small door 20 ft-lb (27 j) Large door 25 ft-lb (34 j)
		<i>Deviation allowed:</i>
Shelter flatness <sup>B, C</sup>	SM-D-563754	3 out of 36 <sup>D</sup>
Shelter squareness <sup>B, C</sup>	SM-D-563754	6 out of 36 <sup>EF</sup>

<sup>A</sup>Flatness of doors and openings at gasket and contact surfaces. This shall be inspected by checking the flatness of the four sides and the flatness at the corners using a straight edge. JO-Blocks, dial indicator height gage or surface plate, or both. Flatness shall be within 0.030 in. (1 mm) total.

<sup>B</sup>Method of measurement and tolerances with tools and gages used shall be subjected to approval by the purchaser technical activity designated in the contract.

<sup>C</sup>The purchaser technical activity designated in the contract shall be notified by the contractor 15 days before this inspection is to be performed.

<sup>D</sup>Four deviations out of the 36 interior measurements on any one sample shall be cause for rejection of the shelter.

<sup>E</sup>Seven deviations out of the 36 interior measurements on any one sample shall be cause for rejection of the shelter.

<sup>F</sup>More than two deviations in any one corner of the shelter be cause for rejection of the shelter.

10.12 *Visual and Mechanical Inspection*—Examine equipment for the requirements of construction (see Section 5). Comply with the item requirements listed in MIL-STD-252, Type 4, 5, 7, 8, 9 and 11 defects only. Further, classify a shelter weight above the required maximum (see 5.12) as a major defect.

10.13 *Shelter Weight Test*—Determine compliance with 5.12 by weighing on a platform beam or dial indicator scale. The platform of the scale shall be of sufficient extent so as to allow the placement of the entire shelter on it. The beam or indicator shall have 1 lb (± 0.5 kg) or less graduations. The scale shall have an accuracy of at least ± 1 lb (± 0.5 kg) or one-sixth of 1 % of full scale reading, whichever is smaller. Calibrate the scale at least twice per month using standard weights traceable to the National Institute for Standards and Technology. Failure to meet the requirements of 5.12 shall constitute failure of this test.

**TABLE 3 Sequence of First Article Inspection<sup>A</sup>**

Inspection	Requirements Subsection	Test Subsection
Cleaning	5.4	10.4
Welding	5.5	10.5
Lamination	5.2	10.3
Interchangeability	5.10	10.10
Riveting	5.6	10.6
Construction tightness	8.4	10.24
Finish	5.8	10.8
Marking	5.9	10.9
Dimensional (in accordance with stated drawing	5.1	10.11
Visual and mechanical	5.1	10.12
Shelter weight	5.12	10.13
Door latch torque	8.2	10.22
Moisture resistance <sup>B</sup>	6.2	10.7
Temperature	6.3	10.14
Heat transfer	6.4	10.15
Rail transport	7.2.1	10.16
Drops <sup>C</sup>	7.3	10.18
Construction tightness <sup>D,E</sup>	8.4	10.24
Towing, simulated	7.4	10.19
Lifting and towing eye pulls	7.5	10.20
Lift transport, simulated	7.2.2	10.17
Steps, roof access	7.6	10.21
Light tightness	8.7	10.27
EMI shielding	8.3	10.23
Watertightness	8.5	10.25
Fording	8.6	10.26
Door latch torque (second time)	8.2	10.22

<sup>A</sup>First article sample testing and shelter testing shall not begin until at least seven days after the sealer application, including application of touch-up sealer.

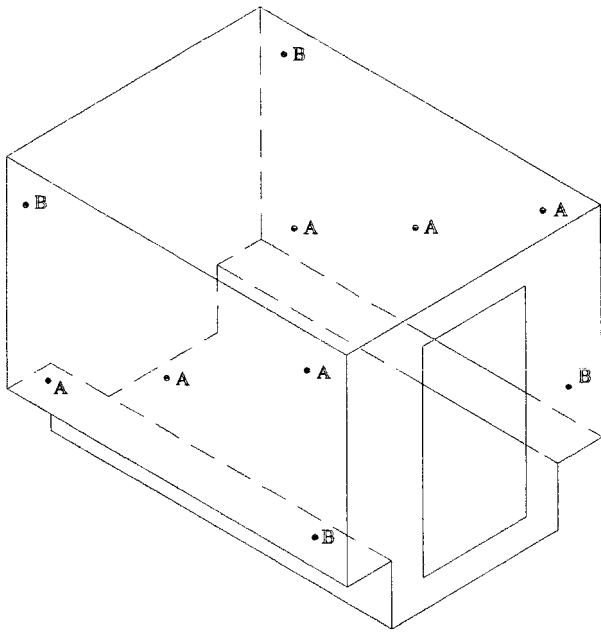
<sup>B</sup>First article specimen testing shall be completed no later than the end of this test (see 11.1.1). This inspection shall not begin until at least seven days after final finish application including touch-up paint.

<sup>C</sup>See Note 10 of Table 7.

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

<sup>E</sup>Door portion and gasket portion only.

10.14 *Temperature Test*—Place the shelter, with both doors and the louver cover closed and with the drain hole closed in a manner acceptable to the purchaser in a temperature controlled room and subjected to the tests of 10.24.1 and 10.24.2. Measure air temperature by ten thermocouples located in accordance with Fig. 2. Outside thermocouples shall be provided with radiation shields of aluminum foil between the



NOTE 1—A = Outside T.C.s approximately 10 in (250 mm) from corners.

NOTE 2—B = Inside T.C.s as shown

FIG. 2 Thermocouple Location on Sidewalls

thermocouple and radiation surface. Air circulation shall not exceed a velocity of 7 miles per hour (11 kg/h) at 3 in. (75 mm) away from any shelter surface. Conduct inspection to determine compliance with 5.13 after completion of each test.

10.14.1 *Operating Temperature*—Stabilize the air temperature inside and outside the shelter at 120 to 125°F (49 to 52°C) for a period of 5 min, during which time check the doors and latches for ease of operation and freedom from binding. Then subject the exterior of the shelter roof panel to an additional simulated solar load applied as rapidly as possible to produce a temperature of 195°F (90°C) (minimum) on the outside skin of the roof panel as measured by 12 thermocouples located in accordance with Fig. 3. Obtain the simulated solar load using at least 28 lamps, type 1000T3, 230 volts.<sup>7</sup> Arrange the lamps in four rows of seven lamps each and operate within 10 % of rated voltage. Maintain the 120 to 125° (49 to 52°C) ambient air temperature plus the roof solar load for a period of 4 h at which time remove the solar load and increase the air temperature both inside and outside the shelter to 160 – 0 + 5°F (71 – 0 + 3°C) (as measured by the ten thermocouples of Fig. 2) as rapidly as possible and maintain for 5 min. Then completely remove the shelter from the heated chamber to an ambient temperature between 60 and 85°F (16 and 29°C).

NOTE 2—The length and position of the thermocouple's wires shall permit complete removal. Open the shelter drain hole prior to shelter removal.

10.14.2 *Storage Test*—Subject the shelter alternately to Method 501.4 and Method 502.4 of MIL-STD-810EF, except perform three cycles of each test (high temperature and low temperature). The cycles shall range from 160°F (71°C) for the

high temperature tests and –80°F (–62°C) for low temperature tests (as measured by the ten thermocouples of Fig. 2). In addition, all doors and latches shall operate freely without binding at either temperature extreme.

