Designation: E2518 – 11

Standard Specification for Cargo Bed Cover, Type IV (M923, 5 Ton Cargo Truck/M1083, 5 Ton Medium Tactical Vehicle (MTV)/ M1082, 5 Ton MTV Trailer)[1]

This standard is issued under the fixed designation E2518; 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 the general requirements for the Type IV Cargo Bed Cover (CBC). The Type IV CBC is a removable general purpose rigid wall enclosure that is mounted to the following model 5 ton cargo trucks: (*1*) the M923 Medium Tactical Vehicle (MTV) and (*2*) the M1083 MTV. It also can be mounted on the M1095 5 Ton MTV Trailer. The CBC provides environmental protection and security for mission equipment and items of general transport.

1.2 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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]

E1925 Specification for Engineering and Design Criteria for Rigid Wall Relocatable Structures

F501 Test Method for Aerospace Materials Response to Flame, with Vertical Test Specimen (for Aerospace Vehicles Standard Conditions) (Withdrawn 1998)[3]

2.2 *Federal Standards:*[4]

FED-STD-595 Colors Used in Government Procurement

2.3 *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-STD-1472 Design Criteria: Human Engineering

MIL-DTL-53039 Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant

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

2.4 *Military Handbooks:*[4]

MIL-HDBK-759 Human Engineering Design

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

2.5 *OSHA Documents:*[5]

Title 29 CFR 1910

2.6 *ACGIH Documents:*[6]

ACGIH Threshold Limit Values

3. General Requirements

3.1 *First Article*—When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.1.1. A first article is defined as a pre-production or an initial production sample consisting of one or more of each type of completed CBC.

3.2 *Conformance*—Items furnished under this specification shall be subjected to conformance inspection in accordance with 4.1.2.

[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.

Current edition approved Sept. 1, 2011. Published October 2011. Originally approved in 2006. Last previous edition approved in 2006 as E2518 – 06. DOI: 10.1520/E2518-11.

[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] The last approved version of this historical standard is referenced on www.astm.org.

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

[5] Available from Occupational Safety and Health Administration (OSHA), 200 Constitution Ave., NW, Washington, DC 20210, http://www.osha.gov.

[6] Available from American Conference of Governmental Industrial Hygienists, Inc. (ACGIH), 1330 Kemper Meadow Dr., Suite 600, Cincinnati, OH 45240, http://www.acgih.org.

3.3 *Operating Requirements*—Unless otherwise specified, the Type IV CBC shall meet the following operating requirements in both the height extended and height retracted configurations.

3.3.1 *Configurations*—The Type IV CBC shall have two configurations, height extended and height retracted. The height extended configuration is the normal operating configuration for the CBC and provides for maximum usable volume. The height retracted configuration provides less usable volume but is capable of being loaded on the C-130 and C-141 Military Airlift Command (MAC) fixed wing aircraft. Unless otherwise specified, the CBC shall meet all the requirements of this specification sheet in both the height extended and height retracted configurations.

3.3.2 *Height Adjustment Device*—In both its payloaded (see 3.3.8) and non-payloaded configurations the Type IV CBC shall be capable of being manually extended from its retracted configuration and vise versa by two soldiers in 20 min using only the tools of the Basic Issue Items (BII) and the Additional Authorization List (AAL) as described in the carrier's Operator's Manual, and tools supplied with the CBC. Any hardware or special tools required for extending/retracting the CBC shall be provided as part of the CBC. Additional materials handling equipment shall not be required. The CBC shall be capable of multiple extension/retraction cycles, in accordance with its manual, without damage or degradation to either the CBC, its carrier, or its height adjustment devise.

3.3.3 *CBC Service Life, Reliability, and Maintainability*—The service life for the CBC shall be at least 15 years. The mean time to repair at the organizational and intermediate level shall not exceed 4 hours at the 90th percentile. Gaskets, seals, flaps, and other materials shall be fixed to the CBC and shall be replaceable.

3.3.4 *Personnel Hazards:*

3.3.4.1 *Mechanical*—The CBC shall conform to regulatory and consensus design safety standards, unless military applications require more stringent limits, and reflect applicable system and personnel safety factors. The CBC shall provide personnel maximum access and safety while installing, operating, and maintaining the equipment.

3.3.4.2 *Edge Rounding*—All exposed edges and corners shall be rounded. Sharp edges and corners that can present a personnel safety hazard or caused equipment damage during operation and maintenance shall be rounded or suitably protected.

3.3.5 *Toxicity:*

3.3.5.1 *Materials*—Certain chemicals have been identified in Title 29 CFR 1910 as cancer-producing substances (carcinogens). Materials used in the CBC shall not contain these chemicals. Consideration of the human toxicity of a substance should be given prior to material selection.

3.3.5.2 *Gases or Vapors*—The materials, as installed in the equipment and under service conditions specified in the equipment specification, shall not liberate noxious odors, toxic or corrosive gases, or vapors that would be detrimental to the health of personnel.

3.3.6 *Vents*—The CBC shall include two vents for fresh air ventilation. The vents shall be located to facilitate fresh air flow through the cargo area. The vents shall prevent intrusion of driven rain and have provisions for blackout. Vents shall be capable of providing ventilation when the vehicle is both stationary and on the move. Vents requiring operation shall be capable of being operated manually. The interior surface of the door shall have a warning in at least 1½ in. high letters contrasting the color of the door. The warning shall say "Warning—Suffocation hazard, door must remain open while occupied." This requirement shall apply to the Type IV CBCs in the height extended configuration only.

3.3.7 *Roof Loads*—The CBC roof shall be capable of supporting, without structural damage, degradation or permanent deformation: (*1*) a uniformly distributed load of 40 lb/ft^2 over the entire surface and (*2*) a concentrated load of 660 lb over a 1 × 2 ft area applied anywhere on the roof.

3.3.8 *Interior Payload Provisions*—The CBC shall be capable of accepting threaded fasteners such as rivnuts and inserts for mounting equipment to the interior of the CBC. The Type IV CBC and its Interior Payload Provisions shall be capable of supporting at least 1100 lb of payload during its stationary, rail transport, ground mobility and crane lifting operation modes without damage or degradation to either the CBC or its interior payload provisions. The payload shall be attached to the interior surfaces using interior payload provisions and shall be distributed as follows: 200 lb mounted to each of the four wall surfaces, or 400 lb mounted to each of the two side wall surfaces, and 300 lb mounted to the ceiling.

