Designation: E2377 – 10

Standard Specification for Shelter, Electrical Equipment, Lightweight[1]

This standard is issued under the fixed designation E2377; 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 reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers two types of lightweight electrical equipment shelters designed for transport on the M1152A1, M1152A1 with B2 Armor Kit, M1037, and M1097 High Mobility Multipurpose Wheeled Vehicle (HMMWV). These shelters are transported by rail, air, marine and highway when mounted or dismounted from their vehicles.

1.2 *Classification*—The shelters will be of the following types, as specified (see 6.2).

1.2.1 *Type I*—Shelter, Electrical Equipment, Lightweight (w/o Tunnel, 17-2-0035-1).

1.2.2 *Type III*—Shelter, Electrical Equipment, Lightweight, Modified, General Purpose (w/ Tunnel, 17-2-0035-3).

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 The following safety hazards caveat pertains only to the test required portion, Section 4, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

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 Standard:*[3]

SAE-AS8090 Equipment, Towed Aerospace Ground, Mobility

2.3 *Federal Standard:*[4]

FED-STD-595 Colors Used in Government Procurement

2.4 *Military Standards:*[4]

MIL-STD-209 Slinging and Tiedown Provisions for Lifting and Tying Down Military Equipment

MIL-STD-810 Environmental Test Methods and Engineering Guidelines

MIL-STD-1366 Transportability Criteria

MIL-C-53072 Chemical Agent Resistant Coating (CARC) System Application Procedures and Quality Control Inspection

2.5 *Military Handbook:*[4]

MIL-HDBK-1791 Designing for Internal Aerial Delivery in Fixed Winged Aircraft

2.6 *ACGIH Documents:*[5]

Threshold Limit Values

2.7 *Drawings:*[6]

17-1-8565 Extension Kit, Pintle

17-1-8584 Mounting Kit Shelter To HMMWV

17-2-0035 Interface Control Drawing for, Shelter, Electrical Equipment, Lightweight, Types I and III

13228E1639 Standard Camouflage, Pattern For Shelter, Lightweight, Multipurpose

3. General Requirements

3.1 *First Article*—When specified (see 6.3), a sample shall be subjected to first article inspection in accordance with 4.1.1. A first article is defined as a preproduction or an initial production sample consisting of one or more of each type of completed shelters.

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[1] 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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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, http://www.sae.org.

[4] Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, http://dodssp.daps.dla.mil.

[5] Available from American Conference of Governmental Industrial Hygienists, Inc. (ACGIH), 1330 Kemper Meadow Dr., Cincinnati, OH 45240, http://www.acgih.org.

[6] Available from Shelter Technology, Engineering & Fabrication Directorate, U.S. Army Natick Soldier RD&E Center, ATTN: RDNS-ST, Kansas Street, Natick, MA 01760-5018, http://www.natick.army.mil.

TABLE 1 Weight and Payload Capacity

Type	Maximum Shelter Weight	Minimum Payload Capacity	Mounting Kit Incl. Hardware	Pintle Extension Incl. Hardware
I	608 lb (275.8 kg)	3300 lb (1496.9 kg)	88 lb (39.9 kg)	50 lb (22.7 kg)
III	643 lb (291.7 kg)	3300 lb (1496.9 kg)	88 lb (39.9 kg)	50 lb (22.7 kg)

TABLE 2 Spare Parts

Part
HMMWV Mounting Kit
Pintle Extension Kit
Door Assembly
Rear Ladder
Steps
T-bar Door Holder

TABLE 3 Interface Parts

Part	Reference Part No.
Mounting Kit, Shelter To HMMWV	17-1-8584-1
Extension Kit, Pintle	17-1-8565-1

TABLE 4 System Integration Configurations[A]

All Source Analysis System
Chemical Biological Protected Shelter
Common Ground Station
Firefinder
Light Ground Station Module
Meteorological Measuring Set
Standardized Integrated Command Post System
Trojan
Unmanned Aerial Vehicle—Short Range

[A]Available from Shelter Technology, Engineering & Fabrication Directorate, U.S. Army Natick Soldier RD&E Center, ATTN: RDNS-ST, Kansas Street, Natick, MA 01760-5018, http://www.natick.army.mil.

TABLE 5 Attaching Surface Resistance Load

Threaded Fastener Size (in.)	Torque (ft-lb)	Pull-out (lb)
10 to 32	8 (1.11 kg-m)	800 (362.9 kg)
¼ through ½	10 (1.38 kg-m)	1 000 (453.6 kg)

3.2 *Physical Performance Requirements:*

3.2.1 *Weight and Payload*—The shelter weight and payload capacity of each shelter type shall be as listed in Table 1. The maximum shelter weight listed does not include the weight of the Mounting Kit and Pintle Extension and their attaching hardware. The shelter shall be capable of accepting the payload distribution specified in the contract or purchase order (see 6.2). The Contractor shall fashion an appropriate simulated payload design to be used for all testing. This payload design shall be approved by the procuring agency prior to its use in any test.

3.2.2 *Parts InterchangeabiIity:*

3.2.2.1 *Spare Parts*—The spare parts are listed in Table 2 and are depicted on interface drawing number 17-2-0035. All spare parts and related assemblies shall be functionally and dimensionally interchangeable without modification or rework of the part, assembly, or shelter.

3.2.2.2 *Interface Parts*—The interface parts are listed in Table 3. All interface parts and related assemblies shall be functionally and dimensionally interchangeable, without modification or rework of the part, assembly, shelter, or vehicle, with the reference parts listed in Table 3.

3.2.3 *Shelter Configuration*—The shelter shall meet the configuration constraints specified on interface drawing. 17-2-0035 for the shelter type specified.

3.2.3.1 *Shelter Flatness and Squareness*—Shelter surfaces shall be flat and square. Each surface of the shelter shall be flat within ⅛ in. (0.32 cm) per each 48 in. (122 cm) length. Adjacent surfaces shall be perpendicular within 0.10 degrees.

3.2.3.2 *Shelter Dimensions*—The shelter shall meet the dimensional constraints within the specified tolerances required by interface drawing 17-2-0035 for those dimensions, which are not provided for reference only.

3.2.3.3 *Integration*—The shelter shall be capable of accepting all integration configurations of the systems listed in Table 4 (see 6.2) without modification or rework to the system integration designs listed in Table 4. The shelter shall be capable of accepting integration configuration cutouts at various locations. Shelter surfaces shall be capable of accepting the installation of individual pieces of equipment installed by system integrators at various locations. For installations where threaded mechanical fasteners are the preferred fasteners, the attaching surfaces shall be capable of resisting the loads listed in Table 5 for the listed sizes of threaded mechanical fasteners, without damage or degradation to the shelter or fastener.

3.2.4 *Chemical and Biological (CB) Resistance*—All shelter surfaces, except weather seals and gaskets, shall be resistant to, and shall not absorb, chemical and biological agent contamination, decontamination fluids, and petroleum products. Weather seals and EMI gaskets shall either meet the requirements above or be easily replaceable.