10.15 *Heat Transfer Test*—Place the shelter in a temperature controlled room that is at a constant temperature of –40 + 5°F (–40 + 3°C) outside the shelter. The walls and ceiling of the chamber shall be a minimum distance of 2½ ft (750 mm) from the walls and ceiling of the shelter. Place a 3KW electric coil open frame heater at the center of the shelter floor. Place a multi-speed 10 or 12 in. (250 or 300 mm) diameter fan 6 in. (150 mm) 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 degrees. Maintain a stabilized temperature inside the shelter of not less than 100°F (38°C) above the outside. Air circulation shall not exceed a velocity of seven miles per hour (11 kg/h) at 3 in. (75 mm) away from any shelter surface. Stabilize electrical power input and temperatures when the inside and outside groups of thermocouples each vary less than 2½ °F (1.5°C) while maintaining the minimum differential of 100°F (38°C) located in accordance with Fig. 2. Temperature and electrical power input stabilization for at least 30 min. In the stabilized condition the electrical power input will equal the heat loss. Do not change the rpm of the fan. The power input to the fan and heater shall be constant during the stabilization period and measured by an ammeter, voltmeter, and wattmeter in the electrical circuit. Use the power input, the average inside and outside temperature, and the inside surface area of the shelter in calculating the overall coefficient of heat transfer, that shall be no greater than that specified in 6.4. Failure to meet the requirements of 6.4 shall constitute failure of this test.

NOTE 3—To avoid a large pressure differential between the inside and outside of the shelter, a form of pressure relief should be incorporated into the drain hole.

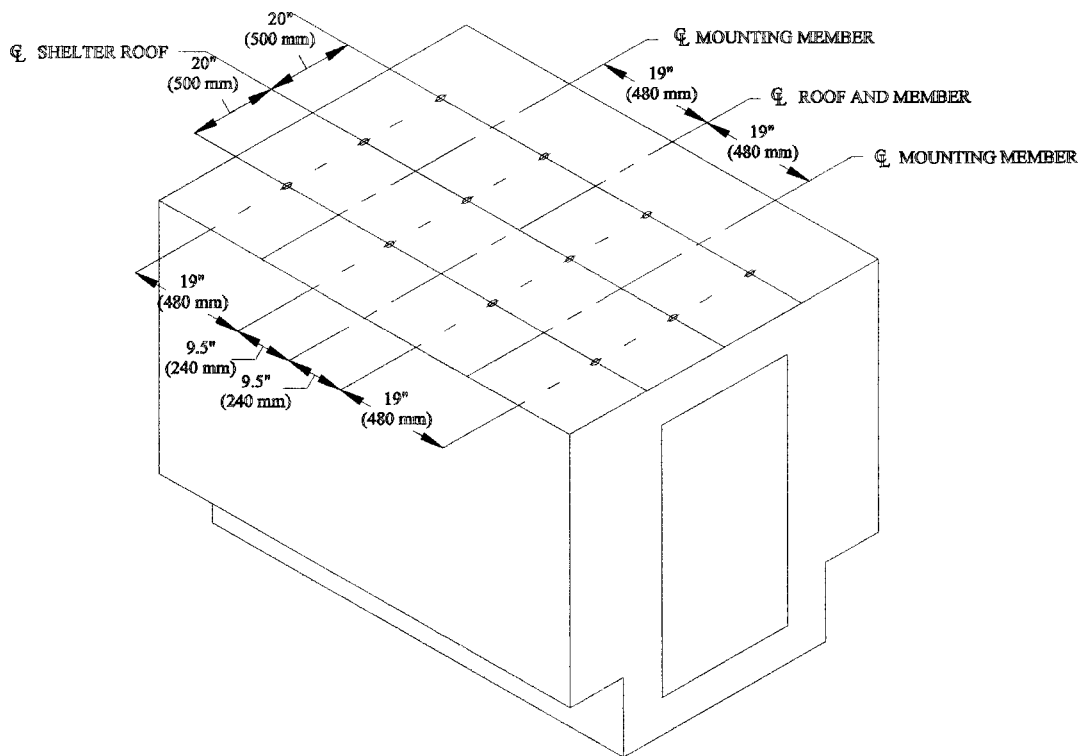
10.16 *Rail Transport, Impact Test*—Load the shelter with a 1900 lb (860 kg) load in accordance with Drawing SM-D-650085 and load on a railroad flat car. Perform the test in accordance with MIL-STD-810F Procedure VII. Impact test the shelter and position in both the longitudinal and lateral directions on the flat car. Rail transportability tests shall be performed for impacts at 4, 6, and 8 mph (6, 10, and 13 km/h) and 8 mph (13 km/h) reversed. Make a damage survey after each impact. The shelter shall have sustained no deformation and shall meet the requirements of 7.2.1 and 5.13. Failure to meet the requirements of 7.2.1 and 5.13 shall constitute a failure of this test.

10.17 *Lift Transport, Simulated Test*—Load the shelter with 8605 ± 5 lbs (3907 ± 3 kg) of water contained in a waterproof bag that rests against the floor and sides of the shelter and place boards inside the shelter across the door opening. Suspend the shelter for a period of 30 min by the four lifting eyes using the lift and tie-down device. Conduct an inspection for deformation between 30 and 60 min after removal of the load. Failure to meet the requirements of 7.2.2 shall constitute failure of this test.

10.18 *Drop Test*—Perform all drop tests in an environment at a temperature between 50 and 95°F (10 and 35°C). Lift the

<sup>7</sup> Commercially available from several sources.





NOTE 1—Tolerance  $\pm \frac{1}{2}$  (13 mm).  
**FIG. 3 Thermocouple Location of Roof**

shelter with 1900 lb (860 kg) payload, from the ground as specified in 10.18.1 and 10.18.2, quick release and allow to fall freely (that is, dropped such that the skid impacts onto a hard concrete flat surface) and meet the requirements of 7.3. Measure all drop heights perpendicular to the concrete surface and from the surface to the bottom of the raised skid. Thoroughly inspect the shelter after each specified drop and meet the requirements of 7.3. Failure to meet the requirements of 7.3 shall constitute failure of this test.

10.18.1 *Flat Drop*—Lift the entire shelter 18 in. (460 mm) and drop once. Initial contact shall be along the entire length of both skids.

10.18.2 *Rotational Drops*—After completion of the flat drop test, subject the shelter to four rotational drops as follows: place a 4 in. (100 mm) (nominal) high board under one edge of the shelter such that the entire length of a skid is on the board (for the roadside and curbside drops), or the ends of both skids are on the board (for the rear and front end drops). Then raise the edge of the shelter opposite the board 18 in. (460 mm) and drop. Perform the rotational drops, that is, the edge that impacts, in the following order: rear end, front end, roadside and curbside.

10.19 *Towing, Simulated Test*—Position the shelter such that the outboard vertical surface of the roadside skid is against the 2 in. (50 mm) side of a 2 by 4 in. (50 by 100 mm) (nominal) by 7 ft (2 m) board that is anchored to the ground so that it can not move (or an equivalent stop approved by the purchaser). Simultaneously apply a minimum force of 2000 lb (900 kg) to each roadside towing eye in a direction parallel to the ground and perpendicular to the side of the shelter. Maintain the

applied force for a period of at least 5 min. Then repeat the test for the curbside skid and towing eyes. Examine the shelter to determine compliance with 5.13 and 7.4. Failure to meet the requirements of 5.13 and 7.4 shall constitute failure of this test.

