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Standard Performance Specification for Cargo Bed Cover (CBC) HMMWV, Type I[1]

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1. Scope

1.1 *Scope*—This specification covers the performance requirements for the Type I Cargo Bed Cover (CBC). The Type I Cargo Bed Cover is a removable general purpose rigid enclosure for the cargo bed of the M1152A1, M1152A1 with B2 Armor Kit, M1037, M1042, M1097, and M1113 High-Mobility Multipurpose Wheeled Vehicle (HMMWV). The Type I CBC provides environmental protection and security for mission equipment and items of general transport.

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

2. Referenced Documents

2.1 *ASTM Standards:*[2]

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

2.2 *Army Standards:*[3]

ARMY TM 9-2320-280-10 HMMWV'S Operator's Manual

ARMY TM 10-5411-231-13&P Technical Manual

2.3 *Commercial Standards:*

ANSI/ASQC Z1.4-2003 Sampling Procedures and Tables for Inspection by Attributes[4]

SAE AS8090 Mobility, Towed Aerospace Ground Equipment, General Requirements for[5]

2.4 *Federal Standard:*[6]

FED-STD-595 Colors Used in Government Procurement

2.5 *Military Standards:*[6]

MIL-STD-129 Military Marking For Shipment and Storage

MIL-STD-209 Interface Standard for Lifting and Tie-down Provisions

MIL-STD-810 Environmental Engineering Considerations and Laboratory Tests

MIL-STD-913 Requirements for the Certification of Sling Loaded Military Equipment for External Transportation by Department of Defense Helicopters

MIL-STD-1366 Transportability Criteria

MIL-PRF-22750 Coating, Epoxy, High Solids

MIL-C-46168 Coating, Aliphatic Polyurethane, Chemical Agent Resistant

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

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

2.6 *Military Handbook:*[6]

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

2.7 *The American Conference of Governmental Industrial Hygienists (ACGIH):*[7]

ACGIH Threshold Limit Values

2.8 *Drawings:*[3]

81337-103984 Cargo Bed Cover, Type I (1¼ Ton HMMWV)

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

[4] Available from American Society for Quality (ASQ), 600 N. Plankinton Ave., Milwaukee, WI 53203, http://www.asq.org.

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

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

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

81337-103984-101 Cargo Bed Cover, Type I (1¼ Ton HMMWV), Camouflage

3. General Requirements

3.1 *Alternate Components and Construction*—The interface drawings referenced herein specify the use of specific components and construction of previously produced CBCs. Specific materials, components and construction methods shall be considered for reference only. Dimensional characteristics specified in the interface drawings that are required for spare part interchangeability and for operation and interoperability of the CBC with the vehicle shall be adhered to. When this specification or the referenced drawings specify use of a specific component, the contractor may substitute a component equal to the specified component provided that the contractor complies with the performance requirements specified herein.

3.2 *Design and Construction Requirements*—Design and construction of the Type I CBC shall meet all physical and environmental requirements herein and shall conform to the interface and interoperability requirements specified on the drawings, all subsidiary drawings, and parts lists.

3.2.1 *Dimensions, Weight and Payload*—The Type I CBC shall conform to the interface and interoperability dimensions of interface drawing 81337-103984. The Type I CBC including its mounting hardware, shall weigh no more than 450 lbs. The Type I CBC shall be capable of carrying 500 lbs of payload mounted to it's interior payload provisions (see 3.4.2).

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

3.2.3 *Blackout*—The Type I CBC/carrier combination, with the personnel door and ports closed, shall not permit a light source from within to emit detectable amounts of light.

3.2.4 *Parts Interchangeability*—The spare parts of the CBC produced under this specification shall be functionally and dimensionally interchageable with parts specified below without modification or rework of the part or assembly.