3.3.9 *Personnel Door Loads:*

3.3.9.1 *Personnel Door Structure*—The personnel door, including its frame(s) and hardware, shall be capable of supporting a 200 lb static load without damage or degradation to either the CBC or its personnel door, frame(s) and hardware. The load shall be applied parallel to the hinge line, along the door edge opposite the hinge, with the personnel door open to 90 degrees. The personnel door shall operate freely after application of the load.

3.3.9.2 *Door Stop*—The personnel door, including its frame(s) and hardware, shall withstand a wind gust of 60 mph in any direction when the door is secured by its door stop.

3.3.10 *Surface Impact Resistance*—The exterior surface of the CBC's roof shall be capable of withstanding a blow from a 30 lb steel cylinder, 3 in. in diameter with a hemispherical end, dropped from a height of 30 in., without structural degradation. All other exterior wall surfaces shall be capable of withstanding a blow from the same steel cylinder, dropped from a height of 16 in., without structural degradation.

3.3.11 *Tailgate Operation*—The CBC, when mounted on its carrier, shall not inhibit operation of the carrier's tailgate.

3.3.12 *Blackout*—The CBC/carrier combination, with the personnel door and ports closed, shall not permit a light source from within to emit detectable amounts of light. This requirement shall apply to the Type IV CBCs in the height extended configuration only.

3.4 *Support and Ownership Requirements*—Unless otherwise specified, the Type IV CBC shall meet the following support and ownership requirements in both the height extended and height retracted configurations.

3.4.1 *Weight*—The Type IV CBC, including its height adjustment devise, but not its hardware/adapter kit, shall weigh no more than 800 lb.

3.4.2 *Personnel Door*—The Type IV CBC shall be equipped with a vertically hinged single personnel door, centrally located in the rear wall. The door opening shall be a minimum of 48.00 in. wide by 60.00 in. high in the height extended configuration and shall be a minimum of 48.00 in. wide by 24.00 in. high in its height retracted configuration. The personnel door shall swing to the outside. The personnel door's fully opened position shall be at least 135 degrees from its closed position. A door stop, for securing the personnel door in its fully opened position, shall be provided. In its closed position the personnel door shall prevent the intrusion of driven rain and dust and shall provide blackout protection.

3.4.2.1 *Door Handle*—The personnel door shall be equipped with a door handle that provides positive closure. From either side, the door handle shall be capable of being moved to its opened or closed position with a maximum force of 30 lb applied to the door handle. The personnel door shall be capable of being padlocked from the outside securing the CBC from the exterior.

3.4.2.2 *Secondary Exit*—A secondary exit shall be provided within the personnel door. The secondary exit opening shall be a minimum of 35.00 in. wide by 30.00 in. high. The secondary exit shall be capable of being opened with a maximum force of 30 lb applied to the release mechanism from inside of the CBC with: (*1*) the tailgate closed and the personnel door locked (*2*) the tailgate closed and the personnel door unlocked and (*3*) the tailgate open and the personnel door locked. With the personnel door locked, the secondary exit shall not be capable of being opened from outside the CBC. The secondary exit shall provide unobstructed egress for military personnel. This requirement shall apply to the Type IV CBC in the height extended configuration only.

3.4.3 *Ladder*—A ladder shall be provided to allow military personnel to safely enter and exit the CBC/carrier combination utilizing the CBC's Personnel Door. The ladder shall be capable of supporting at least 400 lb applied to any individual step without damage or degradation to either the CBC, carrier or ladder. The CBC shall have a stowage location for the ladder capable of securely retaining the ladder in all transportation modes without impeding any operations of the CBC or its carrier. The M1083 and M1095 carriers applicable to the Type IV CBC are equipped with a ladder.

3.4.4 *Roof Access Handholds/Footholds*—Roof access handholds/footholds shall be provided for safe access from the ground to and descend from the roof when the CBC is mounted on its carrier. The roof access handholds/footholds shall either be built into the CBC or attached to the exterior. The roof access handholds/footholds shall be designed such that the CBC/carrier combination does not: (*1*) exceed the legal highway size limitations imposed by states and foreign countries and (*2*) limit any other modes of transportation (for example, rail, air, ship). The roof access handholds/footholds shall be designed for the 5th percentile female through the 95th percentile male military personnel. Each roof access handhold/footholds shall be capable of supporting 400 lb without damage or degradation to either the CBC or the roof access step/handhold.

3.4.5 *Power and Signal Entry Ports*—Two ports shall be provided in the side walls as forward as practicable to permit the pass through of power and signal lines into the CBC enclosed area when the CBC is in its height extended configuration. One port shall be located on the driver's side and the other port shall be located on the passenger's side. Each port shall be a minimum of 4 in. in diameter and not allow the intrusion of driven rain and dust into the CBC and have provisions for blackout. The power and signal access ports shall have provisions for blackout.

3.4.6 *Transportability*—The CBC/carrier combination shall be capable of obtaining transportability approval from the Military Traffic Management Command transportability Engineering Agency (MTMCTEA) based on the requirements for transport in the following modes:

3.4.6.1 *Rail*—The CBC/carrier combination with payload shall: (*1*) meet the Gabarit International de Chargement (GIC) equipment gauge envelope as defined in interface standard MIL-STD-1366, and (*2*) be capable of withstanding multiple rail impacts without damage or degradation to either the CBC or its carrier and without damage to the tiedown cables, or blocking or bracing.

3.4.6.2 *Fixed Wing*—The CBC/carrier combination shall be transportable in C-130 and larger Air Mobility Command (AMC) aircraft. The combination shall also be capable of roll-on/roll-off loading at ramp angles of 15 degrees on the C-130 and larger AMC aircraft without special handling procedures or equipment. The Type IV CBCs shall be capable of roll-on/roll-off loading on the C-130 and C-141 AMC aircraft in the height retracted configuration only.

3.4.6.3 *Helicopter Sling Load (HSL)*—The Type IV CBC mounted on its carrier, in all its payload configurations, shall be capable of helicopter sling transport by CH-47 or larger rotary wing aircraft in the dual point configuration without damage or degradation to either the Type IV CBC or the carrier as a result of being flown.