10.20 *Lifting and Towing Eye Tests*—Perform all lifting and towing eye tests in an environment whose temperature is between 50 and 95°F (10 and 35°C). Subject each lifting and towing eye to a tensile load of 5000 lb (2270 kg) applied in each of three mutually perpendicular directions that are described by the line of intersection of two adjacent panels. Perform the test by outward pulls between each adjacent pair, without deformation to the eye assemblies or the shelter. After all pulls, examine the shelter to determine compliance with 5.13 and 7.5. Failure to meet the requirements of 5.13 and 7.5, shall constitute failure of this test.

10.21 *Steps, Roof Access Test*—Determine compliance with 7.6 by applying a vertical load of 400 – 0, +5 lb (180 – 0, +3 kg) to the center of the outer section and maintain the load for 30 s. Failure to meet the requirements of 7.6 and 5.13 shall constitute failure of this test.

10.22 *Door Latch Torque*—Measure the torque of each door latch as specified on drawings SM-D-649951 and SM-D-649953. Examine the door latches for the requirements for construction in accordance with 8.2

10.23 *EMI Shielding Test*—Test the shelter for shielding in accordance with methods of Test Method E1851 and Specification E1925 and the requirements of 8.3. Install the EMI shields and EMI filter in accordance with drawings as listed in DL-SM-B-649950 for the test. No other modification will be

made. Perform tests at the following frequencies with air louver cover secured in the full open position. Failure to meet the requirements of 8.3 shall constitute failure of this test:

- 10.23.1 150 kHz and 18.0 MHz for magnetic field,
- 10.23.2 400 MHz, 1.0 GHz, and 10.0 GHz for plane waves.

10.24 *Construction Tightness Test*—Perform this test in three portions as follows to determine compliance with 8.4: shelter, door, and gasket. Conduct all portions indoors and in still air. Correct any leaks found during any portion of this test before proceeding with the next portion of this test.

10.24.1 *Shelter Portion*—Place the shelter in a position that will allow access to all exterior joints and fasteners on all surfaces and test as follows:

10.24.1.1 *Assembled Condition*—Use no sealant, caulking, tape, etc. on the shelter except as detailed on the drawings. Complete the shelter 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. Install the rivnuts used to connect these parts, however, in the shelter. The shelter exterior need not be painted before the second portion, 10.24.2 of the test is performed.

10.24.1.2 *Group A Audit Test*—Completely assemble and finish the shelter.

10.24.1.3 *Test Fixtures and Equipment*—This test requires the use of the following:

- 10.24.1.4 Door fixture in accordance with SC-D-781228,
- 10.24.1.5 Drain fixture in accordance with SC-D-781235,
- 10.24.1.6 U-tube manometer with graduations of 0.1 in. (2.5 mm) of water or less,
- 10.24.1.7 Air flow regulating device,
- 10.24.1.8 Temperature potentiometer and two thermocouples, with a combined accuracy of  $\pm 0.2^\circ\text{F}$  ( $\pm 0.1^\circ\text{C}$ ) or less,
- 10.24.1.9 Air flow measuring device with graduations of 0.05 SCFM (standard cubic feet per minute) ( $25\text{ cm}^3/\text{s}$ ) or less and with an accuracy of  $\pm 0.05$  SCFM ( $25\text{ cm}^3/\text{s}$ ) or less, and
- 10.24.1.10 Miscellaneous rubber tubing and fittings, as required.

10.24.1.11 *Performance of Test*—Install or assemble test fixtures and equipment, or both, as required by Drawing SC-D-781236. Testing shall then proceed as follows:

10.24.1.12 *Procedure*—Introduce clean, dry air into the shelter through the drain fixture. The temperature differential between the pressurized air inside the shelter and the air outside the shelter shall not exceed  $2^\circ\text{F}$  ( $1^\circ\text{C}$ ). Do not proceed testing until the temperatures have stabilized within that limit. Achieve and maintain an interior differential pressure of  $12.0 \pm 0.3$  in. of water ( $3 \pm 75$  Pa). The air flow required to maintain this pressure shall not exceed 1.5 SCFM ( $700\text{ cm}^3/\text{s}$ ). If the flow exceeds this limit, the shelter shall be considered as having failed this test. Rework shall be accomplished. Then reinspect the rework area(s) in accordance with 10.24.1. Perform the inspection of 10.24.1.13 regardless of the pressure and SCFM achieved to locate any leak(s).

10.24.1.13 *Report*—While the interior differential pressure is maintained, paint every joint rivet, rivnut, bolt, and any other area on the exterior where two pieces interface 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 12.2. In any event, reinspect the reworked area(s) in accordance with 10.24 after rework.

10.24.2 *Door Portion*—After successful completion of the shelter portion in accordance with 10.24.1, test the shelter as follows:

10.24.2.1 *Assembled Condition*—Use no sealant caulking, tape, etc. on the doors except as detailed on the drawings. Completely assemble the doors and louver cover with all hardware and gaskets installed on the shelter, and close and latch. Meet the requirements of Note 23 on drawing SM-D-649953 and the tightening instruction on Sheet 4 of drawing SM-D-208682 before proceeding with this test.

10.24.2.2 *Test Fixtures and Equipment*—This test requires the use of the items in 10.24.1.5-10.24.1.8, and 10.24.1.10.

10.24.2.3 *Performance Test*—Install or assemble, or both, the test fixture and equipment as required by drawing SC-D-781236. Testing shall then proceed as follows:

10.24.2.4 *Procedure*—Introduce clean dry air into the shelter through the drain fixture. The temperature differential between the pressurized air inside the shelter and the air outside the shelter shall not exceed  $2^\circ\text{F}$  ( $1^\circ\text{C}$ ). Testing shall not proceed until the temperatures have stabilized within that limit. Achieve and maintain an interior differential pressure of  $6.0 \pm 0.3$  in. ( $1.5 \pm 75$  Pa) of water. If the shelter is unable to achieve and maintain that pressure the shelter shall be considered as having failed this test. Perform the inspection of 10.24.2.5 regardless of the pressure achieved, to locate the leak(s). Rework shall be accomplished. Reinspect the reworked area(s) in accordance with 10.24.2.

10.24.2.5 *Report*—While maintaining the interior differential pressure paint every joint, rivet, rivnut, bolt, and any other area on the shelter exterior of the doors and louver cover where two pieces interface 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 12.2. In any event, inspect the reworked area(s) in accordance with 10.24.2 after rework.

10.24.3 *Gasket Portion*—After successful completion of the outer door portion in accordance with 10.24.2, test the gasket seating on the inner and outer doors and the louver cover as follows:

10.24.3.1 *Assembled Condition*—The assembled condition shall be as required in 10.24.2.1.

10.24.3.2 *Test Equipment*—This test requires the use of a piece of paper 0.0035 in. (0.09 mm) maximum thickness by  $2\frac{1}{2}$  in. (64 mm) wide.

10.24.3.3 *Performance of Test*—Perform the following inspection on both the outer and inner door assemblies, and the louver cover, once at the center of the top and bottom (except

on top of the louver cover), ½ in. (13 mm) away from each-corner. Close the door or cover 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). Withdraw the paper 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, increase the gasket compression and repeat this inspection. If a gasket(s) is unable to meet this inspection requirement without exceeding the requirements stated in 10.24.3.1 the shelter shall be considered as having failed this test. Rework shall be accomplished. Then reinspect the rework area(s) in accordance with 10.24.2 and 10.24.3.