3.2.5 *Pressurization*—The shelter shall be capable of being pressurized to withstand over pressurization of 1.2 in. water gauge (iwg) with an air leakage not to exceed 10 standard cubic feet per minute (scfm) for Types I and III.

3.2.6 *Roof Loads*—The shelter roof shall be capable of supporting, without damage or degradation: (*1*) a uniformly distributed load of 40 lb/ft^2 (0.0195 kg/cm^2) over the entire surface and (*2*) a concentrated load of 660 lb (299.4 kg) over a 1 by 2 ft (30 by 61 cm) area, applied anywhere on the roof.

3.2.7 *Floor Loads*—The shelter floor shall be capable of supporting, without damage or degradation: (*1*) a uniformly distributed load of 65 lb/ft^2 (0.0317 kg/cm^2) over the entire floor, (*2*) a concentrated load of 1 000 lb (453.6 kg) applied over a 1 by 2 ft (30 by 61 cm) area, and (*3*) a point load of 125 lb (56.7 kg), over 1 in.^{2} (6.45 cm^2).

3.2.8 *Door:*

3.2.8.1 *Door Handle*—From either side, the shelter door shall be capable of being opened and closed with a maximum force of 48 lb (21.8 kg) applied to the door handle. From inside the shelter, the shelter door shall be capable of being opened and closed with a maximum force of 48 lb (21.8 kg) applied to the door handle with the outside handle locked. The door shall be capable of being padlocked from the outside.

3.2.8.2 *Door Structure and Hinge Assembly*—The door and hinge assembly shall be capable of supporting a 200 lb (90.7 kg) static load applied parallel to the hinge line, along the door edge opposite the hinge, with the door open to 90 degrees, without degradation or damage to the door or door hardware and the door shall operate freely after such a load is applied.

3.2.8.3 *Door Stop*—The door shall include a doorstop capable of automatically latching the door, when opened, at 90 degrees. The stop shall automatically prevent the door from swinging beyond 90 degrees when engaged and allow the door to open 180 degrees when disengaged. The door stop shall be capable of being disengaged by personnel, while they are standing on the ground, when the shelter is mounted on the HMMWV and shall not obstruct entry/exit through the door. The doorstop shall be capable of withstanding a static load equal to 10 lb/ft^2 (0.0049 kg/cm^2) times the largest surface area of the door. The load shall be applied normal to the door's largest surface and on the edge opposite the hinge, with the door latched at 90 degrees. The door and its hardware shall be capable of withstanding these loads without degradation, damage, or improper door operation.

3.2.8.4 *Door Maintainability*—The door shall not be removable from the exterior when locked and shall be easily removable with hand tools when unlocked. Hand tools are defined as those found in Tool Kit, General Mechanics, Automotive and Shop Equipment, Automotive Maintenance and Repair (NSN: 5180-00-177-7033 and 4910-00-754-0654, respectively).

3.2.8.5 *Door Drip Edge*—There shall be a drip edge over the entire width of the door. The drip edge shall prevent water rolling down the side of the shelter from entering the shelter.

3.2.9 *Ladder*—A ladder shall be provided to allow personnel carrying equipment, with a combined weight of up to 400 lb (181.4 kg), to enter and exit the shelter safely while the shelter is mounted on the vehicle without damage or degradation to the shelter or ladder. The ladder shall have a stowage location on the door as described on interface drawing 17-2-0035. The ladder must stow securely in all transportation modes (see 3.4).

3.2.10 *Impact Resistance*—The shelter shall be capable of withstanding, without damage, the impact of any of the hand tools as defined in 3.2.8.4, dropped onto the top of the floor surface from a height of 30 in. (76 cm).

3.2.11 *Roof Access Steps/handholds*—Roof access steps and handholds shall be provided for safe access to the roof. These steps/handholds shall be either built into the shelter or attached to the exterior. The steps/handholds shall be designed such that the vehicle/shelter combination does not (*1*) exceed the legal highway size limitations imposed by states and foreign countries, and (*2*) limit any other modes of transportation (that is, rail, air, ship). The roof access steps/handholds shall be designed for the 5th percentile female through the 95th percentile male military personnel and each step shall be capable of supporting 400 lb (181.4 kg) without deformation of the step or shelter.

3.2.12 *Interface Requirements*—The shelter shall conform to the interface requirements noted on interface drawing 17-2-0035.

3.3 *Environmental Performance Requirements:*

3.3.1 *Marine Atmosphere*—The shelter, in operational and storage mode, except for the mounting kit's shock isolator assembly, shall be fully operational when exposed to a marine environment equivalent to 25 lb/acre/yr (2.8 g/m^2/yr). The shelter shall not corrode or degrade.

3.3.2 *Electromagnetic Interference (EMI)*—The shelter shall provide the minimum shielding effectiveness prescribed by Specification E1925, Figure 1, in any location of the shelter over the frequency range of 150 kHz to 10 Ghz.

3.3.3 *Climate Range:*

3.3.3.1 *Temperature Range*—In storage, the shelter shall be capable of withstanding exposure to temperatures of −70 to 160°F (−56.7 to 71.1°C) with no evidence of corrosion or degradation of the fasteners, seals, or other hardware. In transit, the shelter shall be capable of withstanding exposure to temperatures of −65 to 160°F (−53.9 to 71.1°C). The operational temperature of the shelter shall be −65 to 125°F (−53.9 to 51.7°C) plus solar load.

3.3.3.2 *Temperature Shock*—The shelter shall withstand a temperature shock from an equilibrium state at 160 to −70°F (71.10 to −56.7°C) and from an equilibrium, state at −70 to 160°F (−56.7 to 71.1°C) without evidence of structural damage, degradation, or permanent deformation.

3.3.3.3 *Solar Load*—The shelter shall withstand a solar induced outer roof surface temperature of 205°F (96.1°C) while maintaining an internal temperature of 85°F (29.4°C), without evidence of structural damage, degradation, or permanent deformation.

3.3.3.4 *Sunshine (Ultraviolet Effects)*—The shelter shall show no evidence of structural damage, degradation, or permanent deformation as a result of exposure to ultraviolet effects.

3.3.3.5 *Humidity*—The shelter shall be capable of withstanding daily exposure of up to 97 % relative humidity, and exposure of 100 % relative humidity (with condensation) for short periods of time, without evidence of structural damage, degradation, or permanent deformation.

3.3.4 *Heat Transfer*—The shelter shall have an overall heat transfer coefficient of no more than 0.50 BTU/h/ft^2/°F (0.24 cal/h/cm^2/°C).

3.3.5 *Blowing Dust/Sand*—The external moving parts of the shelter shall be designed to resist the effects of blowing dust and sand without degradation. Blowing sand is defined as 150 to 1 000 micron particles in concentrations of 1.32 by 10^{-4} pounds per cubic feet (lb/ft^3)(2.11 by 10^{-6} g/cm^3) with a wind velocity of 1 750 ± 250 ft/min (533.4 ± 76.2 m/min).