3.4.6.4 *Ground Mobility*—The CBC/carrier combination shall be capable of meeting the same mission profile and miles as the carrier when driven over road courses as defined by Perryman, Churchville, and Munson courses found at Aberdeen Proving Ground, Maryland, without damage or degradation to either the CBC or its carrier. The CBC/carrier combination shall meet U.S. and NATO countries' highway legal limits.

3.4.6.5 *Lifting Provisions*—The CBC shall be equipped with lift provisions to enable it, with its payload, to be lifted on and off its carrier without damage or degradation to either the CBC or its lift provisions. The CBC's lift provisions shall conform to the crane lift requirements of interface standard MIL-STD-209.

3.4.7 *Finish:*

3.4.7.1 *Non-Skid Surfaces*—All horizontal surfaces of the CBC (such as, interior floor (if applicable) and exterior roof) shall be non-skid.

3.4.7.2 *Interior Color*—The color of the interior walls and ceiling of the CBC shall be semi-gloss white (see 6.4).

3.4.7.3 *Exterior Color*—Unless otherwise specified in the contract (see 6.2), the exterior color of the CBC shall be in accordance with a three-color camouflage pattern. The pattern shall be generated by the government and supplied to the contractor (see 6.4.1). The interior surface of the personnel door and secondary exit shall match the primary exterior color of the CBC.

3.4.8 *Chemical Agent Resistance*—All exterior surfaces, except weather seals and gaskets, shall be Chemical Agent Resistant Coated (CARC) in accordance with MIL-DTL-53072 using MIL-DTL-53039 chemical agent resistant coatings. All interior surfaces, except weather seals and gaskets, shall be Chemical Agent Resistant Coated (CARC) in accordance with MIL-DTL-53072 chemical agent resistant coating. Weather seals shall be resistant to chemical and biological agent contamination, decontamination fluids and petroleum products or be replaceable at the unit level.

3.4.9 *Special Tools*—No special tools or equipment shall be required to mount, dismount or operate the CBC. The Type IV CBC may have a height adjustment devise which includes special tools or equipment (see 3.3.2).

3.4.10 *Mounting*—The CBC shall be capable of multiple mounting and dismounting cycles from its carrier, in accordance with its manual, without damage or degradation to either the CBC, its carrier or its mounting provisions and hardware. These hardware/adapter kits shall allow the Type IV CBCs to mount to their respective carriers, and shall be ordered separately (see 6.2). With the CBC mounted to the carrier, the D-rings in the bed of the carrier shall not be covered, nor shall the operation of the D-ring be limited.

3.4.11 *Carrier Interface:*

3.4.11.1 *Carrier Series*—Using applicable adapters (see 3.4.10) the Type IV CBC shall be capable of mounting to, and allowing full operation of, the following carriers:

(1) M923, 5 Ton Cargo Truck,

(2) M1083, 5 Ton Medium Tactical Vehicle (MTV), and

(3) M1095, 5 Ton MTV Trailer.

3.4.11.2 *Carrier Modifications:*

(1) M923 Modifications—Installation of the Type IV CBC shall utilize the M923's existing mounting regions to the maximum extent possible. Modifications to the M923, such as drilled holes, shall be kept to a minimum. No modifications shall be made to the vehicle's frame. Any proposed modification(s) made to the M923 must be submitted to the government for approval prior to incorporation into the design. Only modifications capable of being made in the field with hand tools or small power tools (that is, installation of rivnuts, drilled or punched holes) shall be considered. Only modifications which permit multiple mounting and dismounting shall be considered.

(2) M1083 and M1095 Modifications—The Type IV CBC shall be capable of being mounted to the M1083 and M1095 using the existing mounting regions of the carriers. No modifications shall be made to these carriers. The D-rings in the bed of the carrier shall not be covered, nor shall the operation of the D-ring be limited.

3.4.11.3 *Hardware/Adapter Kits*—The CBC shall have provisions to mount it to any of the carriers listed in 3.4.11.2*(1)*. These provisions may include separate hardware or adapters for each type carrier. The hardware/adapter kits shall have as much commonality as practicable. The hardware/adapters kits shall be ordered separately from the CBC. The kits shall not be part of the CBC weight but shall weigh no more than 200 lb. A ladder meeting the requirements of 3.4.3 shall be provided for the M923 hardware/adapter kit only. The M1083 and M1095 carriers come with a ladder, and therefore do not require a ladder.

3.4.11.4 *Installation Tools*—The Type IV CBC using the appropriate carrier hardware/adapter kit shall be capable of being attached to, and detached from, the carrier using only those tools of the Basic Issue Items (BII) and the Additional Authorization List (AAL) as described in the carrier's operator's manual.

3.4.11.5 *Interference*—The Type IV CBC shall not obstruct or interfere with the installation, removal, or operation of the carrier's components (such as, reflectors, brake/tail lights, rear antenna mounts or D-rings).

3.4.12 *Identification*—The exterior endwall at the door end of each CBC shall be permanently marked to identify the item nomenclature, including CBC type, manufacturer, contract number, national stock number, tare weight and serial number. This information shall be visible, by personnel standing on the ground, with the CBC either mounted or dismounted from its carrier.

3.5 *Environmental Requirements*—Unless otherwise specified, the Type IV CBCs shall meet the following Environmental requirements in both the height extended and height retracted configurations.

3.5.1 *Humidity Resistance*—The CBC shall be capable of withstanding daily exposure of up to 97 % relative humidity for 20 hours and exposure of 100 % relative humidity (with condensation) for 4 hours without evidence of corrosion, structural damage, degradation or permanent deformation.

3.5.2 *Marine Atmosphere (Sea-Salt Fallout)*—The CBC, when exposed to a marine environment sea salt fallout rate equivalent to 25 pounds per acre per year (2.0 g/m^2/yr), shall not corrode or degrade.

3.5.3 *Ice*—The CBC including its door(s), vents and cable ports shall be capable of withstanding and remaining operational while the CBC is exposed to the forces and effects due to the accumulation of 0.25 in. (6 mm) of ice produced by freezing rain, mist, or sea spray.