NOTE 4—Where hinge interferes with inspection, perform inspection adjacent to the hinge, at two places along each side at approximately ⅓ and ⅔ the height of each door and louver cover. Total inspection locations are 14 for each door and 11 for the louver cover.

10.24.4 *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 12.2. Records shall contain, as a minimum, the shelter serial number and the following:

10.24.4.1 *Shelter Portion:*

10.24.4.2 An indication of compliance with 10.24.1.1 and Drawing SC-D-781236,

10.24.4.3 Temperature differential, interior differential pressure, and air flow in accordance with 10.24.1.12.

10.24.4.4 If any leak was found,

10.24.4.5 Date inspection was performed,

10.24.4.6 A statement that rework was performed, if applicable, and

10.24.4.7 Date reinspection was performed, if applicable.

10.24.4.8 *Door Portion:*

10.24.4.9 An indication of compliance with 10.24.2.1 and Drawing SC-D-781236,

10.24.4.10 Temperature differential and interior differential pressure in accordance with 10.24.2.4,

10.24.4.11 If any leak was found,

10.24.4.12 Date inspection was performed,

10.24.4.13 A statement that rework was performed, if applicable, and

10.24.4.14 Date reinspection was performed, if applicable,

10.24.4.15 *Gasket Portion:*

10.24.4.16 An indication of compliance with 10.24.3.1 and the 25 inspection location points in accordance with 10.24.3.3,

10.24.4.17 If the shelter was equipped with EMI gaskets,

10.24.4.18 If an inadequate gasket bearing was found and at what location,

10.24.4.19 Date inspection was performed,

10.24.4.20 A statement that rework was performed, if applicable, and

10.24.4.21 Date reinspection was performed, if applicable.

10.24.4.22 *Availability Records*—The contractor shall make the above records available to the purchaser for review upon request.

10.24.5 *CTT Rework*—The nine holes in the floor panel shall be plugged in accordance with Note 18 on drawing

SM-D-649953 after successful completion of first portion of test 10.24.1 and after compliance with Group A audit sampling requirements of 12.2.

10.25 *Watertightness Test*—Conduct the test in still air. Subject the shelter, after painting and prior to the fording test and without the use of external sealing, caulking, taping, etc., to a two part spray test to determine compliance with 8.5. Failure to meet the requirements of 8.5 shall constitute failure of this test. Use nozzles,<sup>8</sup> pointing directly at the surface under test. Permanently install gages in piping to indicate pressure at remote nozzles. Prior to the performing of the spraying, record the weight of the shelter and meet the requirements of 5.12. Open and close the shelter doors so that the latching mechanism is completely engaged for a total of ten operations.

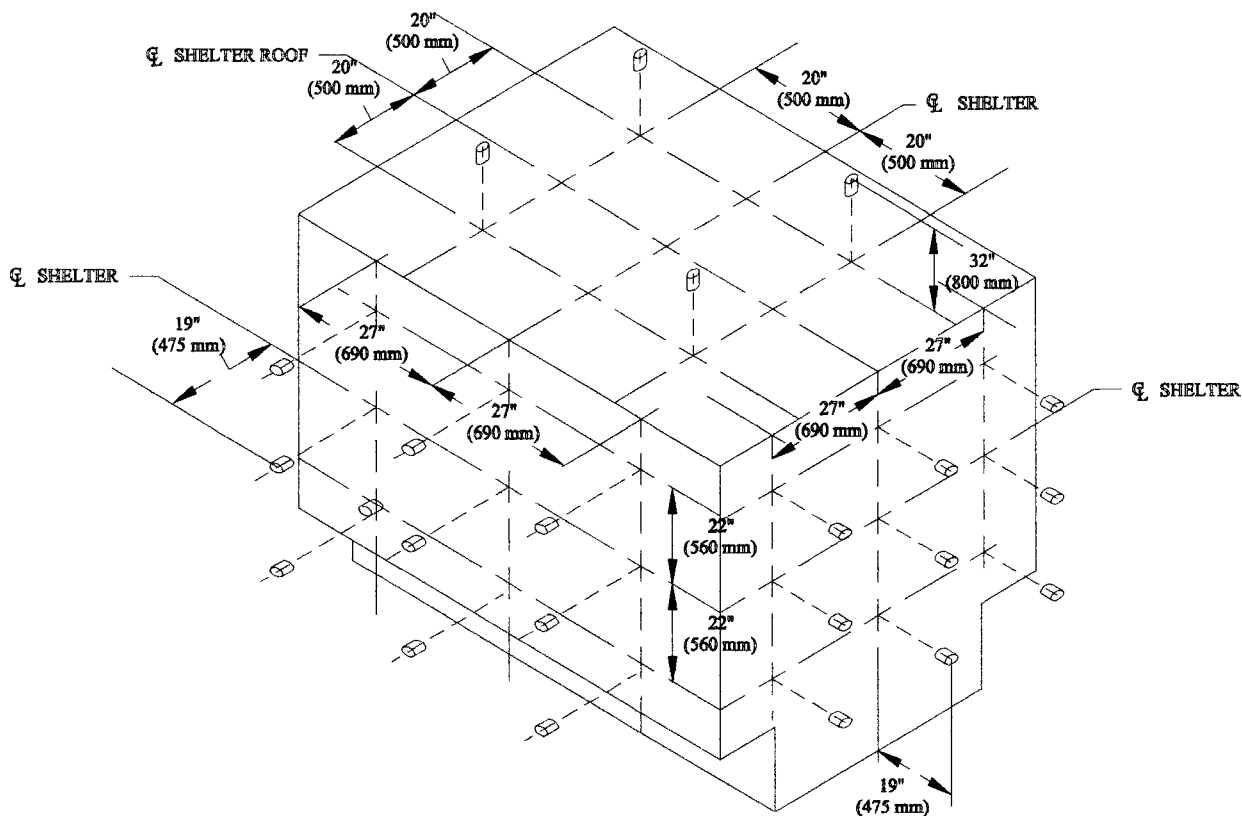
10.25.1 *Doors and Louver Cover Closed* (See Fig. 4)—First spray each of the five exposed surfaces of the shelter with the nozzles arranged to provide uniform coverage of the panel under test. Test each end panel using nine nozzles, each side using nine nozzles, and the roof using four nozzles. Operate each nozzle at a pressure of 40 psig (280 KPa) at the nozzle and located 19 in. (480 mm) from the panel under test, with the exception of the roof nozzles that shall be at a distance of 32 in. (800 mm). Spray each panel for a period of 40 min. After the test, there shall be no visual evidence of leakage into the shelter.

10.25.2 *Door Louver Cover Open* (See Fig. 5)—Test the inlet louver with the louver cover fully opened to the limit of the stop by spraying water at the door end panel. Locate five nozzles across the width of the end of the inlet louver. Locate three nozzles across the width of the end panel, 30 in. (760 mm) above the roof, and 36 in. (910 mm) from the end panel. Locate the remaining two nozzles to each side, 30 in. (760 mm) above the roof, 12 in. (300 mm) from the end panel and 36 in. (910 mm) from the side panel. Operate each nozzle at a pressure of 15 psig (100 KPa) at the side panel. Operate each nozzle at a pressure of 15 psig (100 KPa) at the nozzle. Spray the panel for a period of 20 min. 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, drill holes in the shelter in accordance with Fig. 6 and Fig. 7. Prior to fording, seal the holes with rivets and sealer in accordance with 5.3.