3.3.6 *Watertightness*—The completed shelter, without the aide of supplementary sealing, caulking, taping, etc., shall be capable of withstanding a 40 psig (0.0195 kg/cm^2) spray from nozzles located in accordance with Specification E1925. The shelter shall not allow water leakage into the shelter and shall not gain weight (see 4.2.1.1).

3.3.7 *Detectability:*

3.3.7.1 *Color and Camouflage*—Unless otherwise specified (see 6.2), the shelter shall be the standard color and pattern specified on drawing 13228E1639. The interior surface of the personnel door shall match the primary exterior color of the

shelter. The color of the interior ceiling shall be painted semi-gloss white in accordance with Color Number 27875 in accordance with FED-STD-595. The interior walls and floor shall be painted semi-gloss light green in accordance with Color Number 24533 in accordance with FED-STD-595. All painting shall be in accordance with MIL-C-53072.

3.3.7.2 *Blackout*—The shelter, with the door closed, shall not permit a light source from within to emit detectable amounts of light.

3.4 *Transportability Performance Requirements*—The shelter and shelter/vehicle combinations shall not exceed the legal highway size limitations imposed by states and foreign countries and shall be capable of obtaining transportability approval from Military Traffic Management Command Transportability Engineering Agency (MTMCTEA) based on requirements for transport in the following modes.

3.4.1 *Rail Transport*—The dismounted shelter and shelter/vehicle combinations, with a simulated payload (see 3.2.1), shall: (*1*) meet the Gabarit International de Chargement (GIC) equipment gauge envelope as defined in interface standard MIL-STD-1366, and (*2*) shall be capable of withstanding multiple rail impacts without damage or degradation to the shelter or shelter/vehicle combination, and without damage to the tiedown cables, or blocking or bracing, (see 4.4.1).

3.4.2 *Fixed-wing Air Transport*—The dismounted shelter and shelter/vehicle combinations, with payload (see 3.2.1) shall be transportable in C-130 and larger Air Mobility Command (AMC) aircraft. The dismounted shelter shall be capable of being aircraft loaded while attached to a 463L pallet. The shelter mounted on the M1097 HMMWV shall be capable of roll-on/roll-off loading at ramp angles of 15 degrees on C-130 and larger AMC aircraft without special handling procedures or equipment.

3.4.3 *Rotary Wing External Air Transport*—The dismounted shelter and shelter/vehicle combination, with payload (see 3.2.1) shall be capable of being externally transported by DoD rotary wing aircraft, CH-47 and larger. At maximum loaded weight, the dismounted shelter and shelter/vehicle combination shall be capable of meeting the external air transport requirements specified in Annex A1. The dismounted shelter with or without mission equipment shall also be capable of being flown under the UH-60 helicopter. The shelter, shelter/vehicle and shelter/vehicle/trailer combinations shall be structurally capable of meeting the requirements of interface standard MIL-STD-209 and withstanding the loads when flown in: single point, dual point, and tandem load configurations and shall show no signs of damage or degradation as a result of being flown.

3.4.4 *Ground Mobility*—The shelter/vehicle combination, with payload (see 3.2.1), mounted on an M1097 HMMWW, shall be capable of being driven over road courses as defined by the Perryman, Churchville, and Munson courses found at Aberdeen Proving Ground, Maryland, without damage or degradation to the shelter, or damage or degradation to the vehicle, caused by the shelter. The shelter/vehicle combination shall meet U.S. and NATO countries highway legal limits.

3.4.5 *Fording*—The dismounted Type I shelter shall be capable of being forded to a depth of 30 in. (76 cm) of water, measured from the lowest part of the shelter, without structural damage, water penetration into the shelter, weight gain, or signs of seal failure.

3.4.6 *Material Handling*—The dismounted shelter, with payload (see 3.2.1), shall he capable of withstanding flat and rotational drops from 6 in. (15 cm) without structural damage, permanent deformation, or degradation. The shelter shall also be capable of being placed on an unimproved surface without structural damage, permanent deformation, or degradation.

3.4.7 *Lifting and Tiedown Provisions*—The shelter shall be provided with lifting and tiedown provisions that meet the requirements of interface standard MIL-STD-209.

3.5 *Identification*—The exterior of the shelter shall be permanently marked to allow the user to identify the manufacturer, contract number, and production unit. The dimensions which locate the center-of-gravity of the shelter in the three planes; the gross weight and mission equipment payload of the shelter; and the bearing pressure on the bottom shock elements. This information shall be visible with the shelter either mounted or dismounted from the vehicle. The location of the center-of-gravity shall be determined by the contractor using the first article unit of production with simulated mission payload.

3.6 *Recycled, Recovered or Environmentally Preferable Materials*—Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.7 *Toxicity*—Materials used shall cause no skin irritations or other injuries and produce no vapor hazards, including the emission of toxic or noxious odors, to personnel, in or around the shelter, under all environmental conditions. Exposure of personnel to toxic substances shall not be in excess of the threshold values contained in the ACGIH Threshold Limit Values.

3.8 *Flame Resistance*—The shelter shall be designed to be fire resistant in accordance with Specification E1925.

4. Verification

4.1 *Classification of Inspections*—Alternative test methods, techniques, or equipment, such as the application of statistical process control, the contractor may propose tool control or cost effective sampling procedures. Acceptable alternative verification approaches, including the use of sample testing, shall be identified in the contract. The inspection requirements specified herein are classified as follows:

4.1.1 *First Article Inspection*—When a first article inspection is required, it shall be applied to the first article submitted in accordance with 3.1. Specific verifications to be performed shall be defined by the contract (see 6.2) and shall include verifications contained in Table 6.

4.1.2 *Conformance Inspection*—When a conformance inspection is required (see 6.2), specific inspections to be performed shall be defined in the contract (see 6.2) and shall include any verification contained herein.