NSN	Part Number	Description
1005-01-044-4555	700272	Handle, Chest
5410-00-984-5065	104055	Step, Folding
5411-01-481-5892	104050	Ventilator, 2 Way
2510-01-481-6056	104002	Door, Cab Access
5340-00-302-1840	104054	Holder, Door
5340-01-481-6506	104053	Lock, Door, 3 Point
5340-01-481-6503	104052	Lock, Door, 2 Point
2510-01-481-6049	103990	Panel, Door, Lower
2510-01-481-6054	103989	Panel, Door, Upper
5440-01-481-6010	104049	Ladder, 24 in.
Not available	103999-1	Panel Assembly, Storage Access
Not available	103999-3	Panel Assembly, Storage Access

3.2.5 *Mounting*—The Type I CBC shall be capable of multiple mounting and dismounting cycles from its carrier, in accordance with its technical manual, without damage or degradation to either the Type I CBC, its carrier or its mounting provisions and hardware. Any hardware required for mounting the CBC to the HMMWV shall be provided as part of the Type I CBC. Mounting and dismounting shall be accomplished using only those tools of the Basic Issue Items (BII) and the Additional Authorization List (AAL) as described in the HMMWV'S Operator's Manual, ARMY TM 9-2320-280-10.

3.2.6 *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 Type I CBC, under all environmental conditions. Exposure of personnel to toxic substances shall not be in excess of the threshold values contained in ACGIH Threshold Limit Values.

3.2.7 *Workmanship*—The Type I CBC, including all parts and accessories shall be constructed and finished in a workmanlike manner with particular attention given to removal of burrs and sharp edges, accuracy of dimensions, welding, painting, alignment of parts and assemblies, and the tightness of screws, bolts, and so forth. Cloth components shall be clean and free of holes, cuts, or tears. All components shall be properly adjusted before the Type I CBC is prepared for delivery to the purchaser.

3.3 *Components*—Components shall meet the following performance requirements.

3.3.1 *Personnel Door*—The Type I CBC shall be equipped with a personnel door as specified on the drawings. The door shall not interfere with the operation of the rear whip antennae located on the HMMWV's rear fenders. 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.

3.3.1.1 *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 10 lb applied to the door handle. The personnel door shall be capable of being padlocked from the outside securing the Type I CBC from the exterior.

3.3.1.2 *Secondary Exit*—A secondary exit shall be provided within the personnel door. The secondary exit shall be as specified on drawings. The secondary exit shall be capable of being opened with a maximum force of 10 lb applied to the release mechanism from inside of the Type I 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 Type I CBC. The secondary exit shall provide unobstructed egress for military personnel.

3.3.2 *Ladder*—A ladder shall be provided that is capable of supporting at least 400 lb applied to any individual step without damage or degradation to the type I CBC, carrier or ladder. The ladder shall be capable of supporting at least 400 lb applied to any individual step without damage or degradation to the Type I CBC, carrier or ladder. The Type I 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 Type I CBC or its carrier.

3.3.3 *Roof Access Steps/Handholds*—Roof access steps/handholds shall be provided in locations specified on the drawings for safe access from the ground to and from the roof when the Type I CBC is mounted on its carrier. Each roof access step/handhold shall be capable of supporting 400 lb

without damage or degradation to either the Type I CBC or the roof access step/handhold.

3.3.4 *Power and Signal Access Ports*—Two ports shall be provided in the front wall to permit the pass through of power and signal lines from the cab to the Type I CBC enclosed area. The power and signal access ports shall have provisions to prevent the intrusion of driven rain and dust and have provisions for blackout.

3.3.5 *Vents*—The Type I CBC shall include 2 vents for fresh air ventilation as specified on the drawings. 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. 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."

3.3.6 *Cab Access Port*—The Type I CBC, while mounted to the HMMWV, shall provide access for military personnel between the driver's compartment and the Type I CBC without adversely affecting vehicle operations. The port opening shall be a minimum of 34.00 in. wide by 29.00 in. high. The port shall have a cover (door) centrally located on the front wall of the Type I CBC. The port shall be located as low as possible without compromising the structural integrity of the Type I CBC. The port shall permit access through the port without interference with the HMMWV's "B" pillar. The access port cover (door) shall not open into the cab of the HMMWV and, in the open position, shall take up as little room as practicable. The cover (door) shall be capable of being opened from both the interior and exterior of the Type I CBC by applying no more than 10 lb of force and shall be capable of being locked from the interior.

