DRAFT Purchase Description
Heavy Dump Truck (HDT), 100,000 lbs. Gross Vehicle Weight Rating (GVWR)
22.5 Ton, 18 Cubic Yard

This purchase description is approved for use by U.S. Army Tank-automotive and Armaments Command (TACOM) and available for use by all Departments and Agencies of the Department of Defense (DoD).

1. SCOPE.

This purchase description establishes the performance, configuration and system requirements for the HDT and HDT with Material Control System (MCS).

1.1. Summary. The HDT is an enabling capability for theater sustainment operations. The HDT will be introduced into a theater of operations to transport material used by units for horizontal construction projects. The HDT will provide units the ability to safely accomplish the following tasks: construction and maintenance of main supply routes, logistical facilities, bituminous roads, helipads, airfields, landing strips, motor pools and parking areas. The HDT will also be used during routine exercises, deployments and in support of foreign assistance operations. The HDT will be capable of supporting mobility, counter mobility, survivability and sustainment needs and all applicable North Atlantic Treaty Organization (NATO) interoperability criteria.

1.1.1. Heavy Dump Truck. The HDT will be used primarily in support of construction projects by loading, transporting and dumping payloads of sand and gravel aggregates, crushed rock, hot asphalt mixes, earth, clay, rubble, large boulders and other materials up to the HDT's GVWR to job sites under worldwide climatic conditions. The HDT will be capable of releasing a uniform amount of aggregate while in motion to allow fast, accurate distribution of material onto the desired surface. The HDT will have a MCS which provides the capability to distribute its load into actuated chutes allowing its payload to be poured into specific locations. The HDT also serves as a quarry truck for the quick transport of bulk raw earth material to and from the crushing screening and washing plant and the asphalt mixing plant. The HDT will be fielded to horizontal construction companies, quarry platoons, asphalt teams and equipment support platoons and will have a Gross Vehicle Weight (GVW) not exceeding 100,000 lbs. in B-kit configuration. The HDT shall be furnished with an armored A-cab fully capable of safely accommodating an armored B-kit, be rust proofed and be camouflage Chemical Agent Resistant Coating (CARC) painted. The HDT vehicle shall satisfy Environmental Protection Agency (EPA), Society of Automotive Engineers (SAE), Department of Transportation (DOT), Federal Motor Vehicle Safety Standards (FMVSS) and Federal Motor Carrier Safety Regulations (FMCSR) requirements applicable to vehicles in their weight classes at the time of manufacture. The HDT vehicle shall be transportable by highway, rail, marine and air modes worldwide.

1.2. Vehicle Classification. The HDTs are described as follows:

Model	Nomenclature
HDT	Heavy Truck Dump, 100,000 lbs. GVWR, 22.5 Ton
HDT w/MCS	Heavy Truck Dump, 100,000 lbs. GVWR, 22.5 Ton, w/Material Control System (MCS)

Comments, suggestions, or questions on this document should be addressed to U.S. Army Tank - Automotive and Armaments Command (TACOM), 6501 E. 11 Mile Road, Warren, MI 48397-5000, ATTN: RDTA-EN/STND/TRANS or emailed to usarmy.detroit.rdecom.mail.tardec-standardization@mail.mil.

AMSC N/A
FSC 2320

2. APPLICABLE DOCUMENTS.

The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all of the latest revision specified requirement documents cited in sections 3 and 4 of this specification, whether or not they are listed. The latest versions of the documents listed below and throughout this specification can be obtained from the following:

1. http://www.everyspec.com

2. http://www.ihs.com/products/design/industry-standards/index.aspx

SPECIFICATIONS

AUTOMOTIVE TANK PRODUCT DESCRIPTION (ATPD)

ATPD 2206	- Batteries, Storage: Lead-Acid, "Maintenance-Free"

COMMERCIAL ITEM DESCRIPTION

A-A-50271	- Plate Identification
A-A-52513	- Bracket Assembly, Liquid Container, Five Gallon
A-A-52557	- Fuel Oil, Diesel

MILITARY

MIL-PRF-2104	- Lubricating Oil, Internal Combustion (Heavy Duty)
MIL-PRF-2105	- Lubricating Oil, Gear, Multipurpose
MIL-PRF-10924	- Grease, Automotive and Artillery
MIL-PRF-46167	- Lubricating Oils, Internal Combustion Engine
MIL-C-46168	- Coating Aliphatic Polyurethane, Chemical Agent Resistant
MIL-C-53039	- Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant
MIL-C-53072	- Chemical Agent Resistant Coating (CARC) System application Procedures and Quality Control Inspection
MIL-PRF-62048	- Air Cleaners, Automotive: Heavy Duty, Dry-Type (For Internal Combustion Engines) (Metric)
MIL-DTL-64159	- Coating, Water Dispersible Aliphatic Polyurethane, Chemical Agent Resistant

STANDARDS

FEDERAL

FED-STD-595	- Colors Used In Government Procurement

MILITARY

MIL-STD-209	- Interface Standard for Lifting and Tiedown Standards
MIL-STD-461	- Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-642	- Identification Marking of Combat and Tactical Transport Vehicles

MIL-STD-1366	- Transportability Criteria
MIL-STD-1791A	- Designing for Internal Aerial Delivery in Fixed Wing Aircraft

(Unless otherwise indicated, copies of the above specifications and standards are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094, or at http://quicksearch.dla.mil or https://assist.dla.mil).