4.2 *Physical Performance Verification:*

TABLE 6 Sequence Of First Article Verifications

Verification	Requirement Paragraph	Verification Paragraph
Flame Resistance	3.8	4.7
Color and camouflage	3.3.7.1	4.3.7.1
Identification	3.5	4.5
Weight	3.2.1	4.2.1.1
Spare parts	3.2.2.1	4.2.2.1
Interface parts	3.2.2.2	4.2.2.2
Door handle	3.2.8.1	4.2.8.1
Shelter	3.2.3	4.2.3
Flatness	3.2.3.1	4.2.3.1(*1*)
Squareness	3.2.3.1	4.2.3.1(*2*)
Electromagnetic interference (EMI)	3.3.2	4.3.2
Roof loads	3.2.6	4.2.6
Floor loads	3.2.7	4.2.7
Door structure and hinge assembly	3.2.8.2	4.2.8.2
Door stop	3.2.8.3	4.2.8.3
Door maintainability	3.2.8.4	4.2.8.4
Door drip edge	3.2.8.5	4.2.8.5
Ladder	3.2.9	4.2.9
Roof access steps/handholds	3.2.11	4.2.11
Interface requirements	3.2.12	4.2.12
Chemical and biological (CB) resistance	3.2.4	4.2.4
Pressurization	3.2.5	4.2.5
Temperature range	3.3.3.1	4.3.3.1
Toxicity	3.7	4.6
Humidity	3.3.3.5	4.3.3.5
Toxicity	3.7	4.6
Marine atmosphere	3.3.1	4.3.1
Temperature shock	3.3.3.2	4.3.3.2
Heat transfer	3.3.4	4.3.4
Blowing dust/sand	3.3.5	4.3.5
Sunshine (ultraviolet effects)	3.3.3.4	4.3.3.4
Solar load	3.3.3.3	4.3.3.3
Blackout	3.3.7.2	4.3.7.2
Payload	3.2.1	4.2.1.2
Fixed-wing air transport	3.4.2	4.4.2
Flat-drop	3.4.6	4.4.6.1
Rotational drop	3.4.6	4.4.6.2
Shelter placement	3.4.6	4.4.6.3
Lifting and tiedown provisions	3.4.7	4.4.7
Rotary-wing air transport	3.4.3	4.4.3
Rail transport	3.4.1	4.4.1
Ground mobility	3.4.4	4.4.4
Watertightness	3.3.6	4.3.6
Fording	3.4.5	4.4.5
Impact Resistance	3.2.10	4.2.10
Electromagnetic interference (EMI) (2nd time)	3.3.2	4.3.2
Shelter dimensions	3.2.3.2	4.2.3.2
Door handle (2nd time)	3.2.8.1	4.2.8.1
Integration	3.2.3.3	4.2.3.3
Torque	3.2.3.3	4.2.3.3(*1*)
Pull-out	3.2.3.3	4.2.3.3(*2*)

4.2.1 *Weight and Payload:*

4.2.1.1 *Weight*—Compliance with 3.2.1 shall be determined by weighing the shelter, the mounting kit, and the pintle extension including their associated hardware. The scale used shall have 1 lb (453.6 g) or less graduation and shall have an accuracy of at least ±1 lb (453.6 g). The scale shall have a current calibration, traceable to the National Institute for Standards and Technology. Any item exceeding maximum weight listed in Table 1 shall be considered a failure.

4.2.1.2 *Payload*—Racks, shelves, attaching hardware, and individual weights shall be installed in the shelter to simulate a payload of 3300 lb (1496.9 kg) (see 3.2.1) The simulated payload shall be distributed throughout the shelter (see 6.2). This simulated payload shall be used for all verifications which require a payload, and any failure of this payload (racks, shelves, or attaching hardware) attributable to the shelter during the course of the test shall constitute failure of the test being performed.

4.2.2 *Parts Interchangeability:*

4.2.2.1 *Spare-parts*—Compliance with 3.2.2.1 shall be determined by selecting two shelters from the production lot of completed shelters. The parts listed in Table 2 shall be interchanged between the shelters. The interchange shall be accomplished by removing the fasteners, interchanging the parts and reinstalling the fasteners. Inability to interchange the parts or loss of functionality in accordance with 3.2.2.1 shall constitute failure of this test.

4.2.2.2 *Interface Parts*—Compliance with 3.2.2.2 shall be determined by selecting one of each of the parts listed in Table 3 from the production lot of completed shelters. The interchange shall be accomplished by removing the fasteners, interchanging the parts and reinstalling the fasteners with a government furnished shelter/vehicle combination. Inability to interchange the parts in accordance with 3.2.2.2 shall constitute failure of this test.

4.2.3 *Shelter Configuration*—The shelter shall be inspected to determine compliance with 3.2.3. Failure to meet the requirements of 3.2.3 shall constitute failure of this test.

4.2.3.1 *Shelter Flatness and Squareness*—The following flatness and squareness tests shall be performed to determine compliance with the requirements with 3.2.3.1. Failure to meet the requirements of 3.2.3.1 shall constitute failure of this test.

(1) Flatness—The flatness of the shelter panels shall be determined using a straight edge, that is at least 48 in. (120 cm) long, which is flat within 0.005 in. (0.13 mm) total. Two ⅛-in. (3.2 mm) shims shall be placed under the straight edge, one at each end. A series of measurements shall be taken along the length of the straight edge, in both the horizontal and vertical directions, across the shelter's interior/exterior surfaces to identify the largest cup or bow.

(2) Squareness—The shelter shall be tested in accordance with Specification E1925. For the purpose of this test, any horizontal surface shall be considered a roof/floor and any vertical surface shall be considered a wall. In those regions where a 36 in. (90 cm) square is impractical, a square of the appropriate size shall be used and the allowed gap shall be proportional.

4.2.3.2 *Shelter Dimensions*—Each non-reference dimension specified on the interface drawing 17-2-0035 shall be measured. Failure to meet the requirements of 3.2.3.2 shall constitute failure of this test.

4.2.3.3 *Integration*—The shelter shall be examined to determine compliance with 3.2.3.3. In addition, the shelter will be integrated with one or more of the systems listed in Table 4 (see 4.1). After the successful integration of the shelter, threaded fasteners shall be tested. Test fixtures shall be fashioned to evaluate the shelter's ability to securely hold threaded fasteners (10-32 through 1/2-20 bolts). The test fixtures shall be fashioned to induce only a twisting load to the shelter attachment point for the torque test and, primarily, only an axial tensile load through the centerline of the shelter attachment point for the pull-out test. Reaction forces applied

by the pull-out test fixture onto the shelter surface shall be outside a 3 in. (7.6 cm) radius measured from the center line of the fastener being tested. Failure to meet the requirements of 3.2.3.3 shall constitute failure of this test.

(1) Torque—To determine compliance, a torque load equal to 8 ft-lb (1.11 kg-m) for the 10-32 bolt and 10 ft-lb (1.38 kg-m), for the other bolts shall be applied to all fasteners installed in the shelter, fasteners used to integrate the system (see 4.2.3.3) should be used wherever possible. Failure to meet the torque requirements of 3.2.3.3 shall constitute failure of this test.

(2) Pull-out—To determine compliance, a tensile load equal to 800 lb (362.9 kg) for the 10-32 bolt and 1 000 lb (453.6 kg) for the other bolts shall be applied to all fasteners installed in the shelter, fasteners used to integrate the system (see 4.2.3.3) should be used wherever possible. Failure of meet the pull-out requirements of 3.2.3.3 shall constitute failure of this test.

4.2.4 *Chemical and Biological (CB) Resistance*—To determine compliance with the requirements of 3.2.4, it shall be verified that the shelter is finished in accordance with MIL-C-53072.