10.26 *Fording Test*—Securely restrain the shelter and immerse in water to a depth of 30 ± ½ in. (760 ± 13 mm), measured from the bottom of the shelter skirts, for a period of 1 h. After immersion, examine the shelter to determine compliance with 8.6. Failure to meet the requirements of 8.6 shall constitute a failure of this test.

10.26.1 *Weight Differential*—To determine compliance with 8.6, weigh the shelter in accordance with 10.13 before and after fording. Drill holes in accordance with Fig. 6 and Fig. 7 if a weight differential of 1 lb (0.5 kg) or more exists. Any water

<sup>8</sup> The sole source of supply of apparatus, known to the committee at this time is Model G295Q (or 36295Q) available from Spraying Systems Company, Wheaton, IL. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee that you may attend.



NOTE 1—Tolerance:  $\pm \frac{1}{2}$  in. (13 mm).

NOTE 2—Nozzle locations for the rear end and roadside panels are the same as for the front end and curbside panels, respectively, shown above.

FIG. 4 Nozzle Locations—Watertightness Test

escaping from any of the drilled holes shall constitute failure of the fording test. A weight differential of more than 2 lbs (1 kg) after the fording test shall constitute failure of this test.

10.27 *Light Tightness Test*—Test the inlet louver assembly for light tightness with an unshielded, lighted 100 W incandescent lamp placed in a plane 1 ft (300 mm) from the outside shelter surface of the louver. Regardless of the position of the lamp in the plane relative to the louver, no direct rays of light shall be visible when viewed by the observer from the darkened shelter interior. Failure to meet the requirements of 8.7 for light tightness shall constitute failure of this test.

10.28 *Lift and Tie Down Device Test* (see Drawing SM-D-649952)—Pre-stretch all slings by subjecting each sling leg to a load of 5000 + 50 lb (2270  $\pm$  23 kg). Subject the slings to a destructive tensile load. Fail the cable before slippage occurs about the sling sleeves. Fail each sling leg at a load higher than 9500 lb (4300 kg). Failure to meet the requirements of 9.2 shall constitute failure of this test.

10.29 *Impact Panel Test*—Subject a 24 in. (600 mm) specimen having no support from internal structural members to impact as follows: drop a 70 lb (32 kg) steel cylinder 3 in. (75 mm) in diameter and hemispherical at one end vertically 30 in. (760 mm) so that the hemispherical end of the weight strikes the center of the outer skin of the section on a horizontal plane. Support the specimen along its four edges by a framework backed by concrete. The frame shall be made of four pieces of 2 by 4 in. (50 by 100 mm) (nominal) lumber, rigidly bolted

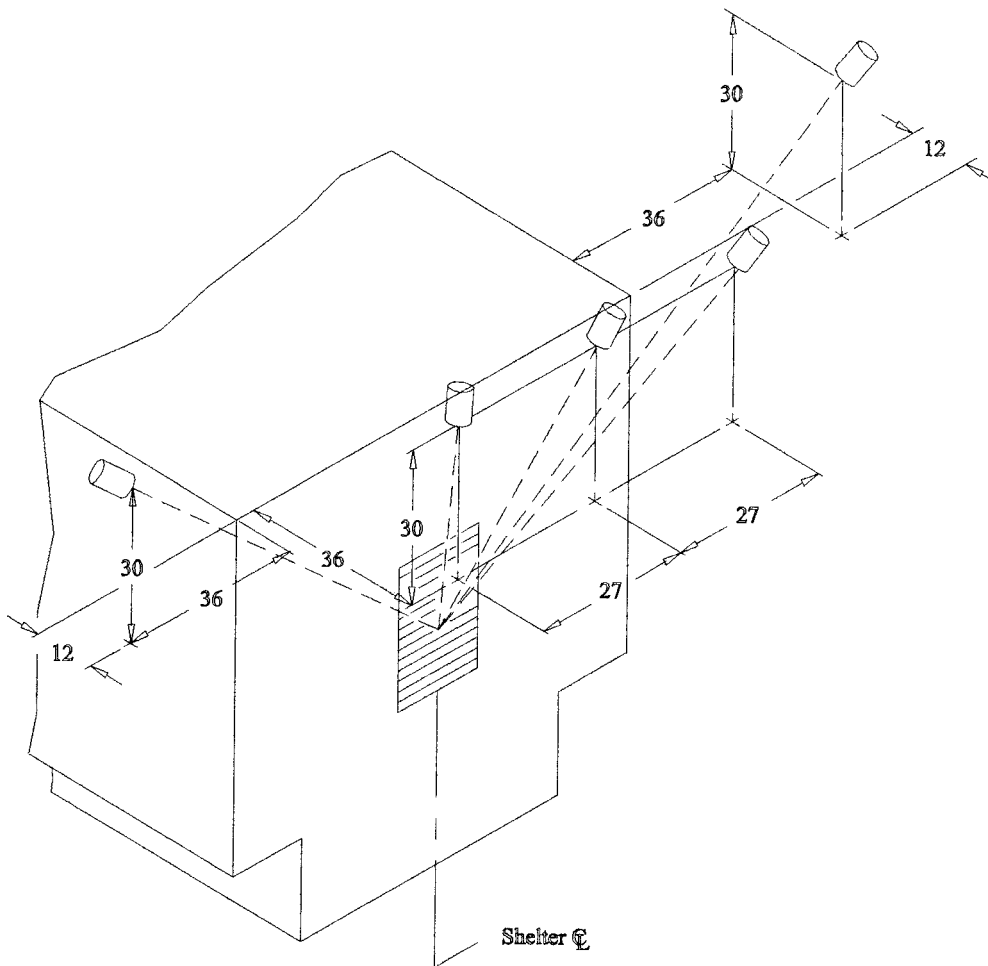
together to form a square 24 in. (600 mm) on a side (outside dimension), 4 in. (100 mm) (nominal) high, so that the frame rests on the 2 in. (50 mm) (nominal) faces. The panel specimen shall have the four edge surfaces bound with a 1 in. (25 mm) flange channel frame of skin material attached through flanges by  $\frac{3}{16}$  (5 mm) blind rivets on 3 in. (75 mm) centers and be bolted to the frame with a minimum of two  $\frac{1}{4}$  in. (6 mm) diameter bolts per edge (see Fig. 8). After the test, open the specimen for examination for conformance with applicable drawings. Failure to meet the requirements of 9.3 when tested as specified above shall constitute failure of this test.

## 11. First Article Inspection

11.1 *First Article Inspection*—When a first article is required (see 9.1 and 15.3), it shall be inspected and tested for the characteristics specified in 11.1.1 and 11.1.2. Unless otherwise specified, inspections and tests shall be performed by the contractor. The failure to pass any inspection or test shall be cause for rejection of the first article.

11.1.1 *First Article Specimens*—The contractor shall provide and test the first specimens listed in Table 1. All specimens shall reflect material and conditions that will be used in production. Failure of any specimen within a group shall be cause for rejection of all specimens within that group.

11.1.2 *First Article Shelter*—The contractor shall provide and test a first article shelter that shall reflect material and conditions that will be used in production. Inspection shall



NOTE 1—Dimensions are in inches, tolerance:  $\pm \frac{1}{2}$  in. (13 mm).