3.4 *Structural Requirements:*

3.4.1 *Roof Loads*—The Type I 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 by 2 ft area applied anywhere on the roof.

3.4.2 *Interior Payload Provisions*—The Type I CBC shall be capable of accepting threaded fasteners such as rivnuts and inserts for mounting equipment to the interior of the Type I CBC in accordance with ARMY TM 10-5411-231-13&P. The Type I CBC and its Interior Payload Provisions shall be capable of supporting at least 500 lbs of payload during its stationary, rail transport, ground mobility, external air transport and crane lifting operation modes without damage or degradation to either the Type I 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: 100 lbs mounted to each of the three wall surfaces, excluding the door surface, and 200 lbs mounted to the ceiling. The Contractor shall fashoin an appropriate payload design to be used for all testing. This payload design shall be approved by the procuring agency prior to use.

3.4.3 *Personnel Door Loads:*

3.4.3.1 *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 Type I 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.

3.4.3.2 *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.

3.4.4 *Surface Impact Resistance*—The exterior surface of the Type I CBC's roof shall be capable of withstanding a blow from a 30 lb steel cylinder, 3 inches 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.

3.5 *Transportability*—The Type I CBC/carrier combination shall be capable of meeting the requirements for transport in the following modes:

3.5.1 *Rail*—The Type I 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 Type I CBC or its carrier and without damage to the tiedown cables, or blocking or bracing.

3.5.2 *Fixed Wing*—The Type I 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.

3.5.3 *Helicopter Sling Load (HSL)*—The Type I CBC mounted on its carrier , in all its payload configurations, shall be capable of being externally transported by CH-47 or larger rotary wing aircraft in the single point, dual point and tandem configurations without damage or degradation to either the Type I CBC or the HMMWV. The M998 series HMMWV's shall be equipped with a rear bumper (that is, airlift crossmember). The Type I CBC/carrier combination shall be structurally capable of meeting the requirements of interface standard MIL-STD-209 and MIL-STD-913 and shall show no signs of damage or degradation as a result of being flown.

3.5.4 *Ground Mobility*—The Type I CBC/carrier combination, shall be capable of meeting the requirements of SAE AS8090 for Type V mobility without damage or degradation to either the Type I CBC or its carrier. The Type I CBC/carrier combination shall meet U.S. and NATO countries' highway legal limits.

3.5.5 *Lifting Provisions*—The Type I 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 Type I CBC or its lift provisions. The Type I CBC's lift provisions shall conform to the crane lift requirements of interface standard MIL-STD-209.

3.6 *Finish and Marking:*

3.6.1 *Non-skid Surfaces*—All horizontal surfaces of the Type I CBC (for example, interior floor and exterior roof) shall be non-skid.

3.6.2 *Interior Color*—The color of the interior walls and ceiling of the Type I CBC shall be semi-gloss white color chip number 27875 of FED-STD-595.

3.6.3 *Exterior Color*—The exterior color of the Type I CBC shall either three color camouflage pattern in accordance with drawing 81337-103984-101 or sand color chip number 686 of FED-STD-595 as specified in the purchase order (see 6.2). The interior surface of the personnel door and secondary exit shall match the primary exterior color of the Type I CBC.

3.6.4 *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 either MIL-C-46168 or MIL-C-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 using MIL-PRF-22750 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.

3.6.5 *Identification*—The Type I CBC shall be marked in accordance with MIL-STD-129.

3.7 *Environmental Requirements*—Unless otherwise specified, the Type I CBC shall meet the following Environmental requirements.

3.7.1 *Humidity Resistance*—The Type I 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.