4.2.5 *Pressurization*—Air shall be supplied to the shelter, in operational configuration, with all appropriate openings closed, and an internal pressure of 1.2-in. water gauge shall be obtained and maintained. The air pressure and air flow shall be stabilized. Any additional air supplied to maintain specified internal pressure shall be recorded to determine compliance with 3.2.5. Failure to meet the requirements of 3.2.5 shall constitute failure of this test.

4.2.6 *Roof Loads*—The shelter roof shall be subjected to a uniform load of 40 pounds per square foot (lb/ft^2) (0.0195 kg/cm^2) over the entire surface. After removal of the uniform load, a 660-lb (299.4 kg) load over a 1- by 2-ft (30- by 61-cm) area at the weakest area of the roof shall be applied. Each test shall be for a duration of 5 min. Failure to meet the requirements of 3.2.6 both during the test and subsequent removal of the load shall constitute failure of this test.

4.2.7 *Floor Loads*—The shelter's floor shall be uniformly loaded to 65 lb/ft^2 (0.0317 kg/cm^2) for 30 min. Prior to removal of the uniform load, all moveable parts shall be operated to ensure no interference exists between components. After completion of the above test, the uniform load shall be removed and a concentrated 1 000 lb load shall be applied over a 1- by 2-ft (30- by 61-cm) area centered on the floor and left in position for 30 min. The 2-ft (61-cm) dimension shall be parallel to the shelter's sidewall. Prior to removal of the concentrated load, all movable parts shall be operated to ensure no interference exists between components. After completing both of the above tests, the concentrated load shall be removed and a load of 125 lb (56.7 kg), balanced on a 1 $in.^2$ (6.45 cm^2) block, shall be applied for 5 min to the center of the floor. Failure to meet the requirements of 3.2.7 shall constitute failure of this test.

4.2.8 *Door:*

4.2.8.1 *Door Handle*—The shelter door shall be securely closed. A 48 lb (22 kg) load shall be applied to the door handle in the direction which best facilitates opening the door. After it has been verified that 48 lb is adequate to open the door, the door shall be closed and a 48 lb (21.8 kg) force applied in the direction which best facilitates the securing of the door. After it has been verified that 48 lb (21.8 kg) is adequate to secure the door, the outer door handle shall be locked and the above procedure shall he repeated. Failure to meet the requirements of 3.2.8.1, shall constitute failure of this test.

4.2.8.2 *Door Structure and Hinge Assembly*—The door shall have a 200 lb (90.7 kg) static load applied parallel to the hinge line, along the door edge opposite the hinge, with the door open to 90 degrees. After 30 min the load shall be removed and the door examined. Failure to meet the requirements of 3.2.8.2 shall constitute failure of this test.

4.2.8.3 *Door Stop*—This test shall be performed with the door in the open position, held by the door stop mechanism. A fixture shall be attached to the midpoint of the edge of the door opposite from the hinge which shall permit the application of a load equivalent to 10 lb/ft^2 (0.0049 kg/cm^2) times the largest surface area of the door, normal to the door's surface, using free running pulleys and a ¼ in. (0.635 cm) diameter steel cable to transmit the load. Failure to meet the requirements of 3.2.8.3 shall constitute failure of this test.

4.2.8.4 *Door Maintainability*—The door shall be inspected to ensure compliance with 3.2.8.4. Failure to meet the requirements of 3.2.8.4 shall constitute failure of this test.

4.2.8.5 *Door Drip Edge*—The door shall be inspected to ensure compliance with 3.2.8.5. Failure to meet the requirements of 3.2.8.5 shall constitute failure of this test.

4.2.9 *Ladder*—The ladder shall be attached to the shelter, which is mounted on an M1097 HMMWV, or to a mounting surface which simulates the M1097 HMMWV, according to the contractors attaching instructions. A 400 lb (181.4 kg) load shall be applied for 5 min in the location, which shall cause the greatest amount of stress to the ladder. The ladder shall not be damaged or deformed. Failure to meet the requirements of 3.2.9 shall constitute failure of this test.

4.2.10 *Impact Resistance*—A hand tool as defined in 3.2.8.4 shall be selected and shall be allowed to freefall from a height of 30 in. (76 cm) onto the floor surface of the shelter. Failure to meet the requirements of 3.2.10 shall constitute failure of this test.

4.2.11 *Roof Access Steps/handholds*—A vertical load of 400 lb (181.4 kg) shall be applied one step at a time to the outer most point of each deployed step and maintained for 30 s. The access steps/handholds shall he evaluated for compliance with 3.2.11. Failure to meet the requirements of 3.2.11 shall constitute failure of this test.

4.2.12 *Interface Requirement*—The interfaces shall be evaluated for compliance with the interface drawings listed in 3.2.12. Failure to meet the requirements of 3.2.12 shall constitute failure of this test.

4.3 *Environmental Performance Verification:*

4.3.1 *Marine Atmosphere*—The shelter, in the operational and storage mode, shall be exposed to a marine atmosphere and tested in accordance with Specification E1925. Failure to meet the requirements of 3.3.1 shall constitute failure of this test.

4.3.2 *Electromagnetic Interference (EMI)*—The shelter shall be tested in accordance with Test Method E1851, except that

the measurements shall be made at 150 kHz and 14 Mhz in the H-field and 400 MHz, 1 GHz, and 10 GHz in Plane Wave. Failure to meet the requirements of 3.3.2 shall constitute failure of this test.

4.3.3 *Climatic Range:*

4.3.3.1 *Temperature Range*—The shelter shall be tested in accordance with, Specification E1925. Failure to meet the requirements of 3.3.3.1 shall constitute failure of this test.

4.3.3.2 *Temperature Shock*—The shelter shall be tested in accordance with MIL-STD-810. Failure to meet the requirements of 3.3.3.2 shall constitute failure of this test.

4.3.3.3 *Solar Load*—The shelter shall be tested in accordance with Specification E1925. Failure to meet the requirements of 3.3.3.3 shall constitute failure of this test.

4.3.3.4 *Sunshine (Ultraviolet Effects)*—The shelter's exterior components subject to solar exposure shall be tested in accordance with MIL-STD-810. Failure to meet the requirements of 3.3.3.4 shall constitute failure of this test.

4.3.3.5 *Humidity*—The shelter shall be tested for daily exposure of up to 97 % relative humidity for 20 h and exposure of 100 % relative humidity (with condensation) for 4 h in accordance with MIL-STD-810. Moisture Resistance Test, Method 507, Procedure II, Cycles 4 or 5. After cycling has been completed the shelter shall be inspected. Failure to meet the requirements of 3.3.3.5 shall constitute failure of this test.

4.3.4 *Heat Transfer*—The shelter shall be tested in accordance with Specification E1925. Failure to meet the requirements of 3.3.4 shall constitute failure of this test. The Type III shelters may have the tunnel openings closed off for this test.