STANDARDIZATION AGREEMENT

STANAG 1135	- Turbine Fuel, Aviation, Kerosene Type, Grade JP-8
STANAG 4007	- Electrical Connectors Between Prime Movers, Trailers and Towed Artillery
STANAG 4015	- Starter Battery Spaces For Tactical Land Vehicles
STANAG 4019	- Emergency Towing Facilities
STANAG 4074	- Auxiliary Power Unit Connections For Staring Tactical Land Vehicles

(Copies of the above STANAGs are available from web site: http://www.ihs.com/products/design/industry-standards/index.aspx).

2.2 Other Government Documents, Drawings and Publications.

The following other Government documents, drawings and publications form a part of this Specification to the extent specified herein.

DOCUMENTS

DEPARTMENT OF TRANSPORTATION (DOT)

FEDERAL MOTOR VEHICLE SAFETY STANDARDS (FMVSS) – PART 571

108	- Lamps Reflective Devices and Associated Equipment
111	- Rear View Mirrors-Passenger Cars and Multiple Purpose Passenger Vehicles
121	- Air Brake System
125	- Warning Devices
208	- Occupant Crash Protection
209	- Seat Belt Assembly
210	- Seat Belt Assembly Anchorages

FEDERAL MOTOR CARRIER SAFETY REGULATIONS (FMCSR) – PART 393

40	- Required Brake System
41	- Parking Brake System
42	- Brakes Required on all Wheels
43	- Breakaway and Emergency Braking
45	- Brake Tubing and Hose Adequacy
48	- Brakes to be Operative
52	- Brake Performance
93	- Fire Extinguishers
95	- Emergency Equipment on All Power Units

(Copies of the Code of Federal Regulations (CFR) are available from the Superintendent of Documents, U.S. Government Print Office, Washington, DC 20402. Copies of DOT documents are also available from the Department of Transportation, Federal Highway Administration, Washington, DC 20591 or at www.dot.gov).

DRAWING	NOMENCLATURE
0614-2550	- Vehicle Mount Assembly

10939520	- Catch Assy, Rifle
11630581	- Bracket, Mounting, Rifle
11630594	- Support, Rifle
11677011	- First Aid Kit
A3013367	- Mounting Base, Elec Equip, MT-6352/VRC
A3050655-1	- Antenna Mounting Bracket AS-3900A
A3014042-1	- Cable Assembly, Power Elec CX 13305/VRC
A3014031-4	- Antenna Cable CG-3855
A3014038-3	- Speaker Cable
A3014550-1	- Speaker Bracket
A3014065-1	- Loudspeaker, LS-671/VRC
E5-51-527	- M13 Decontamination Kit
6-1-2248	- Sign Kit, Vehicle Class Assembly and Detail

(Copies of the above drawings are available from the U.S. Army Tank-automotive and Armaments Command (TACOM), ATTN: RDTA-EN/STND/TRANS, Warren, MI 48397-5000, or by email to usarmy.detroit.rdecom.mail.tardec-standardization@mail.mil).

TECHNICAL MANUAL (TM)

TM 3-6665-321-12&P
(TM is available from web site: http://www.armyproperty.com/tm/3-6665-321-12P).

ENVIRONMENTAL PROTECTION AGENCY (EPA)

Control of Air Pollution from New Motor Vehicles & New Motor Vehicle Engines.
Compliance with Interstate Motor Carrier Noise Emission Standards.

(Application for copies should reference "Code of Federal Regulations 40 CFR and the Federal Register, and should be addressed to the Superintendent of Documents, US Government Printing Office, Washington, D.C. 20402,
or at www.epa.gov).

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS, INC. (ACGIH)

(Application for copies should be addressed to ACGIH, 1330 Kemper Meadow Dr., Suite 600, Cincinnati, OH 45240, or at www.acgih.org).

2.3 Other Publications.

ASSOCIATION OF AMERICAN RAILROADS (AAR)

(Application for copies should be addressed to AAR, 50 F Street, NW, Washington, DC 20001-1564, or at www.aar.org).

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

SAE J185	- Access Systems for Off-road Machines
SAE J198	- Windshield Wiper Systems-Trucks, Buses and Multipurpose Vehicles
SAE J318	- Air Brake Glad hands Service (Control) and Emergency (Supply) Connector for Trucks, Truck Tractor, and Trailers.
SAE J336	- Sound Level For Truck Cab Interior
SAE J382	- Windshield Defrosting Systems Performance Requirements, Trucks, Buses and Multi-Purpose Vehicles
SAE J516	- Hydraulic Hose Fittings
SAE J517	- Hydraulic Hose