3.7.2 *Marine Atmosphere*—The Type I CBC, when exposed to a Marine environment equivalent to 25 lbs per acre per year (2.0 $g/m^2/yr$), shall not corrode or degrade.

3.7.3 *Ice*—The Type I CBC including its door(s), vents and cable ports shall be capable of withstanding and remaining operational while the Type I 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.

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

3.7.5 *Temperature Shock*—The Type I CBC shall withstand a temperature shock from an equilibrium state of 160°F to -70°F within 5 minutes and from an equilibrium state of -70°F to 160°F within 5 minutes without evidence of structural damage, degradation or permanent deformation.

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

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

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

3.7.9 *Fungus*—The Type I CBC shall be impervious to fungus growth. Materials shall be selected to minimize fungus growth.

3.7.10 *Watertightness*—The Type I 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 Type I CBC surface. The Type I CBC shall not allow more than 8 fluid oz. of water into the interior of the Type I CBC in a 40 minute period and the weight of the Type I CBC shall not increase by more than 1.00 lb.

3.8 *Other Requirements:*

3.8.1 *First Article*—When specified (see 6.2), a sample shall be subjected to first article inspection (see 4.2.1). A first article is defined as a preproduction or an initial production sample consisting of one or more completed Type I CBC.

3.8.2 *Inspection Comparison Testing Sample*—When specified (see 6.2), the contractor shall furnish a sample for comparison inspection and approval (see 4.2.2).

3.8.3 *Manuals*—Unless otherwise specified (see 6.5), technical manuals shall be provided with each Type I CBC.

4. Quality Assurance

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

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

4.1.2 *Responsibility for Dimensional Requirements*—Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on

the end item, the inspection shall be made at any point, or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

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

4.2.1 *First Article Inspection*—When a first article inspection is required (see 3.8.1 and 6.2), the Type I CBC shall be examined for the visual defects in Table 1, dimensions specified, and tested as specified and in the sequence specified in Table 2. Unless otherwise specified (see 6.2), all testing shall be performed on the same Type I CBC. The presence of any visual defect, any dimension not within the specified tolerance, or failure of any test shall be cause for rejection of the first article.

4.2.2 *Comparison Sample Inspection*—When a comparison sample inspection is required (see 6.2), it shall be inspected and tested as specified in 4.2.1.

4.2.3 *Quality Conformance Inspection*—Unless otherwise specified, sampling for inspection shall be performed in accordance with ANSI/ASQC Z1.4-2003.

TABLE 1 Sequence of First Article Verifications

Verification	Paragraph Requirement	Verification Paragraph
Dimensions	3.2.1	4.3.1
Weight	3.2.1	4.3.1
Payload	3.4.2	4.3.13
Workmanship (Visual)		
Toxicity (initial)	3.2.6	4.3.6
Non-skid surfaces	3.6.1	4.3.17.1
Interior Color	3.6.2	4.3.17.2
Exterior Color	3.6.3	4.3.17.3
Chemical agent resistance	3.6.4	4.3.18
Identification	3.6.5	4.3.19
Mounting (Perform 2½ times)	3.2.5	4.3.5
Tailgate operation	3.2.2	4.3.2
Personnel door	3.3.1	4.3.7
Door handle	3.3.1.1	4.3.7.1
Secondary exit	3.3.1.2	4.3.7.2
Ladder	3.3.2	4.3.8
Roof access steps/handholds	3.3.4	4.3.9
Power and signal access ports	3.3.5	4.3.10
Vents	3.3.6	4.3.11
Mounting (Perform 2 times)	3.2.5	4.3.5
Roof loads	3.4.1	4.3.12
Personnel door structure	3.4.3.1	4.3.14.1
Door Stop	3.4.3.2	4.3.14.2
Surface impact resistance	3.4.4	4.3.15
Interior payload provisions	3.4.2	4.3.13
Rail	3.5.1	4.3.16.1
Fixed wing	3.5.2	4.3.16.2
Helicopter Sling Lift	3.5.3	4.3.16.3
Ground Mobility	3.5.4	4.3.16.4
Lifting provisions/mounting	3.5.5	4.3.16.5
Temperature shock	3.7.5	4.3.23
Toxicity (Final)	3.2.6	4.3.6
Blowing sand and dust	3.7.6	4.3.25
Watertightness	3.7.10	4.3.29
Blackout	3.2.3	4.3.3
Interchangeability	3.2.4	4.3.4
Repeat the following:		
Tailgate operation	3.2.2	4.3.2
Humidity resistance	3.7.1	4.3.20
Marine atmosphere	3.7.2	4.3.21
Ice	3.7.3	4.3.22
Temperature range	3.7.4	4.3.23
Ultraviolet effects	3.7.7	4.3.26
Flame resistance	3.7.8	4.3.27
Fungus	3.7.9	4.3.28