3.5.4 *Temperature Range*—The CBC shall be capable of withstanding temperatures ranges of −60ºF to 160ºF in storage and transit and −60ºF to 120ºF plus solar load for normal operations. The CBC, including fasteners, seals or other hardware, shall show no evidence of corrosion or degradation.

3.5.5 *Temperature Shock*—The CBC shall withstand a temperature shock from an equilibrium state of 160ºF to −70ºF within 5 min and from an equilibrium state of −70 ºF to 160ºF within 5 min without evidence of structural damage, degradation, or permanent deformation.

3.5.6 *Blowing Sand and Dust*—The CBC, when mounted on its carrier, shall resist the effects of blowing sand and dust without damage or degradation. The CBC shall remain fully operational with no more than 16.80 $in.^3$ (0.50 pt) of sand

penetration into the interior of the CBC. Blowing sand is defined as 150 – 1000 micron particles in concentrations of 1.32×10^{-4} lb/ft^3 with a wind speed of 1750 ft/min.

3.5.7 *Ultraviolet Effects*—The CBC shall show no evidence of structural damage, degradation or permanent deformation as a result of exposure to ultraviolet effects.

3.5.8 *Fire Resistance*—The CBC shall be non-burning or self-extinguishing (that is, have a flame time of less than 30 seconds) after removal of a flame.

3.5.9 *Fungus*—The CBC shall be impervious to fungus growth. Materials shall be selected to minimize fungus growth.

3.5.10 *Watertightness*—The CBC, when mounted on its carrier, without the aide of supplementary sealing, caulking, taping or other means, shall be capable of withstanding a 40 psig spray from nozzles located 19 in. from, and normal to, each external CBC surface. The CBC shall not allow more than 8 fluid oz. of water into the interior of the CBC in a 40-min period and the weight of the CBC shall not increase by more than 1.00 lb.

3.6 *Interface and Operability Requirements*—Unless otherwise specified, the Type IV CBCs shall meet the following interface and operability requirements in both the height extended and height retracted configurations.

3.6.1 *Interchangeability*—The spare parts of the CBC produced under this specification shall be functionally and dimensionally interchangeable without modification or rework of the part or assembly.

3.6.2 *Size*—The Type IV CBC shall enclose the cargo (rear) portion of the carrier to provide the maximum volume practicable for its configuration.

3.6.2.1 *Interior Width, Length, and Height*—The interior dimensions of the Type IV CBC shall be no less than 140.00 in. long by 77.0 in. wide by 72.00 in. high in its height extended configuration and shall be no less than 140.00 in. long by 77.0 in. wide by 30.00 in. high in its stowed configuration. The CBC shall not interfere, cover or limit the operation of the D-Rings located around the perimeter of the host vehicle cargo bed.

4. Verification

4.1 *Classification of Inspections*—The inspection requirements specified herein are classified as follows:

(1) First article inspection (see 4.1.1), and

(2) Conformance inspection (see 4.1.2).

4.1.1 *First Article Inspection*—When a first article inspection is required (see 3.1 and 6.2), the CBC shall undergo the tests and examinations outlined in Table 1. Sampling for the first article inspection shall be as specified in the contract or purchase order.

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

4.2 *Verification Methods*—Verification methods can include visual examination, measurement, testing, simulation, modeling, engineering evaluation, component properties analysis, certification and similarity to previously approved or previously qualified designs. Unless otherwise specified, the Type IV CBC's requirements shall be verified in both the height extended and height retracted configurations.

4.2.1 *Verification Alternatives*—The contractor may propose alternative test methods, techniques, or equipment, including the application of statistical process control, tool control, or cost effective sampling procedures to verify performance. In the case of the Type IV CBC, the contractor may propose to perform verifications in only one configuration (that is, extended or retracted) if it can be shown that this method will to verify the requirement for both configurations.

TABLE 1 Sequence of First Article Verifications

Verification	Requirement Paragraph	Verification Paragraph
Configurations	3.3.1	4.3.1
Height adjustment device	3.3.2	4.3.2
CBC service life, reliability, and maintainability	3.3.3	4.3.3
Personnel hazards	3.3.4	4.3.4
Mechanical	3.3.4.1	4.3.4.1
Edge rounding	3.3.4.2	4.3.4.2
Toxicity	3.3.5	4.3.5
Materials	3.3.5.1	4.3.5.1
Gases or vapors	3.3.5.2	4.3.5.2
Vents	3.3.6	4.3.6
Roof loads	3.3.7	4.3.7
Interior payload provisions	3.3.8	4.3.8
Personnel doors	3.3.9	4.3.9
Personnel door structure	3.3.9.1	4.3.9.1
Door stop	3.3.9.2	4.3.9.2
Surface impact resistance	3.3.10	4.3.10
Tailgate operation	3.3.11	4.3.11
Blackout	3.3.12	4.3.12
Support and ownership requirements	3.4	4.4
Weight	3.4.1	4.4.1
Personnel door	3.4.2	4.4.2
Door handle	3.4.2.1	4.4.2.1
Secondary exit	3.4.2.2	4.4.2.2
Ladder	3.4.3	4.4.3
Roof access step/handholds	3.4.4	4.4.4
Power and signal access ports	3.4.5	4.4.5
Transportability	3.4.6	4.4.6
Rail	3.4.6.1	4.4.6.1
Fixed wing	3.4.6.2	4.4.6.2
Helicopter sling lift (HSL)	3.4.6.3	4.4.6.3
Ground mobility	3.4.6.4	4.4.6.4
Lifting provisions	3.4.6.5	4.4.6.5
Finish	3.4.7	4.4.7
Non-skid surfaces	3.4.7.1	4.4.7.1
Interior color	3.4.7.2	4.4.7.2
Exterior color	3.4.7.3	4.4.7.3
Chemical agent resistance	3.4.8	4.4.8
Special tool	3.4.9	4.4.9
Carrier interface	3.4.11	4.4.11
Identification	3.4.12	4.4.12
Environmental requirements	3.5	4.5
Humidity resistance	3.5.1	4.5.1
Marine atmosphere	3.5.2	4.5.2
Ice	3.5.3	4.5.3
Temperature range	3.5.4	4.5.4
Temperature shock	3.5.5	4.5.5
Blowing sand and dust	3.5.6	4.5.6
Ultraviolet effects	3.5.7	4.5.7
Fire resistance	3.5.8	4.5.8
Fungus	3.5.9	4.5.9
Watertightness	3.5.10	4.5.10
Interface and operability requirements	3.6	4.6
Interchangeability	3.6.1	4.6.1
Size	3.6.2	4.6.2
Interior width, length, and height	3.6.2.1	4.6.2.1
Exterior width, length, and height	3.6.2.2	4.6.2.2

4.3 *Operating Requirements Verification*

4.3.1 *Configurations*—Unless otherwise specified, all verifications shall be performed in both the height extended and height retracted configurations. Failure to meet the requirements of 3.3.1 shall constitute failure of this test.