SAE J534 - Lubrication Fittings
SAE J560 - Seven Conductor Electrical Connector for Truck-Trailer Jumper Cable
SAE J563 - Six and Twelve-Volt Cigar Lighter
SAE J593 - Backup Lamp (Reversing Lamps)
SAE J598 - Sealed Lighting Units for Construction and Industrial Machinery
SAE J682 - Rear Wheel Splash and Stone Throw Protection
SAE J688 - Truck Ability Prediction Procedure

SAE J695 - Turning Ability and Off Tracking
SAE J753 - Lubrication Chart-Construction and Industry Machinery
SAE J849 - Connection and Accessory Location for Towing Multiple Trailers
SAE J931 - Hydraulic Power Circuit Filtration
SAE J942 - Passenger Car Windshield Washer Systems
SAE J994 - Alarm, Backup, Electric; Performance, Test and Evaluation
SAE J1318 - Gaseous Discharge Warning Lamp For Authorized Emergency, Maintenance, and Service Vehicles
SAE J1333 - Hydraulic Cylinder Rod Corrosion Test
SAE J1334 - Hydraulic Cylinder Integrity Test
SAE J1335 - Hydraulic Cylinder No Load Friction Test
SAE J1336 - Hydraulic Cylinder Leakage Test
SAE J1436 - Requirements for Engine Cooling System Filling, Deaeration and Drawdown Test
SAE J1708 - Serial Data Communications Between Microcomputer Systems in Heavy Duty Vehicle Application
SAE J1850 - Class B Data Communications Network Interface
SAE J1939 - Data Link Layer
SAE J1995 - Engine Power Test Code – Spark Ignition and Compression Ignition – Gross Power Rating, Standard
SAE AS1708 - Fitting End, Internal Flare, Design Standard
SAE J2360 - Lubricating Oil, Gear Multipurpose (Metric) Military Use

(Application for copies should be addressed to Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warren, PA 15096, or at www.sae.org).

Tire & Rim Association, Inc.

Year Book

(Application for copies should be addressed to the Tire and Rim Association, Inc., 3200 W. Market Street, Akron, OH 44313, or at www.us-tra.org/).

AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

ASTM A514 - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding
ASTM A607 - Standard Specification for Steel, Sheet Strip, High-Strength, Low-Alloy, Columbium or Vanadium, or Both, Hot-Rolled and Cold-Rolled

(Application for copies should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia, PA 19103).

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 - Structural Welding Code Steel
AWS D1.2 - Structural Welding Code Aluminum

(Application for copies should be addressed to the American Welding Society, Inc., 550 N.W. LeJeune Road, P.O. Box 351040, Miami, FL 33135, or at www.aws.org).

3.0 REQUIREMENTS.

***3.01 The armor requirements specified in ATPD 2375 for the HDT will be aligned with the Classified Mine-Resistant, Ambush-Protected Capabilities Production Document (CPD) Version 1.1 MRAP CPD v1.1 (Annex C) and ATPD 2352T (Appendix E) . The Classified Tactical Wheeled Vehicle (TWV) Long Term Armor Strategy (LTAS) Ballistic Specification, version 3.7, (dated: 19 Jan 2006) shall no longer be the directive to be followed in the design of the HDT.

3.1 First Article Test (FAT). Unless otherwise specified in the contract or purchase order, the HDT complete with its components and accessories will be evaluated by the Government during Production Verification Testing (PVT). HDT vehicles selected for Production Verification Evaluation shall be made with production hard tooling and processes and be fully representative of the vehicles proposed to be furnished under this contract. These HDT vehicles shall be submitted for inspection to determine conformance to this specification.

3.2 System Mission Reliability and Maintainability. To ensure ease of maintenance, Military Standard (MIL-STD)-1472, Design for Maintainer section, shall be used appropriately to ensure that the HDT is designed for compatibility with human maintainers wearing full combat weather equipment. Military Handbook (MIL-HDBK)-759 shall be used to calculate anthropometrical dimensions. Where arm, hand, and thumb-finger controls requiring high control forces are to be used, the maximum force requirements shall not exceed those specified in MIL-STD-1472.

3.2.1 Mission Reliability (Chassis). The HDT chassis (excluding the dump body), while operating within the environment specified in the Operational Mode Summary /Mission Profile (OMS/MP) (Appendix A), shall have a probability of at least 0.95 of completing 325 miles without experiencing a System Abort; and at least 0.80 without experiencing an Essential Function Failure (EFF) Threshold (T). The HDT probabilistic reliability requirements are equivalent to a chassis Mean Miles Between System Abort (MMBSA) and Mean Miles Between Essential Function Failure (MMBEFF) of 6336 miles and 1456 miles, respectively. The HDT chassis reliability requirements shall apply to the armor HDT A-cab and B-kit configurations.

3.2.2. Mission Reliability (Dump Body). The HDT dump body shall have a probability of at least 0.91 of completing 30 dump cycles without experiencing a System Abort; and at least 0.83 without experiencing an EFF (T). The HDT probabilistic reliability requirements are equivalent to a dump body Mean Cycles Between System Abort (MCBSA) and Mean Cycles Between Essential Function Failure (MCBEFF) of 320 cycles and 160 cycles, respectively.