4.3.5 *Blowing Dust/Sand*—The shelter shall be tested in accordance with test method standard MIL-STD-810, except the sand particle size shall be as specified in Table 7. The second 6-h test (Step 3 of Method 510.1) at 145°F (62.8°C) shall be performed immediately after reaching stabilization in Step 2 of Procedure 1. Subsequent to testing, all exposed hardware shall be operated. Failure to meet the requirements of 3.3.5 shall constitute failure of this test.

4.3.6 *Watertightness*—The shelter shall be tested in accordance Specification E1925. The shelter shall be weighed after the test in accordance with 4.2.1.1. Failure to meet the requirements of 3.3.6 as measured within the tolerance of the scales shall constitute failure of this test.

4.3.7 *Detectability:*

4.3.7.1 *Color and Camouflage*—The shelter shall be inspected to determine conformance with the color and pattern as specified in 3.3.7.1. Failure to meet the requirements of 3.3.7.1 shall constitute failure of this test.

4.3.7.2 *Blackout*—The shelter shall be tested in accordance with Specification E1925. Failure to meet the requirements of 3.3.7.2 as determined by an observer detecting rays of light, shall constitute failure of this test.

4.4 *Transportability Performance Verification:*

TABLE 7 Sand Particle Size

Size	Percent Passing Mesh Screen
1 000 microns	100 % passing mesh screen
500 microns	98 ± 2 % passing through mesh screen
150 microns	90 ± 2 % passing through mesh screen

4.4.1 *Rail Transport*—The dismounted shelter and shelter/vehicle combinations, with a simulated payload (see 4.2.1.2), shall be tested in accordance with test method standard MIL-STD-810, Method 516.4, Procedure VIII, rail impact test. When secured to the flatcar, the shelter and shelter vehicle combinations shall then be inspected for conformance to Gabarit International de Chargement (GIC) gauge envelope as shown in interface standard MIL-STD-1366. Failure to meet the requirements of 3.4.1 shall constitute failure of this test.

4.4.2 *Fixed-wing Air Transport Test*—The shelter and shelter/vehicle combinations, with a simulated payload (see 4.2.12), shall be tested for compliance with 3.4.2. MIL-HDBK-1791 shall be used for guidance in conducting this test. Failure to meet the requirements of 3.4.2 shall constitute failure of this test.

4.4.3 *Rotary-wing Air Transport Test*—The shelter and shelter/vehicle combinations, with a simulated payload (see 4.2.1.2), shall be tested in accordance with interface standard MIL-STD-209 and Annex A1. Failure to meet the requirements of 3.4.3 shall constitute failure of this test.

4.4.4 *Ground Mobility*—The shelter/vehicle combination, with a simulated payload (see 4.2.1.2), shall be tested for compliance with 3.4.4. SAE-AS8090, Type V Mobility, shall be used as guidance for this test. Failure to meet the requirements of 3.4.4 shall constitute failure of this test. Table 8 defines the speed/distance requirement for ground mobility testing.

4.4.5 *Fording*—The dismounted Type I shelter shall be immersed in water to a depth of 30 ± ½ in. (76 ± 1.3 cm), measured from the lowest part of the shelter, for a period of 30 min. Afterwards, the shelter shall be weighed in accordance with 4.2.1.1. Failure to meet the requirements of 3.4.5 as measured within the tolerance of the scales shall constitute failure of this test.

4.4.6 *Material Handling*—The dismounted shelter shall be tested in accordance with 4.4.6.1, 4.4.6.2, and 4.4.6.3 to determine compliance with 3.4.6.

4.4.6.1 *Flat-drop*—The shelter, with a simulated payload (see 4.2.1.2), shall be tested in accordance with Specification E1925. Failure to meet the requirements of 3.4.6 shall constitute failure of this test.

4.4.6.2 *Rotational Drop*—The shelter, with a simulated payload (see 4.2.1.2) shall be tested in accordance with Specification E1925. Failure to meet the requirements of 3.4.6 shall constitute failure of this test.

4.4.6.3 *Shelter Placement*—A 1.5 in. (3.8 cm) high cube shall be placed on a flat surface. The shelter with a simulated payload (see 4.2.1.2) shall be lowered onto the surface over the cube. Failure to meet the requirements of 3.4.6 shall constitute failure of this test.

4.4.7 *Lifting and Tiedown Provisions*—The shelter's lifting and tiedown provisions shall be inspected and tested for conformance to interface standard MIL-STD-209 and compliance with 3.4.7. Failure to meet the requirements of 3.4.7 shall constitute failure of this test.

4.5 *Identification*—The shelter shall be inspected to verify the requirements of 3.5. Failure meet the requirement of 3.5 shall constitute failure of this test.

TABLE 8 Ground Mobility—Limited Mileage (at the LMS Maximum Payload Configuration)

Surface/Test Course	Maximum Speed (MPH)	Average Speed (MPH)	Distance (Miles)
Highways—paved roads (Perryman straightaway)	60 (96.5 km/h)	50 (80.5 km/h)	100 (160.9 km)
Gravel roads (Munson gravel road course)	20 (32.2 km/h)	10 (16.1 km/h)	100 (160.9 km)
Cross-country (unimproved) (Perry cross-country secondary road "A")	20 (32.2 km/h)	10 (16.1 km/h)	600 (965.4 km)
Belgian block (Munson Belgian block)	20 (32.2km/h)	10 (16.1km/h)	200 (321.8 km)
Radial washboard 2 to 4-in. (5.1 to 10.2 cm) waves			5 laps
Two-inch (5.1 cm) washboard			5 laps

4.6 *Toxicity*—Demonstrate the shelter does not produce toxic exposures by meeting ACGIH Threshold Limit Values for materials used in the shelter's construction. After completing each of the following environmental verifications, Humidity (4.3.3.5) and Temperature Range (4.3.3.1), a panel of three inspectors shall perform odor tests. Any smell, persisting after 15 s, classified as nauseous, repellent, burning or strongly penetrating or causing dizziness, drying of nasal passages, sneezing or any adverse reaction, detected by any of the inspectors shall be considered a failure. Failure to meet the requirements of 3.7 shall constitute failure of this test.

4.7 *Flame Resistance*—Two specimens of a production sandwich panel 12 by 12 in. (30.5 by 30.5 cm) shall be tested in accordance with Specification E1925. Failure to meet the requirements of 3.8 shall constitute failure of this test.

5. Packaging

5.1 For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2).

6. Notes

NOTE 1—This section contains information of a general or explanatory nature, which may be helpful, but is not mandatory.

6.1 *Intended Use*—These shelters are highly mobile multipurpose shelters. They are suited for housing electronics and communications equipment. They can be mounted on the vehicles listed in 1.1. These Shelters are not intended for airdrop.

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

6.2.1 Title, number and date of the specification.

6.2.2 Quantities and types of shelters (see 1.2).

6.2.3 Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2 and 2.3).