4.3.2 *Height Adjustment Device*—To verify the requirements of 3.3.2, the CBC while mounted on its carrier, shall undergo 10 extension/retraction cycles in accordance with its manual, using only the hardware provided with the CBC. The CBC and its carrier shall be inspected after each cycle for damage or degradation. Failure to meet the requirements of 3.3.2 shall constitute failure of this test.

4.3.3 *CBC Service Life, Reliability, and Maintainability*—The CBC shall be analyzed to determine that its service life is in compliance with 3.3.3. Repairs that are to be completed at the organizational and intermediate levels shall be identified with projected times to repair. Failure to meet the requirements of 3.3.3 shall constitute failure. Using only the hardware provided with the CBC, the CBC shall undergo 10 cycles of installation and removal from its carrier in accordance with its manual. The CBC and its carrier shall be inspected after each cycle for damage or degradation. Failure to meet the mounting and dismounting requirements of 3.3.3 shall constitute failure of this test. The appropriate hardware/adapter kit shall be provided for the Type IV CBCs.

4.3.4 *Personal Hazards:*

4.3.4.1 *Mechanical*—The CBC shall conform to regulatory, such as Title 29 CFR 1910, and consensus design safety standards, that is, ANSI, unless military STDs or HDBKs require more stringent limits, and reflect applicable system and personnel safety factors. The CBC shall provide personnel maximum access (MIL-STD-1472 and MIL-HDBK-759) and safety while installing, operating, and maintaining the equipment.

4.3.4.2 *Edge Rounding*—All exposed edges and corners shall be rounded to a radius not less than 0.03 in. (0.75 mm). Sharp edges and corners that can present a personnel safety hazard or caused equipment damage during operation and maintenance shall be rounded to a radius not less than 0.05 in. (1.3 mm) or suitably protected.

4.3.5 *Toxicity:*

4.3.5.1 *Materials*—Certify that Material Safety Data Sheets do not include chemicals identified in Title 29 CFR 1910 as cancer-producing substances (carcinogens).

4.3.5.2 *Gases or Vapors*—Demonstrate the CBC does not produce toxic exposures exceeding OHSA permissible exposure limits, Title 29 CFR 1910 or ACGIH Threshold Limit Values for noxious odors, toxic or corrosive gases, or vapors from materials used in the CBC's construction. Failure to meet the requirements of 3.3.5.2 shall constitute failure of this test.

4.3.6 *Vents*—The ventilation ports shall be inspected and manually operated (if applicable) for compliance with 3.3.6. Failure to meet the requirements of 3.3.6 shall constitute failure of this test. The Type III CBC shall be verified in the height extended configuration only.

4.3.7 *Roof Loads*—The CBC roof shall be subjected to a uniform load of 40 lb/ft^2 over the entire surface. After removal of the uniform load, a 660 lb load shall be applied to the weakest region of the roof over a 1 × 2 ft area. Each test shall be for duration of 5 min. Failure to meet the requirements of 3.3.7 shall constitute failure of this test.

4.3.8 *Interior Payload Provisions*—The Type III CBC, with the interior payload described in 3.3.8, shall be tested in accordance with 4.4.6.1 (Rail), 4.4.6.4 (Ground Mobility). The CBC shall also be tested in accordance with 4.4.6.5 (Lifting Provisions). Failure to meet the requirements of 3.3.7 shall constitute failure of this test.

4.3.9 *Personnel Door Loads:*

4.3.9.1 *Personnel Door Structure*—The door shall have a 200 lb static load applied parallel to the hinge line, along the door edge opposite the hinge, with the door open 90 degrees. After 10 min the load shall be removed and the door examined. Failure to meet the requirements of 3.3.9.1 shall constitute failure of this test.

4.3.9.2 *Door Stop*—The door shall be in the open position held by the door stop mechanism. A load, equal to 10 lb/ft^2 times the largest surface area of the door, shall be applied normal to the door's surface. The load shall be applied at the midpoint of the edge of the door, opposite the hinge, for 1 min. The load shall be removed and reapplied to the door at the same point, in the opposite direction, for 1 min. Failure to meet the requirements of 3.3.9.2 shall constitute a failure of this test.

4.3.10 *Surface Impact Resistance*—Each type of roof and wall construction found on the completed CBC shall be subjected to an impact from a 30 lb steel cylinder. The cylinder shall be 3.00 in. in diameter with a hemispherical end. The cylinder shall be dropped from a height of 30.00 in. onto the exterior surface of the roof and from a height of 16 in. onto the exterior surfaces of the walls. The cylinder shall be oriented and dropped vertically so that the center of the hemispherical end of the cylinder strikes the center of the designated test area. The test area shall be oriented horizontally. The cylinder shall not be permitted to reimpact the test area after the first impact. The CBC's interior and exterior surfaces shall be visually examined for compliance with 3.3.10. There shall be no fractures on any surface. There shall be no dents on the interior surface. There shall be no damage or degradation permitted, on either surface, outside a 3.00 in. radius measured from the point of impact of the cylinder. In addition, there shall be no damage which would indicate loss of structural integrity.

4.3.11 *Tailgate Operation*—With the CBC mounted on its carrier, the carrier's tailgate shall be operated (that is, opened and then closed). Failure to meet the requirements of 3.3.11 shall constitute failure of this test.