3.2.3 Maintainability (Chassis). The HDT required total maintenance manpower for scheduled and unscheduled maintenance actions, excluding daily checks and services, on the HDT (excluding dump body), shall not exceed 0.0025 Maintenance Man-Hours per Operating Mile (MMH/MI) at the Field level, and 0.0005 MMH/MI at the Sustainment level (T). The HDT chassis reliability requirements shall apply to all armor kit configurations.

3.2.4 Maintainability (Dump Body). The HDT required total manpower for scheduled and unscheduled maintenance actions, excluding daily checks and services, for the dump body will not exceed 0.003 Maintenance Man-Hours per Dump Cycle (total of all levels) (T).

3.2.5 Two-Level Army Maintenance. The HDT shall be supported by the two-level Army maintenance system, which consists of field and sustainment maintenance:

3.2.5.1 Field Maintenance. Field maintenance shall consist of on-system repair and return-to-user tasks, those tasks that do not consist of disassembly of a component (primarily Line Replaceable

Unit (LRU)/Line Replaceable Module (LRM) level replacement). Field maintenance shall be conducted forward in the battle space as the battle rhythm of the supported unit permits and shall be conducted by the system crew chief/operator and ordnance Combat Repair Teams (CRTs) equipped with the Forward Recovery and Maintenance Vehicle (FRMV).

3.2.5.2 Sustainment Maintenance. Sustainment maintenance shall consist of off-system repair and return-to-supply tasks, those tasks required to return components, subassemblies, and end item systems to a serviceable condition. Sustainment maintenance may take place at designated locations anywhere in the world and shall be performed by military personnel, government civilians, and contractors.

3.3 Standard Vehicle and/or Components, Parts and Accessories. The HDT vehicles and their components, parts, and accessories shall be the standard/optional commercial or military types. All components of the HDT shall be common and the same with similar existing systems to the maximum extent possible. The HDT vehicle shall be complete in all respects as normally delivered to users of heavy dump trucks.

3.3.1 Ratings. HDT vehicle components and performance ratings shall meet or exceed component manufacturers' current published ratings for on and off road operating conditions. Components and vehicular ratings shall not be raised to meet the requirements of the specification.

3.3.2 Commonality. The HDT shall have the maximum practical commonality of power train, subsystem, and chassis components with other Army vehicles while meeting HDT requirements (T).

3.3.3 Computer Resource Support. Computer Resources Software shall be compatible with existing tactical maintenance and diagnostic systems such as the Maintenance Service Device (MSD). This will reduce the need for procurement of new maintenance devices. At this time, it is envisioned that there will be no impact on computer resources.

3.3.4 Design Interface. To the greatest extent possible and within rapid fielding constraints, the HDT contractor shall embed and integrate the Built-In Test (BIT)/Built-In Test Equipment (BITE) diagnostic capability and make available on the common data/information interchange network. Maintenance concepts shall include optimum use of accurate on-board diagnostic capability to include BIT or BITE. The BIT BITE diagnostic capability shall apply to all electronic, electro-optic, electro-mechanical, electro-hydraulic, and electro-pneumatic systems as applicable. The contractor shall fully document and support embedded systems and software. The software shall not contain proprietary restrictions. The Department of the Army (DA) Test, Measurement and Diagnostic Equipment (TMDE) Preferred Items List (PIL) will be used as the preferred acquisition guideline for procurement or reprocurement of DA TMDE. The TMDE PIL objectives and policy are defined in Army Regulation (AR) 750-43.

3.3.5 Condition Based Maintenance Plus (CBM+). Condition Based Maintenance (CBM) and CBM Plus (CBM+) shall be used where it is currently being used in the commercial version of the HDT (T). CBM+ capabilities shall use embedded diagnostics and prognostics to provide a sensor-based, self-monitoring, self-reporting, both on and off, platform Objective (O). CBM+ capabilities shall provide a fully sensor-based, self-monitoring, self-reporting, both on and off, platform. The HDT shall make full use of embedded diagnostics and prognostics and shall be fully capable of platform self-diagnostics for system health management in a common logistics operating environment.

3.3.6 Platform Re-Generation Maximum. Rapid repair of the HDT at field level is critical to increasing unit effectiveness by quickly returning equipment to fully mission capable status. The ease of maintenance reduces complexity of tasks thereby enhancing enduring reliability and increasing operational availability. To achieve this "pit stop" capability the HDT shall achieve a Mean Time to Repair (MTTR) of 0.5 hrs (T) and 0.25 hrs (O) hrs for all field level repairs/tasks.

3.4 Special Requirements.

3.4.1 Capabilities.

3.4.1.1 Force Protection. The HDT crew cab and underbody shall have the capability to be armored to the same levels of protection as defined in MRAP CPD v1.1 (CAT I, II, and III) (T),up to 5x MRAP CPD v1.1 (O). The HDT shall be designed and built to accept all armor to provide this level of protection (T). (See below paragraph 3.9, HDT Armoring Concept)

3.4.1.3 Payload. The HDT shall be capable of individually hauling and dumping/ejecting a variety of dry and wet loads to include blast rock, concrete with reinforcing bars, dirt, hot asphalt, snow, rubble, large boulders and sand and have a rated payload capacity of no less than 15 tons for (trails and cross country), 22.5 tons for (primary and secondary roads) and the use of integrated sideboards for on road payloads is expected (T). Objective (O): 20 tons for (trails and cross country) 27 tons for (primary and secondary roads) and the use of integrated sideboards for on road payloads is expected (O).