NOTE 2—Each nozzle axis shall be directed toward the center of the louver.

FIG. 5 Nozzle Locations—Watertightness Test

consist of the inspection listed in Table 3 and shall be in the sequence listed in Table 3.

## 12. Quality Conformance Inspection

12.1 *Component and Material Inspection*—In accordance with 10.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

12.2 *In-Process Inspection*—Inspection shall be made of the requirements specified in Table 4 during the shelter manufacturing process and at the frequency specified below. Whenever nonconformance is noted, corrections shall be made to the items affected, the lot in process, and to the operation. Parts that can not be corrected shall be removed from production.

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

12.2.2 *Sampling for Adhesive and Sealer, Low and High Temperature*—Inspection of adhesive and sealer coupons at the low and high temperature conditions be at the following frequencies.

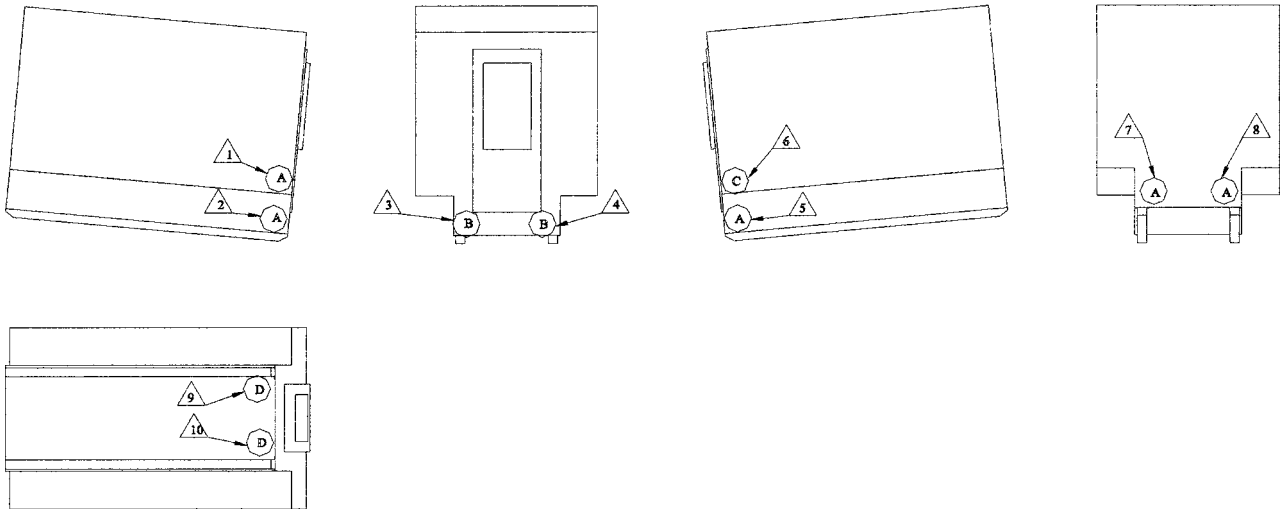
12.2.2.1 When automatic mixing and dispensing processes are used, use once for each 15 batches.

12.2.2.2 When hand mixing and dispensing processes are used, use once for each 15 batches.

12.2.3 *Sampling for Adhesive and Sealer, Room Temperature*—Inspection of adhesive and sealer coupons at the room temperature condition shall be at the following frequencies:

12.2.3.1 When automatic mixing and dispensing processes are used, use once at the start of the process, once at the end on a shift, and once at the end of a continuous run longer than one shift.

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



- NOTE 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
- NOTE 2—Shelter shall remain tipped one-quarter hour before drilling test hole and one-quarter hour after drilling last hole.  
 NOTE 3—Allow sufficient clearance to drill at Locations 9 and 10.  
 NOTE 4—After fording, the shelter shall be weighed prior to drilling holds.  
 NOTE 5—Hole No. 1 through 10 drilled after watertightness; hole No. 11 through 20 drilled after fording.  
 NOTE 6—The purchaser may require three additional holes after watertightness and after fording at locations to be determined by the purchase at the time of testing.  
 NOTE 7—Holes: 0.128/0.132 diameter, by  $\frac{1}{8}$  deep 3.25/3.35 by 16 mm deep.  
 NOTE 8—Rivets: AD45H as supplied by United Shop Machinery Corp. Shelton, CT, or equivalent  
 NOTE 9—Rivets shall be dipped in sealer prior to installation.  
 NOTE 10—Hole shall be drilled in line with existing rivets.  
 NOTE 11—Installed rivets shall not be distorted.  
 NOTE 12—Corner item is a corner cap.  
 NOTE 13—Corner item is a towing eye bracket.  
 NOTE 14—Detail shows upper skid plate and rivnuts removed.  
 NOTE 15—Except as noted, dimensions are from inboard edge of trim angle, not sealer fill.  
 NOTE 16—All dimensions  $\pm \frac{1}{16}$  in. 1.5 mm  
 NOTE 17—Drain not shown.

FIG. 6 Location of Drilled Holes for Fording and Watertightness

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

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

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

12.2.7 *Sampling for Interchangeability*—Each shelter shall comply with the inspection of 10.10 and meet the requirement of 5.10.

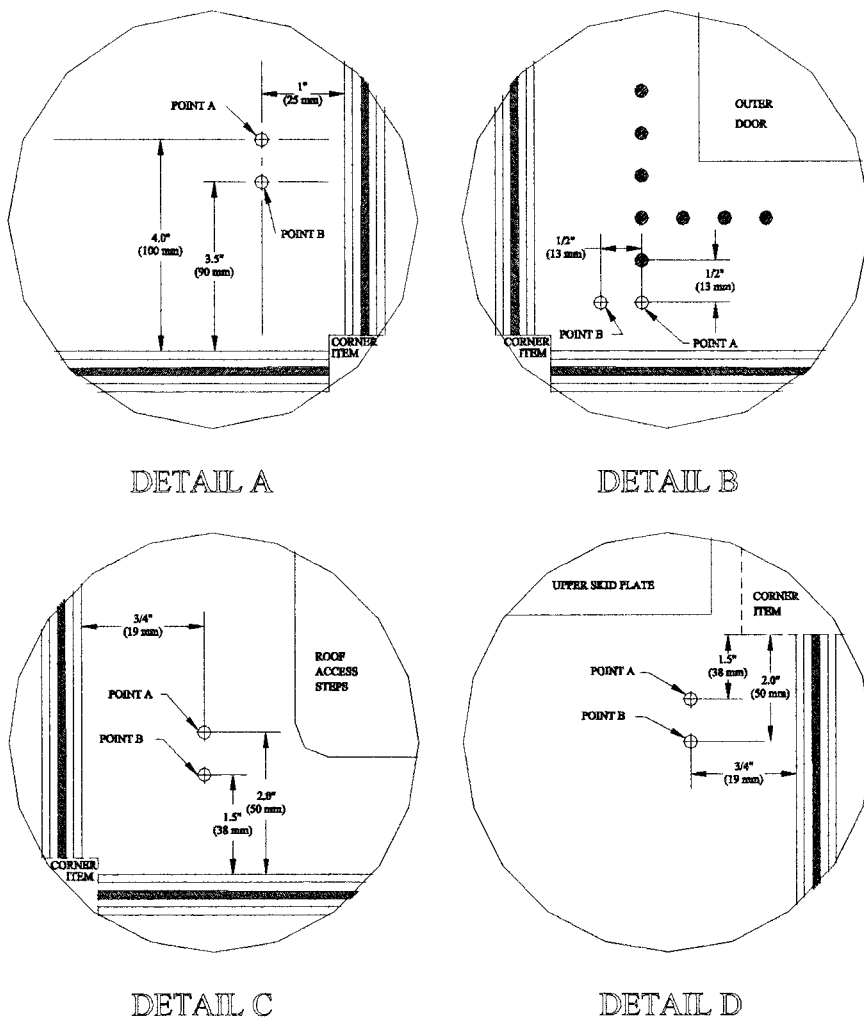
12.2.8 *Sampling for Riveting*—One shelter shall be randomly selected from each ten shelters produced. Selection and inspection shall be prior to application of paint finish.