4.2.3.1 *Component and Material Inspection*—In accordance with 4.3, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase document.

4.2.3.2 *End Item Visual Examination*—The end item shall be examined for the defects listed in Table 3. The lot size shall be expressed in units of one Type II CBC. The sample unit shall be one Type II CBC. The inspection level shall be II and the AQL, expressed in terms of defects per hundred units, shall be 4.0 for major defects and 6.5 for total (major and minor combined) defects.

4.2.3.3 *End Item Dimensional Examination*—The end item shall be examined for conformance to dimensions specified. Any dimension not within the specified tolerance shall be classified as a defect. The lot size shall be expressed in units of one shelter. The sample unit shall be one shelter. The inspection level shall be II and the AQL, expressed in terms of defects per hundred units, shall be 4.0.

4.3 *Verification Methods:*

4.3.1 *Weight*—Compliance with 3.2.1 shall be determined by weighing the Type I CBC and its mounting hardware. The scale used shall have a one (1) lb or less graduation and shall have an accuracy within plus or minus one (1) lb. The scale shall have a current calibration traceable to the National Institute for Standards and Technology. Failure to meet the requirements of 3.4.1 shall constitute failure of this test.

4.3.2 *Tailgate Operation*—With the Type I CBC mounted on its carrier, the carrier's tailgate shall be operated (that is, opened and then closed). Failure to meet the requirements of 3.2.2 shall constitute failure of this test.

4.3.3 *Blackout*—The Type I CBC/carrier combination shall be located at the center of a circle of radius 300 meters, 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 Type I 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 lightbulb, rated at no less than 17 Lumens per watt, A-19 style, shall be located inside the Type I CBC and suspended approximately one (1) foot from the top and center of the Type I CBC with all doors, ports and vents closed. The light shall be turned on and off at random intervals for a period of 5 minutes. Eight observers, positioned along the circumference of the circle at 45 degree intervals starting from the forward longitudinal axis of the Type I CBC/carrier combination, shall record any light detected during the test period. Failure to meet the requirements of 3.2.3 shall constitute failure of this test.

4.3.4 *Interchangeability*—Compliance with 3.2.4 shall be determined by selecting two Type I CBCs from the production lot of completed Type I CBCs. All removable parts shall be interchanged between Type I CBCs selected. The interchange

TABLE 2 Ground Mobility—Limited Mileage

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 (32.2 km/h)	10 (16.1km/h)	200 (321.8 km)
Radial washboard 2 to 4 in. (5.1 to 10.2 cm) waves			5 laps
2 in. (5.1 cm) washboard			5 laps