3.4.1.4 Vehicle Recovery. The HDT shall be capable of being recovered/towed from both the front and from the rear of the vehicle by an Army Heavy Expanded Mobility Tactical Truck (HEMTT), Fifth Wheel Towing Device (FWTD) and a HEMTT wrecker. The HDT shall be interoperable with a US Army standard tow bar (MS500048) and tow cables, and shall be capable of being towed via tow bar or tow cables. The HDT shall be capable of towing an empty HDT using a US Army standard tow bar (T). Vehicle recovery will be conducted by vehicle to vehicle and by organic recovery equipment within the unit the HDT is assigned. Each HDT shall be equipped with front and rear trailer air couplings that control brakes of existing military trailers and shall not connect to the braking system of towed vehicle in like-vehicle recovery scenarios. Specialized instructions/procedures (e.g. identify transfer gear-case shift modes, specify pre-condition requirements, disconnect front or rear propeller shafts to preclude damage) shall be identified in operating instructions. The recovery scenarios and related vehicle systems will undergo testing to validate flat and lift and tow capability (or mitigating circumstances for movement with one or more disabled wheel assemblies) and will include front and rear lift and tow testing.

3.4.2 Painting. The HDT vehicle shall be finished or painted to provide a low reflectance surface. All hardware not normally painted shall be treated to provide low reflectivity. The HDT vehicle shall be cleaned, treated, primed and top coated in accordance with (IAW) Military Specification, Chemical Conversion Coatings on Aluminum and Aluminum Alloys (MIL-DTL)-53072. The HDT primers shall be compatible with their applied surfaces and the specified topcoat. The HDT paint shall be applied and conform to MIL-DTL-64159 or MIL-DTL-53039. The HDT vehicle shall be CARC painted with a three color camouflage pattern conforming to the Government furnished drawing or CARC paint Tan 686, color chip 33446 of Federal Standard (FED-STD)-595 including undercarriage assemblies such as the axles and suspension depending on the specifications in the contract or delivery order. The threaded portion of the wheel studs shall not be painted.

3.4.3 Corrosion Protection. In service, the HDT service environment includes varying periods in military corrosion environments involving high temperature and humidity, salt spray, mud, sand, road de-icing chemicals, ultraviolet radiation exposure, and atmospheric contamination. In these service conditions, the HDT vehicle and dump body shall be capable of operation for a total service life of twenty (20) years (T) or thirty (30) years (O), and during the first fifteen (15) years (T), there shall be no perforations or other functional failures caused by corrosion requiring repair or replacement of parts. These requirements shall be achieved by a combination of design features, material and coating selections, manufacturing process controls, and routine maintenance procedures. The HDT design features shall prevent the accumulation and containment of fluids and other materials which promote corrosion. Joints shall be designed to prevent the penetration and entrapment of corrosion-causing fluids. All metal parts shall be pretreated and primed IAW MIL-DTL-53072. Mixed-metal parts mated together, such as aluminum and steel, shall be electrically isolated from one another to prevent galvanic corrosion.

3.4.4 Markings. HDT vehicle markings shall be IAW MIL-STD-642. Markings such as safety, fuel types (i.e., F-24 and JP-8), fill level of liquids, tire pressure, and instructional markings, ~~etc~~. shall be letters or numerals one inch in height. Painted markings, letters and numerals shall be lusterless paint conforming to MIL–DTL-64159 or MIL-DTL-53039. Black, Chip No. 37030 of FED-STD-595, shall be

used on green or brown background. Green 383, Chip No. 34094 of FED-STD-595, shall be used over a black background.

3.4.5 Instruction, Caution, Identification, Lubricating, Operating and Data Plates. Instruction, caution, identification, operating and data plates shall be provided IAW A-A-50271 and shall be installed in a readily visible location. The HDT vehicle shall be equipped with instructions, plates or diagrams, including cautions and warnings describing any special or important procedures to be followed in assembling, operation or servicing. Instruction plate(s) shall completely describe and depict operating tasks. An identification (name) plate shall be provided. The plate shall contain the vehicle model number, description, national stock number, USA registration number, date of manufacture, contractor's name, and contact number. Installed adjacent to the identification (name) plate shall be a lubricant plate IAW SAE J753, except that it shall reference military lubricants. A HDT vehicle weight classification sign kit shall be provided as described in drawing no. 6-1-2248 (81337), except that the colors used shall be black characters on a background of 383 green. The kit shall be installed in a location behind the front bumper and shall not interfere with other vehicle functions.

3.4.6 Transportability. The HDT vehicle shall be transportable without special permits worldwide by highway, rail, marine and fixed-wing air (C-5 & C-17 aircraft) modes. Preparation, by two crewmembers, for HDT transport by any mode shall not exceed 30 minutes using Basic Issue Items (BII). All parts required to be removed must have a place onboard the HDT for storage.