6.2.4 Requirements for first article and conformance inspection, including number of shelters, inspection lot size, sample size, specific verification test to be performed, and sequence of tests (see 3.1, 4.1, 6.3).

6.2.5 Drawings of the System Integration Configurations (see 3.2.3.3) should be provided. If additional System Integration Configurations are required they should be included in the contract or purchase order.

6.2.6 If standard color and camouflage are not required, then alternate color and camouflage with verification procedures must be specified (see 3.3.7.1).

6.2.7 Payload distribution, rack layout/design, and/or center of gravity (see 3.2.1 and 4.2.1.2).

6.2.8 Packaging requirements (see 5.1).

6.3 *First Article*—When a first article is required (see 6.2), the purchaser should include specific instructions in all acquisition documents regarding arrangements for inspection and approval of the first article.

7. Keywords

7.1 command post; electronics; EMI shield; HMMWV; multipurpose; SICPS

ANNEX

(Mandatory Information)

A1. REQUIREMENTS FOR THE CERTIFICATION OF EXTERNALLY TRANSPORTED MILITARY EQUIPMENT BY DEPARTMENT OF DEFENSE ROTARY WING AIRCRAFT

A1.1 Scope

A1.1.1 This annex establishes the general and detailed requirements for the certification of externally transported military equipment by Department of Defense rotary wing aircraft. This annex is a mandatory part of the specification. The information contained herein is intended for compliance.

A1.2 General Requirements

A1.2.1 *Shipping Provisions:*

A1.2.1.1 *Number*—The number of slinging Provisions shall conform to the requirements as specified in the current revision of MIL-STD-209.

A1.2.1.2 *Location of Lift Provisions*—The location of slinging provisions shall conform to the requirements as specified in the current revision of MIL-STD-209.

A1.2.1.3 *Dimensions*—Slinging provisions shall conform to the dimensions as specified in the current revision of MIL-STD-209.

A1.2.1.4 *Frame Attachments*—Frame members should not be used as lifting points, unless specifically designed for that purpose. Frame members designated for lifting shall meet the structural requirements of the proof load testing section (see A1.3.2) and shall provide a means of restricting movement of the sling legs along the frame member.

A1.2.1.5 *Spreader Bars*—Spreader bars must be certified for use in EAT by the U.S. Army Soldier System Center-Natick. Spreader bars must meet the requirement:

(1) Spreader bars or other load spreading equipment must be specified in the new equipment specification.

(2) The contractor to ensure such devices remain with the item must provide stowage provisions on the item.

(3) Wooden spreader bars and/or other devices, which are to be locally fabricated, shall not be permitted under any circumstances.

(4) All devices shall meet the structural requirements of A1.3.2.4.

A1.2.2 *Rigging Procedures:*

A1.2.2.1 *Sling Sets*—The standard military sling sets and components shown in Table A1.1 shall be used for rigging.

A1.2.2.2 *Minimum Sling Leg Clearance*—The following clearances are required between sling legs and the item of equipment. If minimum clearances cannot be met, padding of the sling legs and/or proof load testing of potential contact area will be required, in accordance with the proof load testing section (see A1.3.2).

(1) Rope Type Sling Legs—A minimum clearance of 1 in. (2.54 cm) must be maintained between rope type (round cross section) sling legs and the load.

(2) Webbing Type Sling Legs—A minimum clearance of 8 in. (20.3 cm) must be maintained between webbing type (flat cross section) sling legs and the load.

A1.2.2.3 *Non-standard Lifting Components*—Non-standard (non-type classified) lifting components are not permitted unless approved by U.S. Army Soldier System Center-Natick and specified in the new equipment specification.

A1.2.2.4 *Drag Inducing Devices*—Drag inducing devices such as drogue chutes are not permitted unless approved by U.S. Army Soldier Systems Center-Natick.

A1.2.2.5 *Tandem Sling Loads*—The following requirements shall apply to all items of equipment rigged as tandem sling loads:

(1) Each individual item of equipment shall meet the requirements of this standard.

(2) All devices required and used for attaching tandem sling loads together must meet the structural requirements of this standard and shall be proof load tested in accordance with the requirements in A1.3.2.

(3) All tandem sling loads require flight testing in the tandem rigged configuration.

A1.2.3 *Static Lift Testing*—Static lift testing is required for each proposed lifting configuration, in accordance with A1.3.1. Static lift testing consists of lifting the item in the proposed rigging configuration to verify sling leg clearances and to determine sling leg angles and lift point loading.

A1.2.4 *Proof Load Testing*—Proof load testing is required for all slinging provisions, interference points, and load bearing components required for lifting, in accordance with A1.3.2. Proof load testing consists of a static pull test compression test of each slinging provision or component to verify structural adequacy.

A1.2.5 *Flight Testing*—Flight-testing is required for each item in its proposed lifting configuration by each specified aircraft in accordance with section A1.3.3. Flight maneuvers shall be performed and test results documented in accordance with the Multi-Service Flight Data Collection Sheet (MSFDCS).

A1.3 Detailed Requirements

A1.3.1 *Static Lift Testing*—The following requirements shall apply to all static lift testing:

A1.3.1.1 The item shall maintain stability while suspended in the rigged configuration.

A1.3.1.2 The maximum sling leg tension (static load times the materiel lift point load factor) shall not exceed the sling leg design limit load as specified in Table 1 for the proposed sling set. The static load is determined by the static lift test or by mathematical analysis. All load calculations shall be performed using the sling leg angles of the proposed rigging configuration.

A1.3.1.3 The sling legs shall meet the clearance requirements of A1.2.2.2. Structural members, which contact a sling leg in the rigged configuration, must be proof load tested, in accordance with A1.3.2.

A1.3.1.4 For dual point configurations, the weight distribution of the item shall meet the dual point weight balance requirements of the specified lifting aircraft (for example, no more than 60 % of the total load on either hook for the CH-53E helicopter).

TABLE A1.1 Military Sling Sets

Sling Set Identification			Sling Leg Characteristics		
Service	Capacity	NSN	Limit Load	Length	Type
Army	10 000 lb (4 536 kg)	1670-01-027-2902	11 300 lb (5 126 kg)	12 to 16 ft (3.66 to 4.88 m)	Rope
Army	25 000 lb (11 340 kg)	1670-01-027-2900	22 500 lb (10 206 kg)	12 to 16 ft (3.66 to 4.88 m)	Rope
Marine Corps	15 000 lb (6804 kg)	1670-00-902-3080	26 700 lb (12 111 kg)	15 to 18 ft (4.57 to 5.49 m)	Web
Marine Corps	40 000 lb (18 144 kg)	3940-01-183-2118	39 800 lb (18 053 kg)	12 to 16 ft (3.66 to 4.88 m)	Rope

A1.3.2 *Proof Load Testing:*

A1.3.2.1 *Material Lift Point Load Factor*—The materiel lift point load factor is calculated using Table A1.2 and is a function of the External Air Transport Weight (EATWT) and the EATWT/ Maximum Projected Frontal Area (MPFA) (see Fig. A1.1) ratio. For items of equipment with cargo carrying capability, the materiel lift point load factor shall be calculated for the minimum and maximum possible EATWT (for example, curbweight and gross vehicle weight).