TABLE 3 End Item Visual Defects

Examine	Defect	Classification	
		Major	Minor
Finish	Not as specified, not finished where required	101	
	Not adherent, for example, blistered, peeled		201
	Runs, wrinkles, streaks, or areas of no film		202
	Finish not dry, that is, wet or tacky to touch		203
	Scratch, gouge, abrasion exposing prime coat or bare metal, in accordance with the drawings		204
	Any area of rust		205
Design	Any characteristic not in accordance with specified requirement	102	
Construction and Workmanship	Component or part fractured, split, punctured, dented, or malformed	103	
	Component missing, inoperative, or will not operate as intended	104	
	Component not properly assembled or secured	105	
	Any functioning component which requires abnormal force to operate		206
	Burr, rough or sharp edges, or silver which may be injurious to personnel or cargo	106	
	Gaskets torn or split	107	
	Gasket or seals painted		207
	Visible gaps between aluminum faces and extruded edges or panel cutout edge members	108	
Welding and brazing (where required)	Not type specified, missing where required	109	
	Incomplete, burn through area pits, crack or fracture, or otherwise not fused	110	
	Stag inclusion, undercoat, not smooth and uniform, scale or flux deposit not removed		208
Metal fasteners, bolts, nuts, screws, studs	Missing, not type specified, broken, stripped, or loose	111	
	Lockwasher missing where required		209
Rivets	Missing	112	
	Not type specified	113	
	Not sufficiently peened, not drawn tight, excessively peened		210
	Cloth cut or tear longer than ⅛ in.	114	
	Hole larger than ⅛ in. diameter	115	
Marking	Missing, incomplete, not legible, not specified type or size, misplaced		
Instruction plate: nameplate	Missing, incomplete, not legible	116	
Instruction manual	Missing, incomplete, not legible	117	

shall be accomplished by removing the fasteners, interchanging the parts and reinstalling the fasteners. Inability to interchange the parts in accordance with 3.2.4 shall constitute failure of this test.

4.3.5 *Mounting*—Using only the hardware provided with the Type I CBC, the Type I CBC shall undergo 10 cycles of installation and removal (see Table 2) 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 requirements of 3.2.5 shall constitute failure of this test.

4.3.6 *Toxicity*—Demonstrate the Type I CBC does not produce toxic exposures by meeting ACGIH Threshold Limit Values for materials used in the Type I CBC's construction. At the beginning of FAT and during the high temperature phases of Ttemperature range (4.3.23.1) and thermal shock (4.3.24), a panel of three inspectors shall perform odor tests. Any smell, persisting after 15 seconds, 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 3.3.6 shall constitute failure of this test.

4.3.7 *Personnel Door:*

4.3.7.1 *Door Handle*—The personnel door shall be securely closed. A 10 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 10 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 10-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 3.3.1.1 shall constitute failure of this test.

4.3.7.2 *Secondary Exit*—The Type I CBC secondary exit shall be measured and examined to determine compliance with

3.3.1.2. The secondary exit with the tailgate closed shall be opened from inside the Type I CBC by applying a 10 lb force in the direction which best facilitates its opening. Failure to meet the requirements of 3.3.1.2 shall constitute failure of this test.

4.3.8 *Ladder*—The ladder shall be attached to the Type I CBC/carrier combination in accordance with the Type I CBC manual. A 400 lb load shall be applied to the center of each step of the ladder for 1 minute. The ladder, Type I CBC and carrier shall be examined for damage or deformation. Failure to meet the requirements of 3.3.2 shall constitute failure of this test.

4.3.9 *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 one (1) minute. 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 3.3.4. Failure to meet the requirements of 3.3.4 shall constitute the failure of this test.

4.3.10 *Power and Signal Access Ports*—The Type I CBC shall be inspected for compliance with 3.3.5. Failure to meet the requirements of 3.3.5 shall constitute failure of this test.

4.3.11 *Vents*—The ventilation ports shall be inspected for compliance with 3.3.6. Failure to meet the requirements of 3.3.6 shall constitute failure of this test.

4.3.12 *Roof Loads*—The Type I 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- by 2-ft area. Each test shall be for a duration of 5 minutes. Failure to meet the requirements of 3.4.1 shall constitute failure of this test.