3.4.6.1 Highway. The HDT vehicle shall meet the requirements for unrestricted Continental United States (CONUS) highway transport and general unrestricted transport in most NATO countries as defined in MIL-STD-1366. The HDT shall be road legal and capable of unrestricted CONUS and NATO countries' highway transport within legal limits without waivers or special permits for all countries in which the will be operated (i.e., current military installations, and deployment sites both in CONUS and Outside the Continental United States (OCONUS)).

3.4.6.2 Overall Clearances. The HDT angle of approach shall be no less than 15 degrees and the angle of departure shall be no less than 15 degrees. The HDT minimum ground clearance shall not be less than 12.5 inches under the lowest point of the axles.

3.4.6.3 Roll-On/Roll-Off (RORO). To maintain safe operations and prevent interference problems the HDT vehicles, with and without pintle towed trailers, shall have adequate clearance underneath them to prevent contact at the ramp crest/toe for a 15 degree ramp, and shall have enough clearance above them to prevent projection interference problems. Angles shall be defined IAW SAE J1100. The HDT vehicle shall be capable of negotiating the worst case ramp angle of 15 deg by the RORO method, without ramp approach shoring and without any portion, except the tires, of the vehicle contacting the surface of the ground, ramp, or aircraft cargo compartment floor. A minimum 1-in clearance between all components of the HDT vehicle (excluding the tires) and the ramp floor shall be maintained.

3.4.6.4 Rail Transport. The HDT shall be rail transportable worldwide. The HDT at reduced width and height and loaded on a 50-inch high railcar, shall meet the dimensional requirements of the AAR Outline Diagram for Single Loads, Without End Overhang, on Open-Top Cars which applies to standard-gauge rail lines in the CONUS. The HDT vehicle shall withstand the rail impact test specified in 3.4.6.5 without degradation or damage.

3.4.6.5 Rail Impact. Rail impact testing will be conducted IAW Appendix B at HDT vehicle curb weight, with and without B-kit installed. The HDT with and without B-kit installed shall meet the military standard rail impact test.

3.4.6.6 Water. The HDT vehicle shall be transportable on the Lighter, Amphibious, Resupply, Cargo (LARC)-LX, Landing Craft, Mechanized (LCM) and Utility (LCU)-8, LCU-1646, LCU-2000, Large Scale Vehicle (LSV), Joint High Speed Vessel (JHSV) and larger vessels to include RORO vessels (T) and meet the criteria published in the MIL-STD-1366 (T).

3.4.6.7 Fixed-Wing Aircraft. The HDT shall comply with MIL-STD-1791A, "Designing for Internal Aerial Delivery in Fixed Wing Aircraft" to meet air transportability requirements. The HDT at curb weight shall be RORO transportable in operational configurations (with and without armor B-kit installed) by C-17 and C-5 aircraft (T) and C-130 aircraft (O). The HDT will be air transportable only at curb weight due to an unsecured payloaded dump body (i.e., shifting dirt, sand loads etc.).

3.4.6.8 Lifting and Tiedown Provisions. The lifting and tiedown provisions on the HDT vehicle, at GVWR (to include installed armor B-kit) minus the pintle towed load, shall meet the criteria of MIL-STD-209. When B-kit is installed on the HDT vehicle, the lifting and tiedown provisions, including all connecting structural members shall meet the criteria of MIL-STD-209. The contractor shall certify that the lifting and tiedown provisions and all related structural components (including bumpers, if used) meet this military standard and provide calculations to prove the design strengths. The locations of the equipment tiedowns shall permit the vehicle to be secured to the transport medium in such a manner to prevent vehicle shifting and movement in any direction. Lifting and Tiedown provisions shall not serve as towing eyes and shall be permanently marked and shall not interfere with the payload of the vehicle (T). HDT lifting and tiedown provisions will be tested at GVWR including B-kit (T).

3.4.6.9 Towing Eyes. The HDT vehicle shall be equipped with towing eyes IAW STANAG 4019. Towing eyes shall not serve as lifting and tiedown provisions. Towing eyes shall be provided on both the front and rear of the HDT vehicle. The towing eyes shall be of such size that the vehicle can be towed by a similar vehicle or other Army vehicles (see paragraph 3.4.1.4) using a US Army standard tow bar, MS500048. The towing eyes shall be of sufficient strength to withstand the maximum forces encountered while being used for towing and winch recovery operations at the HDT GVW, with and without the HDT pintle connected to its companion Light Equipment Utility Trailer (LEUT). Tow shackles shall not be provided with the towing eyes.

3.4.7 Kits. The HDT vehicle shall operate IAW the specification requirements and the HDT manufacturer's technical data after installation of and use of the kits specified herein. The application and use of these kits shall in no way affect the life expectancy of the HDT vehicle or its components. The HDT vehicles shall be furnished with the interface requirements for the kits, such as predrilled holes, electrical hookups, connections/connectors, hole accesses, coolant ports for heater and etc. The HDT vehicles shall have space and power allocation to accept installation of all or any combination of the kits described herein. When specified in the contract or delivery order, the manufacturer shall furnish the kits described herein.