4.3.12 *Blackout*—The CBC/carrier combination shall be located at the center of a circle of radius 300 metres, on level ground, in an area with a wooded or hilly background (that is, the silhouette should not be above the horizon). There shall be no significant obstructions (higher than 18 in. (46 cm)) between observers located on the circumference of the circle and the CBC/carrier combination. Testing will be conducted in hours of darkness between early evening nautical twilight (EENT) and beginning morning nautical twilight (BMNT) on a moonless night. A 100-Watt unshielded white light bulb, rated at no less than 17 Lumens per Watt, A-19 style, shall be located inside the CBC and suspended approximately 1 ft from

the top and center of the CBC with all doors, ports and vents closed. The light shall be turned on and off at random intervals for a period of 5 min. Eight observers, positioned along the circumference of the circle at 45 degree intervals starting from the forward longitudinal axis of the CBC/carrier combination, shall record any light detected during the test period. The Type III CBCs shall be tested in the height extended configuration only. Failure to meet the requirements of 3.3.12 shall constitute failure of this test.

4.4 *Support and Ownership Requirements Verification*—Unless otherwise specified, all verifications shall be performed in both the height extended and height retracted configuration.

4.4.1 *Weight*—Compliance with 3.4.1 shall be determined by weighing the CBC and its mounting hardware. The scale used shall have a 1 lb or less graduation and shall have an accuracy within plus or minus 1 lb. The scale shall have a current calibration traceable to the National Institute for Standards and Technology (NIST). Failure to meet the requirements of 3.4.1 shall constitute failure of this test.

4.4.2 *Personnel Door*—The Type IV CBC personnel door shall be measured to determine compliance with 3.4.2. Failure to meet the requirements of 3.4.2 shall constitute failure of this test.

4.4.2.1 *Door Handle*—The personnel door shall be securely closed. A 30 lb force shall be applied to the exterior personnel door handle in the direction which best facilitates moving the handle into its open position. After it has been verified that 30 lb is adequate to move the handle fully into its open position, the personnel door shall be opened 160 degrees. The personnel door shall then be closed and a 30 lb force shall be applied to the exterior handle in the direction which best facilitates moving the handle to its closed position. Failure to meet the requirements of 3.4.2 and 3.4.2.1 shall constitute failure of this test.

4.4.2.2 *Secondary Exit*—The CBC secondary exit shall be measured and examined to determine compliance with 3.4.2.2. The secondary exit with the tailgate closed shall be opened from inside the CBC by applying a 30 lb force in the direction which best facilitates its opening. The Type IV CBC shall be verified in the height extended configuration only. Failure to meet the requirements of 3.4.2.2 shall constitute failure of this test.

4.4.3 *Ladder*—The ladder shall be attached to the CBC/carrier combination in accordance with the CBC manual. It shall be demonstrated that military personnel using the ladder can safely enter and exit the CBC/carrier combination. A 400 lb load shall be applied to the center of each step of the ladder for 1 min. The ladder, CBC and carrier shall be examined for damage or deformation. Failure to meet the requirements of 3.4.3 shall constitute failure of this test.

4.4.4 *Roof Access Steps/Handholds*—Each deployed step/handhold shall be individually subjected to a vertical load of 400 lb applied to its outer most point and maintained for 1 min. The handhold mounted to the roof shall have a horizontal load of 400 lb applied to the outer most point of the deployed handhold. The roof access steps/handholds shall be evaluated for compliance with 3.4.4. Failure to meet the requirements of 3.4.4 shall constitute the failure of this test.

4.4.5 *Power and Signal Access Ports*—In its height extended configuration, the Type IV CBC shall be inspected for compliance with 3.4.5. Failure to meet the requirements of 3.4.5 shall constitute failure of this test.

4.4.6 *Transportability*

4.4.6.1 *Rail*—The CBC/carrier combination with Interior Mounting Provisions and simulated payload, as specified in each type's specification sheet, shall be Rail Impact tested in accordance with test method standard MIL-STD-810, Method 516.4, Procedure VIII. When secured to the flatcar, the CBC/carrier combination shall then be inspected for conformance to the Gabarit International de Chargement (GIC) gauge envelope as shown in interface standard MIL-STD-1366. Failure to meet the requirements of 3.4.6.1 shall constitute failure of this test.

4.4.6.2 *Fixed Wing*—The CBC/carrier combination shall be tested for compliance with 3.4.6.2 using MIL-HDBK-1791 for guidance. The Type IV CBC shall be tested for roll-on/roll-off loading on the C-130 and C-141 AMC aircraft in the height retracted configuration only. Failure to meet the requirements of 3.4.6.2 shall constitute failure of this test.

4.4.6.3 *Helicopter Sling Loading (HSL)*—The CBC/carrier combination, without payload (that is, its worst case loading condition), in the lifting configuration described in each Type's specification sheet, shall be tested in accordance with interface standard MIL-STD-209 and Annex A1. Failure to meet the requirements of 3.4.6.3 shall constitute failure of this test.

4.4.6.4 *Ground Mobility*—The CBC/carrier combination with interior mounting provisions and simulated payload, as specified in each type's specification sheet, shall be tested in accordance with Table 2 for compliance with 3.4.6.4 (see 6.7). Two-thirds of the miles or laps as applicable shall be driven at the cargo bed covers maximum payload, and ⅓ shall be driven with no payload installed. Failure to meet the requirements of 3.4.6.4 shall constitute failure of this test.

4.4.6.5 *Lift Provisions*—The CBC with interior payload provisions and simulated payload shall be inspected and tested for conformance to the crane lift requirements of interface

TABLE 2 Ground Mobility—Limited Mileage (at the CBC 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)	300 (160.9 km)
Gravel roads (Munson gravel road course)	20 (32.2 km/h)	10 (16.1 km/h)	300 (160.9 km)
Cross-country (unimproved) (Perry cross-country secondary road "A")	20 (32.2 km/h)	10 (16.1 km/h)	1800 (965.4 km)
Belgian block (Munson Belgian block)	20 (32.2 km/h)	10 (16.1km/h)	600 (321.8 km)
Radial washboard 2 to 4-in. (5.1 to 10.2-cm) waves			15 laps
Two-inch (5.1 cm) washboard			155 laps

standard MIL-STD-209 and compliance with 3.4.6.5. Failure to meet the requirements of 3.4.6.5 shall constitute failure of this test.