4.3.13 *Interior Payload Provisions*—A simulated payload shall be installed in Type I CBC. The Type I CBC/HMMWV combination shall be tested in accordance with 4.3.16.1 (Rail) and 4.3.16.4 (Ground Mobility). The Type I CBC shall also be tested in accordance with 4.3.16.5 (Lifting Provisions). Failure to meet the requirements of 3.4.2 shall constitute failure of this test.

4.3.14 *Personnel Door Loads:*

4.3.14.1 *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 minutes the load shall be removed and the door examined. Failure to meet the requirements of 3.4.3.1 shall constitute failure of this test.

4.3.14.2 *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 one (1) minute. The load shall be removed and reapplied to the door at the same point, in the opposite direction, for one (1) minute. Failure to meet the requirements of 3.4.3.2 shall constitute a failure of this test.

4.3.15 *Surface Impact Resistance*—Each type of roof and wall construction found on the completed Type I CBC shall be subjected to an impact from a 30 lb steel cylinder. The cylinder shall be 3.00 inches 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 re-impact the test area after the first impact. The Type I CBC's interior and exterior surfaces shall be visually examined for compliance with 3.4.4. 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.

4.3.16 *Transportability:*

4.3.16.1 *Rail*—The Type I CBC/carrier combination with Interior Mounting Provisions and simulated payload shall be Rail Impact tested in accordance with test method standard MIL-STD-810, Method 516.5, Procedure VII. When secured to the flatcar, the Type I 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 3.5.1 shall constitute failure of this test.

4.3.16.2 *Fixed Wing*—The Type I CBC/carrier combination shall be tested for compliance with 3.5.2 using MIL-HDBK-1791 for guidance. Failure to meet the requirements of 3.5.2 shall constitute failure of this test.

4.3.16.3 *Helicopter Sling Loading (HSL)*—The Type I CBC/HMMWV combination with Interior Mounting Provisions and simulated payload in the lifting configuration, shall be tested in accordance with interface standard MIL-STD-209 and MIL-STD-913. Failure to meet the requirements of 3.5.3 shall constitute failure of this test.

4.3.16.4 *Ground Mobility*—The Type I CBC/HMMWV combination with Interior Mounting Provisions and simulated payload shall be tested in accordance with SAE AS8090 for Type V mobility for the miles specified in Table 2 for compliance with 3.5.4. 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 3.5.4 shall constitute failure of this test.

4.3.16.5 *Lift Provisions*—The Type I CBC with Interior Payload Provisions and simulated payload shall be inspected and tested for conformance to the crane lift requirements of interface standard MIL-STD-209 and compliance with 3.5.5. Failure to meet the requirements of 3.5.5 shall constitute failure of this test.

4.3.17 *Finish:*

4.3.17.1 *Non-skid Surfaces*—The Type I CBC shall be inspected for compliance with 3.6.1. Failure to meet the requirements of 3.6.1 shall constitute failure of this test.

4.3.17.2 *Interior Color*—The interior finish of the Type I CBC shall be inspected for compliance with 3.6.2. Failure to meet the requirements of 3.6.2 shall constitute failure of this test.

4.3.17.3 *Exterior Color*—The Type I CBC shall be inspected to determine conformance with the color and pattern specified in 3.6.3. Failure to meet the requirements of 3.6.3 shall constitute failure of this test.

4.3.18 *Chemical Agent Resistance*—To determine compliance with the requirements of 3.6.4, it shall be verified that the Type I CBC is finished in accordance with MIL-DTL-53072.

4.3.19 *Identification*—The Type I CBC shall be inspected to verify the requirements of 3.6.5. Failure to meet the requirements of 3.6.5 shall constitute failure of this test.

4.3.20 *Humidity Resistance*—The Type I 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 507.3, procedure II, cycles 4 or 5. After cycling has been completed, the Type I CBC shall be inspected. Failure to meet the requirements of 3.7.1 shall constitute failure of this test.