3.4.7.1 Mounting Kit, M13 Decontamination Apparatus. This kit will provide the necessary hardware for mounting one decontamination apparatus (E5-51-527) on the exterior of the HDT vehicle (away from heat sources) and in an accessible location. The decontamination apparatus shall be mounted in its upright position using bracket assembly A-A-52513. Holes shall be predrilled for attachment of the bracket assembly. Holes shall be filled with threaded fasteners.

3.4.7.2 Reserved

3.4.7.3 Arctic Heater Kit, Engine and Personnel. The HDT with and without B-kit installed shall be capable of accepting and operating with the contractor's Arctic Heater Kit. The Arctic Heater kit shall be available from the contractor or supplier/vendor when required and procured through the Army. The contractor shall provide and install up to two (2) Arctic Heater Kits for Government cold room testing at a designated Government test site. The Arctic Heater Kit shall enable the HDT to meet the operating parameters in this specification. This kit shall permit the HDT vehicle, after 24 hours of cold soak at -40 degrees F, to start after 45 minutes of preheating and to operate and move continuously at full load at normal speeds within 15 minutes thereafter. In addition, the kit in conjunction with the standard personnel heater unit shall be sufficient in capacity to attain and maintain the HDT crew cab at a temperature of 41 degrees F at an ambient temperature of -40 degrees F. The windshield must be capable of being defrosted within 30 minutes IAW SAE J382, except that ambient temperature shall be at –40 degrees F with the arctic heater kit and -25 degrees F without arctic heater kit. Windshield defrosting requirements shall be maintained at a speed of 50 mph (T).

3.4.7.4 Fog Lights. The HDT vehicle shall be pre-wired for installation of two standard commercial fog lamps. A separate control switch located on the truck instrument panel shall be furnished. Electrical hook-up shall be designed to preclude fog light operation during blackout conditions.

3.4.7.5 Mounting Kit, Rifle and Mission Oriented Protective Posture (MOPP) Gear and Body Armor. The HDT cab shall be equipped with two (2) U.S. Military Specification (MIL-SPEC) standard quick-release rifle mounts (M16/M4/with and without the M203 grenade launcher and the M249 weapons) for securing weapons during hauling and dumping operations. The HDT in-cab location of the weapon mounts shall provide the operator and passenger unrestricted access to their respective weapon without interfering with operating functions, vehicle and equipment controls, and entry/exit doors. The HDT cab shall provide adequate stowage space for the protective mask, MOPP gear and body armor (T). The contractor shall install two rifle mount kits in the cab, providing any necessary brackets and hardware. The kit shall provide stowage for all versions of the M-16, M4 Carbine and M249 weapons. The rifle mount kits will include two each of the following:

NSN	Nomenclature	TACOM Drawing Number
1095-00-763-7348	Rack, Storage, Small arms	11630529
2590-00-455-5899	Bracket, Small arms	11630581
2590-00-264-8828	Bracket, Small arms	11630594

Holes will be provided for attachment of the mounting items to the HDT cab interior and will be filled with threaded fasteners.

3.4.7.6 Reserved

3.4.7.7 M22 Automatic Chemical Agent Alarm. Space shall be provided on the HDT for the following components; M281 Automatic Chemical Agent Alarm Mounting Kit; the M88 detector (outside cab) and the M42 alarm (inside cab). The preferred location for the detector is outside the cab; however, internal mounting is acceptable if external air is being monitored and the output of the detector sampling air is ducted outside the cab compartment. Threaded holes/weld nuts, or equivalent, shall be provided in the selected position, along with bolts/fasteners tightened in place thus providing expeditious installation of the equipment with the use of on-board tools. Detailed information on M88 mounting bracket dimensions/hole locations, detector size and electrical connector definition is provided in TM 3-6665-321-12&P and drawing number 0614-2550. The M88 detector requires 24 Volts Direct Current (VDC) power that shall be wired directly to the M281 mount junction box. A two wire electrical connection shall also be wired from the M281 mount junction box to the M42 alarm location. Detailed information on M42 mounting bracket dimensions/hole locations is provided on Combat Related Special Compensation (CRDC) Drawing D5-15-8779 (Part No. D5-15-5490), Alarm and bracket weight is 4 lbs.

3.4.8 High-Altitude Electromagnetic Pulse (HEMP). HEMP survivability is required for the HDT. Operation through a HEMP event is not required and the re-cycling of power to restore mission critical functions is acceptable.

3.4.9 Command, Control, Communications, Computer & Intelligence (C4I). The HDT vehicle shall be equipped with Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance ((C4ISR) Integration Kit (57K7274, cage code 19207).

3.4.9.1 Communication and Situation Awareness Equipment Space and Mounting Points. The HDT cab shall provide enough space and power provisions for installation, operation and maintenance of current and future communication and situational awareness equipment (T). The HDT shall have sufficient mounting points (fore, aft, and external), capable of mounting present and emerging communications, computers, antennas, mounted water ration heater, camouflage netting (externally), NATO bridge classification placards, flashing warning beacon kit, automatic chemical agent alarm kit and mounting brackets for standard Army fuel/water containers, etc; (T).