4.4.7 *Finish:*

4.4.7.1 *Non-Skid Surfaces*—The CBC shall be inspected for compliance with 3.4.7.1. Failure to meet the requirements of 3.4.7.1 shall constitute failure of this test.

4.4.7.2 *Interior Color*—The interior finish of the CBC shall be inspected for compliance with 3.4.7.2. Failure to meet the requirements of 3.4.7.2 shall constitute failure of this test.

4.4.7.3 *Exterior Color*—The CBC shall be inspected to determine conformance with the color and pattern specified in 3.4.7.3. Failure to meet the requirements of 3.4.7.3 shall constitute failure of this test.

4.4.8 *Chemical Agent Resistance*—To determine compliance with the requirements of 3.4.8, it shall be verified that the CBC is finished in accordance with MIL-DTL-53072, or that the finish meets the test methods (or equivalent) in MIL-DTL-53072.

4.4.9 *Special Tools*—The CBC shall be tested in accordance with the cycling test of 4.3.1. The Type IV CBC may have special tools as part of their height adjustment devise. Failure to meet the requirements of 3.4.9 shall constitute failure of this test.

4.4.10 *Mounting*—The CBC shall be tested in accordance with the cycling test of 3.4.10. Failure to meet the requirements of 3.4.10 shall constitute failure of this test.

4.4.11 *Carrier Interface*—To demonstrate the requirements of 3.4.11, an unmodified carrier from each designated series shall be provided. The M35A2 shall be modified for installation of the Type IV CBC in accordance with 3.4.11.2*(1)*. The Type IV CBC shall be installed on each carrier using the tools and kits described in 3.4.11.3 and 3.4.11.4. The carrier, including its reflectors, brakes/tail lights, and rear antenna mounts shall be inspected for compliance with 3.4.11.5. The Type IV CBC shall then be removed from the carrier using the tolls described in 3.4.11.4. Failure to meet the requirements of 3.4.11 shall constitute failure of this test.

4.4.12 *Identification*—The CBC shall be inspected to verify the requirements of 3.4.11. Failure to meet the requirements of 3.4.11 shall constitute failure of this test.

4.5 *Environmental Requirements Verification*

4.5.1 *Humidity Resistance*—The CBC shall be tested for daily exposure of up to 97 % relative humidity for 20 hours and exposure to 100 % relative humidity (with condensation) for 4 hours in accordance with test method standard MIL-STD-810, Moisture Resistance Test, Method 507.4, Procedure II, Cycles 4 or 5. After cycling has been completed, the CBC shall be inspected. Failure to meet the requirements of 3.5.1 shall constitute failure of this test.

4.5.2 *Marine Atmosphere (Sea-salt Fallout)*—The CBC, in its operational and storage modes, shall be exposed to the Marine Atmosphere Test in accordance with Specification E1925, paragraph 10.11, except that the complete CBC shall be tested in lieu of samples. Failure to meet the requirements of 3.5.2 shall constitute failure of this test.

4.5.3 *Ice*—The CBC shall be tested in accordance with test method standard MIL-STD-810, Method 521.2, Procedure I, Glaze Ice (6 mm layer). Failure to meet the requirements of 3.5.3 shall constitute failure of this test.

4.5.4 *Temperature Range:*

4.5.4.1 *High Temperature*—The CBC shall be tested in accordance with test method standard MIL-STD-810, Method 501.4, Procedure I, Category A1 (Hot). Failure to meet the requirements of 3.5.4 shall constitute failure of this test.

4.5.4.2 *Low Temperature*—The CBC shall be tested in accordance with test method standard MIL-STD-810, Method 502.4, Procedures I and II, Category C3 (Severe Cold). Failure to meet the requirements of 3.5.4 shall constitute failure of this test.

4.5.5 *Temperature Shock*—The CBC shall be tested in accordance with test method standard MIL-STD-810, Method 503.4. Failure to meet the requirements of 3.5.5 shall constitute failure of this test.

4.5.6 *Blowing Sand and Dust*—The CBC/carrier combination shall be tested in accordance with test method standard MIL-STD-810, Method 510.4, Procedure I except the sand and dust particle concentration shall be 1.32×10^{-4} lb/ft^3, wind speed shall be 1750 ± 250 ft/min and with particle sizes as follows:

(1) 1000 microns 100 % passing mesh screen,

(2) 500 microns 98 % ± 2 % passing through mesh screen, and

(3) 150 microns 90 % ± 2 % passing through mesh screen.

4.5.7 *Ultraviolet Effects*—The CBCs exterior components subject to solar exposure shall be tested in accordance with test method standard MIL-STD-810, Method 505.4, Procedure I. Failure to meet the requirements of 3.5.7 shall constitute failure of this test.

4.5.8 *Fire Resistance*— Any component or material which has not been certified to meet the requirements of 3.5.8 shall be tested in accordance with Test Method F501 with a flame applied for 30 seconds. Failure to meet the requirements of 3.5.8 shall constitute failure of this test.

4.5.9 *Fungus*—All material components shall be certified for resistance to fungi. Where certification does not exist, that material shall be tested in accordance with test method standard MIL-STD-810, Method 508.5. Failure to meet the requirements of 3.5.9 shall constitute failure of this test.

4.5.10 *Watertightness*—The CBC/carrier combination shall be tested in accordance with Specification E1925, paragraph 10.33. Failure to meet the requirements of 3.5.10 shall constitute failure of this test.

4.6 *Interface and Interoperability Requirements Verification:*

4.6.1 *Interchangeability*—Compliance with 3.6.1 shall be determined by selecting two CBCs of a particular type from the production lot of completed CBCs. All removable parts shall be interchanged between CBCs selected. The interchange shall be accomplished by removing the fasteners, interchanging the parts and reinstalling the fasteners. Inability to interchange the parts in accordance with 3.6.1 shall constitute failure of this test.

5. Packaging

5.1 *Packaging*—For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by Department of Defense (DoD) personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contracting the responsible packaging activity.

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*—The Type IV Cargo Bed Cover is an alternatives for the current bow and canvas covers and replacements for the various locally fabricated non-standard covers on the Family of 2½ Ton Vehicles. The CBCs will provide environmental protection and security to the cargo area without compromising the road, sea, or air mobility requirements of the vehicle or trailer on which they are mounted. The CBCs covered by this document are not intended to be used as a stand alone item dismounted from their carrier.