12.2.9 *Sampling for Construction Tightness, Shelter Portion*—All shelters shall be preconditioned in accordance with 10.24.4.1.

12.3 *End Item Inspection*—The end items (see 14.3) 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. The sampling frequency code letter used shall be “A”. The production interval shall be the entire contract quantity of shelters.

12.3.1 *Group A Inspection*—Except for the shelter portion of the construction tightness test that shall be performed on Group A Audit units only, the inspection specified in Table 5 shall be performed on each fully assembled shelter. Conforming shelters shall then be verified by a Group A audit utilizing the AQL percents specified.

12.3.2 *Group B Inspection*—The inspections specified in Table 6 shall be performed on shelters that have been subjected to and satisfied Group A inspection. Inspection shall be in the



NOTE 1 - Tolerance  $\pm 1/16"$  (1.5 mm)

At Location	Shown in Detail	After Watertightness		See Note	After Fording and Weighing		See Note
		Drill Hole No.	At Point in Detail		Drill Hole No.	At Point in Detail	
1	A (As Shown)	1	A	12	11	B	12
2	A (As Shown)	2	A	13, 14	12	B	13, 14
3	B (As Shown)	3	A	10, 13	13	B	10, 13
4	B (Opposite)	4	A	10, 13	14	B	10, 13
5	A (Opposite)	5	A	13, 14	15	B	13, 14
6	C (As Shown)	6	A	12	16	B	12
7	A (Opposite)	7	A	13	17	B	13
8	A (As Shown)	8	A	13	18	B	13
9	D (As Shown)	9	A	13	19	B	13
10	D (Opposite)	10	A	13, 17	20	B	13, 17

NOTE 1—Tolerance:  $\pm 1/16$  in. 1.5 mm.

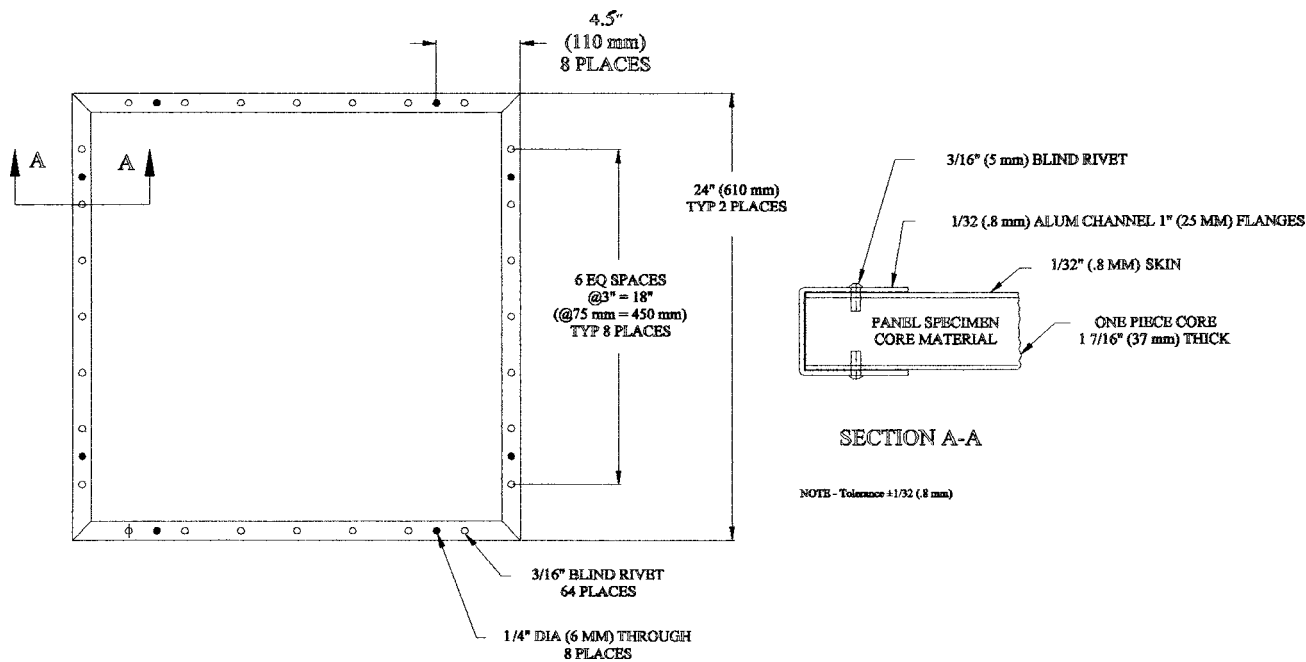
FIG. 7 Locations of Drilled Holes for Fording and Watertightness Tests

order listed in Table 6. Inspection shall not begin until at least seven days after sealer application, including application of touch-up sealer.

12.3.3 Group C Inspection—Group C inspection shall consist of the inspections specified in Table 7. Shelter tests shall be performed on shelters that have been subjected to and satisfied

Group A and Group B inspection. Unless otherwise specified, tests shall be in the order listed. Actions required relative to Group C failures shall be as specified in the contract or purchase order (see 15.2 and 15.4)

12.3.3.1 Sampling for Drop—One shelter shall be randomly selected from the first 50 shelters produced. In the event that



NOTE 1—Tolerance  $\pm 1/32$  (0.8 mm).

FIG. 8 Impact Test Panel

TABLE 4 In-Process Inspection

Inspection	Requirements Subsection	Sampling Subsection	Test Subsection
Core material:			
Density	4.4	12.2.1	10.2.1
Compressive strength	4.4	12.2.1	10.2.2
Shear strength	4.4	12.2.1	10.2.5
Adhesive:			
Room temperature	4.2	12.2.3	10.1
Low temperature	4.2	12.2.2	10.1
High temperature	4.2	12.2.2	10.1
Sealer:			
Low temperature	4.3.2.1	12.2.2	10.1
Room temperature	4.3.1	12.2.3	10.1
High temperature	4.3.2.2	12.2.2	10.1
Clearing	5.4	12.2.4	10.4
Welding	5.5	12.2.5	10.5
Lamination	5.2	12.2.6	10.3
Interchangeability	5.10	12.2.7	10.10
Riveting	5.6	12.2.8	10.6
Construction tightness, shelter	8.4	12.2.9	10.24.1

TABLE 5 Group A Inspection

Inspection	Requirements Subsection	Test Subsection	AQL % (Audit Only)	
			Major	Minor
Construction tightness:				
Shelter portion (audit only)	8.4	10.24.1	1.0	...
Door portion	8.4	10.24.2	1.0	...
Gasket portion	8.4	10.24.3	1.0	...
Visual and mechanical	5.1	10.12	1.0	4.0
Dimensional	5.1	10.11	1.0	...
Door latch torque <sup>A</sup>	8.2	10.22	1.0	...
Shelter weight	5.12	10.13	...	...