4.3.21 *Marine Atmosphere*—The Type I CBC, in its operational and storage modes, shall be exposed to the Marine Atmosphere Test in accordance with Specification E1925, section 10.11, except that the complete Type I CBC shall be tested in lieu of samples. Failure to meet the requirements of 3.7.2 shall constitute failure of this test.

4.3.22 *Ice*—The Type I CBC shall be tested in accordance with test method standard MIL-STD-810, Method 521.1, Procedure I, Glaze Ice (6 mm layer). Failure to meet the requirements of 3.7.3 shall constitute failure of this test.

4.3.23 *Temperature Range:*

4.3.23.1 *High Temperature*—The Type I CBC shall be tested in accordance with test method standard MIL-STD-810, Method 501.3, Procedure I, Category A1 (Hot). Failure to meet the requirements of 3.7.4 shall constitute failure of this test. The Toxicity test (see 4.3.6) shall be performed during the high temperature phase of this test.

4.3.23.2 *Low Temperature*—The Type I CBC shall be tested in accordance with test method standard MIL-STD-810, Method 502.3, Procedures I and II, Category C3 (Severe Cold). Failure to meet the requirements of 3.7.4 shall constitute failure of this test.

4.3.24 *Temperature Shock*—The Type I CBC shall be tested in accordance with test method standard MIL-STD-810, Method 503.3. Failure to meet the requirements of 3.7.5 shall constitute failure of this test. The Toxicity test (see 4.3.6) shall be performed during the high temperature phase of this test.

4.3.25 *Blowing Sand and Dust*—The Type I CBC/carrier combination shall be tested in accordance with test method standard MIL-STD-810, Method 510.3, 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:

1000 microns	100 % passing mesh screen
500 microns	98 ± 2 % passing through mesh screen
150 microns	90 ± 2 % passing through mesh screen

4.3.25.1 The second 6-h test will be conducted at a temperature of 145°F and shall be performed immediately after reaching stabilization. Subsequent to testing, all exposed hardware shall be operated. Failure to meet the requirements of 3.7.6 shall constitute failure of this test.

4.3.26 *Ultraviolet Effects*—The Type I CBCs exterior components subject to solar exposure shall be tested in accordance with test method standard MIL-STD-810, Method 505.3, Procedure I. Failure to meet the requirements of 3.7.7 shall constitute failure of this test.

4.3.27 *Flame Resistance*—Any component or material which has not been certified to meet the requirements of 3.7.8 shall be tested as follows. Two specimens of a production Type I CBC shell material 12 by 12 in. shall be tested. Mount the panel in an appropriate holding fixture in a horizontal position. Adjust the height of the panel so that it is approximately 2½ in. above the top of a standard barrel Bunsen burner. Adjust the flame height to approximately 5 in. with an inner core of approximately 3 inches. Apply the flame for 30 seconds. Failure to meet the requirements of 3.7.8 shall constitute failure of this test.

4.3.28 *Fungus*—All material components shall be certified for resistance to fungi. Where a certification does not exist, the material shall be tested in accordance with test method standard MIL-STD-810, Method 508.4. Failure to meet the requirements of 3.7.9 shall constitute failure of this test.

4.3.29 *Watertightness*—The Type I CBC/carrier combination shall be tested in accordance with Specification E1925, section 10.33. The Failure to meet the requirements of 3.7.10 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). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.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*—The Cargo Bed Covers are alternatives for the current bow and canvas covers and replacements for the various locally fabricated non-standard covers. The Type I 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 Type I CBC covered by this document is not intended to be used as a stand alone item dismounted from it's carrier.

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

6.2.1 Title, number and date of the specification.

6.2.2 Quantities of Type I CBCs (see 1.2).

6.2.3 Issue of DoDISS to be cited in the solicitation.

6.2.4 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.

6.2.5 Packaging Requirements (see 5.1).

6.2.6 Requirements for camouflage pattern information (for example, line art data) (see 3.6.3).

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 *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.

6.5 *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.

7. Keywords

7.1 cargo bed; cover; HMMWV; shelter