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

(1) Title, number, and date of the specification.

(2) Quantities by CBCs (see 1.2).

(3) Issue of DoDISS to be cited in the solicitation.

(4) Requirements for first article and conformance inspection, including number of covers, inspection lot size, sample size, specific verification test to be performed, and sequence of tests.

(5) Packaging Requirements (see 5.1).

(6) Requirements for camouflage pattern information (such as, line art data)

(7) Adapter kit type must be specified with Type IV CBC is ordered.

6.3 *First Article*—When a first article is required (see 6.2), it should be inspected and approved under the appropriate provisions of Federal Acquisition Regulation (FAR). The contracting officer should include specific instructions in all acquisition documents regarding arrangements for inspection and approval of the first article.

6.4 *Interior Color*—Chip Number 27875 of FED-STD-595 may be used for guidance in matching shade of semi-gloss white.

6.4.1 *Exterior Color*—Camouflage pattern: green, Chip Number 34094; brown, Chip Number 30051; and black, Chip Number 37030 of FED-STD-595 may be used for guidance in matching shade of the camouflage pattern. If sand is specified, sand, Chip Number 33303 in accordance with FED-STD-595 may be used for guidance.

6.5 *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.

6.6 *Technical Manuals*—The requirement for technical manuals should be considered when this specification is applied on a contract. If technical manuals are required, specifications and standards that have been cleared and listed in DOD 5010.12-L, Acquisition Management Systems and Data Requirement Control List (AMSDL) must be listed on a separate Contract Data Requirement List (CDRL) DD Form 1423, which is included as an exhibit to the contract. The technical manuals must be acquired under a separate contract line item in the contract.

6.7 *Ground Mobility*—MIL-M-8090, Type V Mobility may be used for guidance in preparation of this test procedure.

7. Keywords

7.1 Cargo Bed; Cover, Shelter; M923, 5 Ton Cargo Truck; M1083, 5 Ton Medium Tactical Vehicle (MTV); M1095, 5 Ton MTV Trailer

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 must be certified for use in External Air Transport (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 or other devices, or both, which are to be locally fabricated, shall not be permitted under any circumstances; and

(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 or proof load testing of potential contact area, or both, 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, and

(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 A1.1 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).

A1.3.2 *Proof Load Testing:*

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

A1.3.2.1 *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.

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 (2 268)	3.5
≥60 (0.0293)	5 001 (2 268.45) – 15 000 (6 804)	3.2
≥60 (0.0293)	15 001 (6 804.45) – 36 000 (16 329.6)	3.2 – (0.000038 × (EATWT – 15 000[A]))

[A] If computing in kilograms, then subtract 6 804 instead of 15 000.

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

(2) 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 or testing, or both, 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.

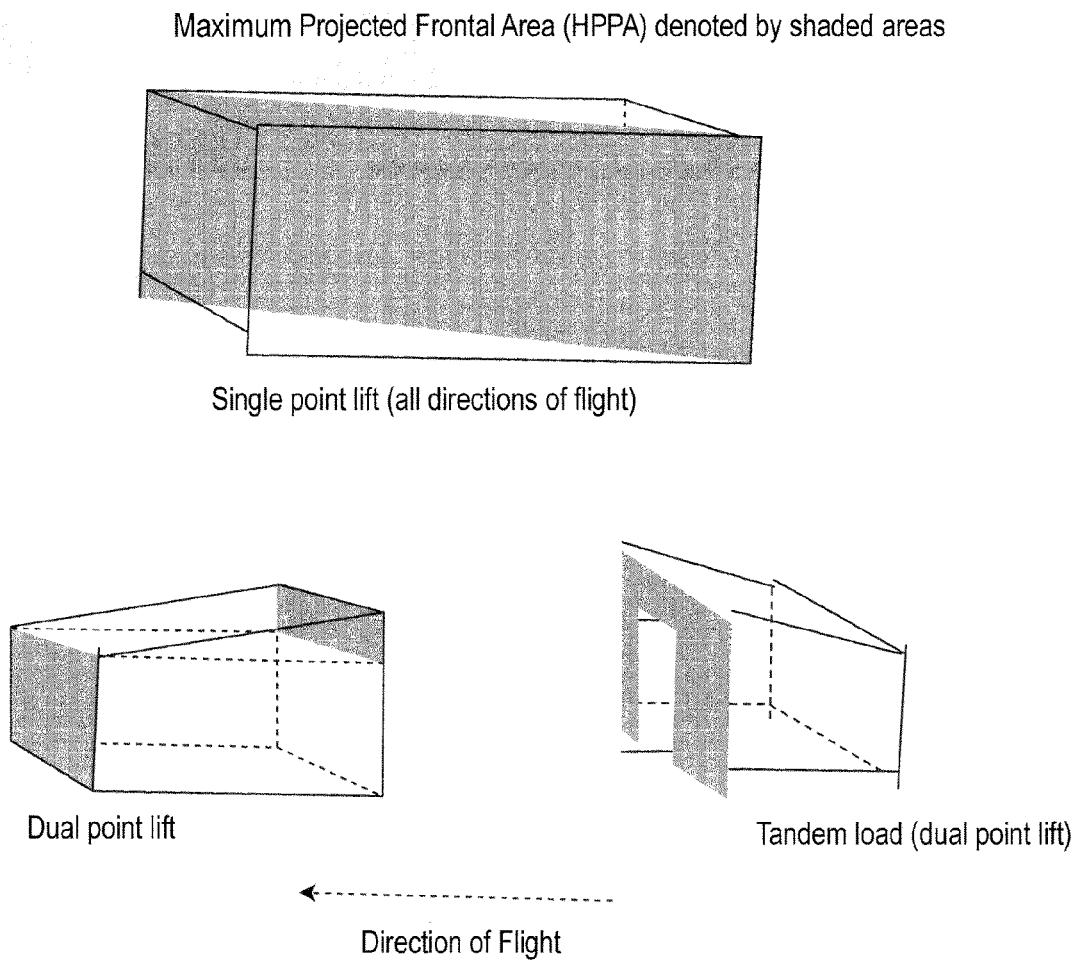

FIG. A1.1 Maximum Projected Frontal Area (MPFA)