<sup>A</sup>Door latch torque to be repeated during the final cursory visual mechanical inspection.

TABLE 6 Group B Inspection

Inspection	Requirements Subsection	Test Subsection	AQL %
Lifting and towing eyes	7.5	10.20	6.5
Steps, roof access	7.6	10.21	6.5
Light tightness	8.7	10.27	6.5
Finish	5.8	10.8	6.5
Construction tightness <sup>A</sup>	8.4	10.24	1.0

<sup>A</sup>Door portion and gasket portion only.

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.

12.3.3.2 *Sampling for Electromagnetic Interference Suppression*—One shelter shall be randomly selected from the first ten shelters produced, one shelter from the next 40 shelters produced, and one shelter from each additional 50 shelters or fraction thereof.

12.3.3.3 *Sampling for Hold Down Assembly*—Two complete hold down assemblies in accordance with Drawing SM-D-649952 shall be randomly selected from the first 50 assemblies produced. In the event that the first delivery quantity is less than 50 units, the sample shall be selected from the first delivery quantity but shall be considered the sample for

the first 50 units. Thereafter, one assembly shall be selected from each additional 100 assemblies or fraction thereof.

12.3.3.4 *Sampling for Remainder of Group C Inspection*—These inspections shall be performed once during production on a shelter/specimen randomly selected from the first 50 shelters produced. In the event that the first delivery quantity is less than 50 units, the sample shall be selected from the first delivery but shall be considered the sample for the first 50 units.



**TABLE 7 Group C Inspection**

Inspection	Requirements Subsection	Sampling Subsection	Test Subsection
Droops <sup>A</sup>	7.3	12.3.3.1	10.18
Construction tightness <sup>B,C,D</sup>	8.4	...	10.24
Watertightness <sup>E</sup>	8.5	...	10.25
Fording <sup>F</sup>	8.6	...	10.26
Door latch torque <sup>F</sup>	8.2	...	10.22
EMI shielding	8.3	12.3.3.2	10.23
Watertightness <sup>F,G,H</sup>	8.5	...	10.25
Fording <sup>F,G</sup>	8.6	...	10.26
Door latch torque <sup>F,G</sup>	8.2	...	10.22
Lift and lie down device	9.2	12.3.3.3	10.28
Core material:	...	...	...
Flammability	4.4	12.3.3.4	10.2.3
Water absorption	4.4	12.3.3.4	10.2.4
Adhesive	...	...	...
Humidity exposure	4.2	12.3.3.4	10.1
Salt spray exposure	4.2	12.3.3.4	10.1
Sealer	...	...	...
Humidity exposure	4.3.3	12.3.3.4	10.1
Salt spray exposure	4.3.4	12.3.3.4	10.1
Impact panel	9.3	12.3.3.4	10.29
Environmentals <sup>B</sup>	...	12.3.3.4	...
Moisture resistance <sup>G</sup>	6.2	...	10.7
Temperature <sup>G</sup>	6.3	...	10.14
Heat transfer <sup>G</sup>	6.4	...	10.15
EMI shielding <sup>I,J</sup>	8.3	...	10.23
Watertightness <sup>G,I</sup>	8.5	...	10.25
Fording <sup>G,I</sup>	8.6	...	10.26
Door latch torque <sup>G,I</sup>	8.2	...	10.22
Rail transport <sup>G</sup>	7.2.1	12.3.3.4	10.16
Drops <sup>A,G,K</sup>	7.3	...	10.18
Construction tightness <sup>D,G</sup>	8.4	...	10.24
EMI shielding <sup>C,L</sup>	8.3	...	10.23
Water tightness <sup>G</sup>	8.5	...	10.25
Fording <sup>G</sup>	8.6	...	10.26
Door latch torque <sup>G</sup>	8.2	...	10.22
Towing, simulated	7.4	12.3.3.4	10.19
Lift transport, simulated	7.2.2	12.3.3.4	10.17

<sup>A</sup>Bulges that 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.

<sup>B</sup>These inspections shall be performed on the same (serial number) shelter and shall not begin until at least seven days after final finish application, including touch-up paint.

<sup>C</sup>The CTT test (6 in. 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 water tightness and fording tests. Records, available to the Government shall be kept of this test, that is, location, size, and condition of any air leaks present. Electrical rubber tape shall be attached to the doors and cover jams 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.

<sup>D</sup>Door portion and gasket portion only.

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

<sup>F</sup>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.

<sup>G</sup>Modification Kit MK-1092/G to remain installed during these tests.

<sup>H</sup>If shelter was not drop tested prior to EMI testing, this watertightness test shall use only the nine nozzles located at the door end of the shelter.

<sup>I</sup>If the rail transport test is to follow the environmental tests on the same shelter these tests shall be done after the drop test.

<sup>J</sup>This inspection may also satisfy sampling for EMI suppression in accordance with 12.3.3.2.

<sup>K</sup>This inspection may also satisfy sampling for drop tests in accordance with 12.3.3.1.

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

### 13. Packaging

13.1 *Packaging Inspection*—The sampling and inspection of the preservation packaging, packing, and container marking shall be in accordance with the requirements of MIL-DTL-55507.

13.2 *Packaging Requirements*—The requirements for packaging shall be in accordance with MIL-DTL-55507.

13.3 *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.

### 14. Quality Assurance

14.1 *Responsibility for Inspection*—Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the purchaser. The purchaser reserves the right to perform any of the inspections set forth in the specifications where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

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

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

14.2 *Classification of Inspection*—The inspection requirements specified herein are classified as follows:

14.2.1 First article inspection (does not include packaging (see 11.1)), and

14.2.2 Quality conformance inspection (see Section 12).

14.3 *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 12).

## 15. Notes

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

15.2 *Acquisition Requirements*—Acquisition documents must specify the following:

- 15.2.1 Title number, and date of this specification,
- 15.2.2 When a first article is required (see 9.1, 11.1, 15.3),
- 15.2.3 When electromagnetic interference suppression capability is required on all delivered shelters (see 5.1, 8.3),
- 15.2.4 If facsimiles are required (see 5.11),
- 15.2.5 Marking and shipping of sample shelters,
- 15.2.6 Actions required relative to Group C failures and inspection of conforming Group C sample units (see 12.3.3), and
- 15.2.7 Level A or B preservation and packing (see 13.2, 15.5).

15.3 *First Article*—First article inspection shall be in accordance with 11.1 and shall consist of specimens (see 11.1.1) and one complete shelter with MK-1079( )/G installed. The purchaser should specify the appropriate type of first article and the number of units to be furnished. The purchaser should also

include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

15.4 *Noncompliance*—In the event of a Group C failure, approval to ship may be withheld, at the discretion of the purchaser, pending his decision on the adequacy of corrective action.

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

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

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

15.8 *Verification Inspection*—Verification by the purchaser 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 purchaser will be adjusted to make maximum utilization of the contractor's quality control system and the quality history of the product.

## 16. Keywords

16.1 adhesive bonded; aluminum; bonding; foam sandwich panels; non-expandable; relocatable structure; rigid wall

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