(1) For an EATWT/MPFA ratio of greater or equal to 60 lb/ft^2 (0.0293 kg/cm^2), the materiel lift point load factor is a function of EATWT in accordance with Table A1.2.

(2) For an EATWT/MPFA ratio between 45 and 60 lb/ft^2 (0.022 and 0.0293 kg/cm^2), the materiel lift point load factor of Table A1.2 is increased by [0.16 × (60-(EATWT/MPFA))].

(3) For an EATWT/MPFA ratio of less than or equal to 45 lb/ft^2 (0.0220 kg/cm^2), the materiel lift point load factor of Table A1.2 is increased by 2.4.

A1.3.2.2 *Calculation of the Design Limit Load*—The design limit load is the maximum resultant product of the materiel lift point load factor multiplied by the static load for the worst case loading condition.

A1.3.2.3 *Proof Load Testing Requirements*—Proof load testing consists of a static pull test or compression load test, to the design limit load of A1.3.2.2, in accordance with the requirements in the current revision of MIL-STD-209. The following requirements shall also apply to all proof load testing for EAT certification:

(1) The application of proof load shall be in the direction of the sling leg when the item is in its' proposed rigged configuration.

(2) All structural members which contact the sling legs must be compression tested to the actual contact load times the Material Lift Point Load Factor.

(3) Load spreading devices or structures, subject to compressive buckling, must be compression tested to 1.5 times Design Limit Load without failure.

A1.3.2.4 *Ultimate Load Verification*—Analysis and/or testing must be performed to verify ultimate load capability.

A1.3.3 *Flight Testing*—The following requirements shall apply to all flight testing:

A1.3.3.1 All maneuvers specified by the Multi-Service Flight Data Collection Sheet (MSFDCS) shall be performed.

A1.3.3.2 The item shall demonstrate stability during all maneuvers performed during the flight test.

A1.3.3.3 The item shall not sustain any damage due to flight and shall be fully operational upon completion of the flight test.

A1.3.3.4 The results of the flight test shall be documented on the MSFDCS.

TABLE A1.2 Calculation of Materiel Lift Point Load Factor

EATWT lb (kg)/ MPFA ft^2 (cm^2)	EATWT, lb (kg)	Materiel Lift Point Load Factor
≥ 60 (0.0293)	5 000 (2268)	3.5
≥ 60 (0.0293)	5 001 (2268.45) – 15 000 (6804)	3.2
≥ 60 (0.0293)	15 001 (6804.45) – 36 000 (16 329.6)	3.2 – (0.000038 × (EATWT – 15 000[A]))

[A] If computing in kg, then subtract 6804 instead of 15 000.

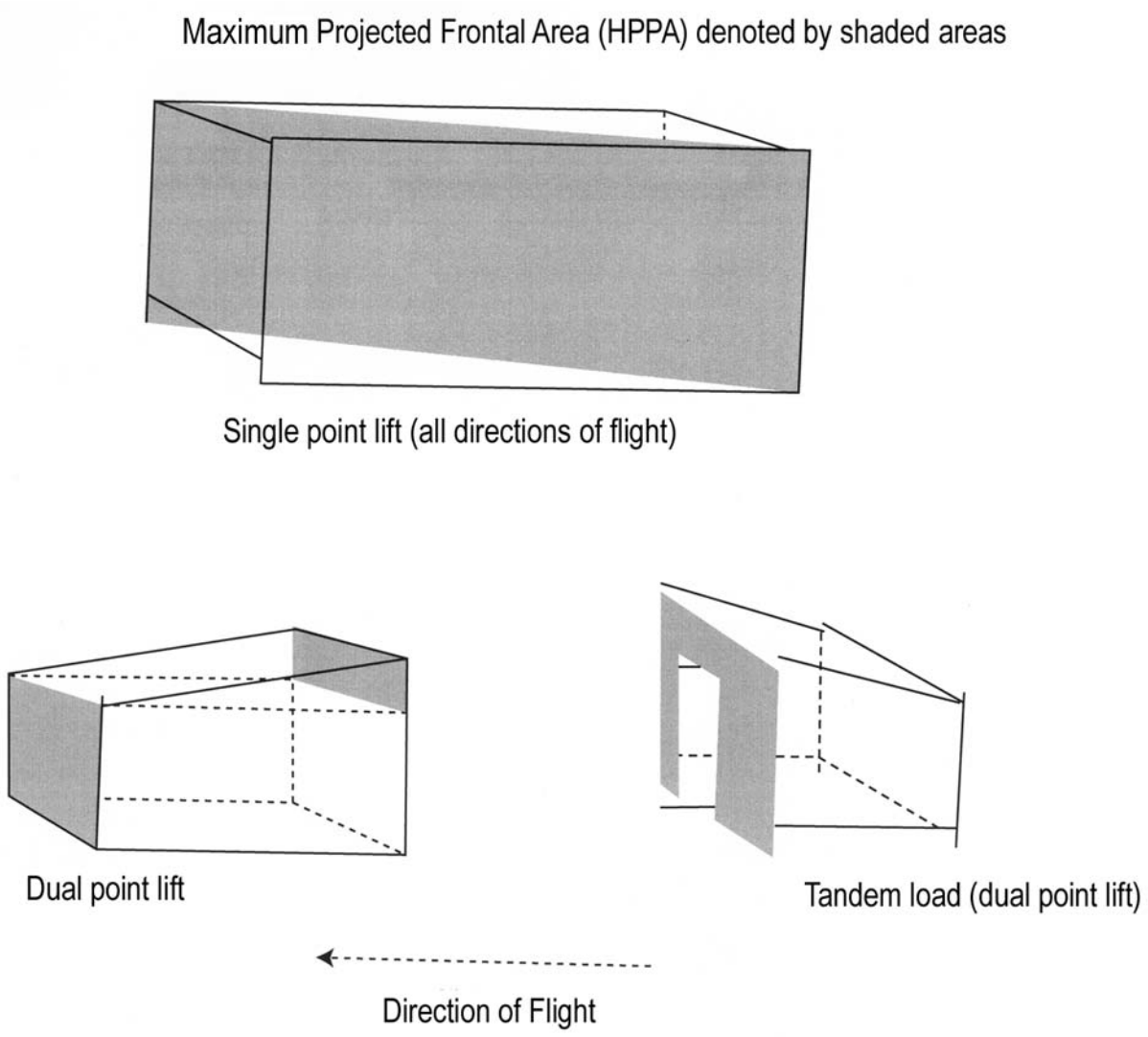

FIG. A1.1 Maximum Projected Frontal Area (MPFA)