3.4.9.1.1 Identifying Friend or Foe (IFF). The HDT shall have space and power provisions for accepting IFF equipment (T).

3.4.9.1.2 Radio frequency Automatic Identification Technology (RF AIT). The HDT shall have provisions for accepting RF AIT devices, or alternative devices, which will enable movement, material, or other management of wheeled vehicles (T).

3.4.9.1.3 Force XXI Battle Command Brigade & Below (FBCB2) Blue Force Tracking. The HDT vehicle shall provide cable and electrical cabling pass-throughs through the vehicle exterior with and without B-kit installed, and dedicated mounting locations with and without B-kit installed as called out in the C4ISR Integration Kit (57K7274, cage code 19207). The HDT shall be furnished with power provisions in accordance to Table 3.

Table 3: Electrical Circuits

Description	Voltage/Current Rating*	Location
FBCB2 PWR	24/20	PDM (Power Distribution Module)
MTS PWR	24/20	PDM
VCS PWR	24/20	PDM
DVE PWR	24/20	PDM
SINCGARS PWR	24/20	PDM
IED 1 PWR	24/50	PDM
IED 2 PWR	24/40	PDM
Spare IED PWR	24/50	PDM
Spare PWR	24/50	(within12 inches from PDM outer cover)
Switched PWR	24/20	(within 12 inches from PDM outer cover)
Switched PWR	12/20	(within 12 inches from PDM outer cover)
Switched PWR	24/20	rear inside cab
Unswitched PWR	12/20	rear inside cab
Unswitched PWR	24/20	rear inside cab
Unswitched PWR	12/20	lower center dash

*Circuit protection shall be provided (i.e., fuse, relay)

3.4.9.1.4 Auxiliary Power Connections. The HDT vehicle shall be equipped with no less than six (6) switched and unswitched auxiliary power connections with rated voltages and amperes IAW Table 3, plus nine (9) additional circuits in the PDM to support emerging systems IAW Table 3. The locations of the auxiliary power connections shall be IAW Table 3.

3.4.9.1.5 Movement Tracking System (MTS) w/Global Positioning System (GPS). The HDT vehicle shall provide cable and electrical cabling pass-throughs through the vehicle exterior, as required, and dedicated mounting locations as called out in the C4ISR Integration Kit (57K7274, cage code 19207). The contractor shall provide power provisions IAW Table 3.

3.4.9.1.6 Vehicle Computing System (VCS). Adequate space allocation and power provisions (i.e., pre-wired for electrical hook-up, etc.) shall be provided in the HDT vehicle cab for installation and operation of a future common Vehicle Computing System (VCS) for hosting Interactive Electronic Technical Manuals (IETMs), vehicle communications and vehicle integrated diagnostics software. For the purpose of readily integrating and retrofitting with commercially viable electronic control technologies and related off-board test equipment, the data bus architecture shall be compliant with International Organization for Standardization (ISO) 9141, SAE J1962. The connection point, for ISO 9141 compliant off-board test equipment must be available inside the HDT vehicle cab.

3.4.9.1.7 Test Measurement and Diagnostic Equipment (TMDE). The HDT vehicle shall feature a serial data bus architecture that networks the following elements: engine, transmission, Central Tire

Inflation System (CTIS), Anti-lock Braking System (ABS), Collision Warning System, and any other hydraulic, pneumatic, or electronically controlled subsystems to be interrogated for the purpose of maintenance, failure analysis and troubleshooting via off board diagnostic test equipment such as, but not limited to SPORT and MSD. The data bus architecture shall be compliant with and interoperable between the following commercially recognized protocols: SAE J1939, J1708/J1587, and J1850. The data bus architecture shall be equipped with technology that has the capability to collect, store and rationalize diagnostics data onboard the vehicle platform. The data bus architecture shall provide diagnostics capability, at minimum, to include fault isolation capability sufficient to identify critical failures of major networked components of each system monitored by the data bus network. ISO 9141 data bus must have an off board connector located in the vehicle cab. The vehicle connectors and circuits to all data busses shall be compatible with current standard Army test equipment. Documentation showing the complete fault isolation capabilities of these systems by the data bus shall be provided to the government. The manufacturer shall provide all standard and proprietary data, data descriptions and error codes necessary to communicate with the electronic control modules and to maintain the electronically controlled subsystems. The manufacturer shall provide data, which specifies limits for all parameters, and how to interpret data outside limits.

3.4.9.1.8 Single Channel Ground and Airborne Radio System (SINCGARS) Radio Set. A 24-volt, 20 Amp power connection for the SINCGARS power cable (A3014042-1, CX-13305/VRC) shall be furnished in the HDT crew cab. Adequate space shall be available inside the HDT crew cab for installation, at a point convenient to the driver, for the SINCGARS AN/VRC-90 Radio Set including the MT-6352/VRC mounting base. Dedicated mounting locations, as called out in C4ISR Integration Kit (57K7274), shall be provided for the installation of the MT-6352/VRC mounting base (A3013367). Radio mount, P/N 22-65834, shall be removed from the vehicle configuration. Provisions shall be provided for the installation of the antenna mounting bracket (A3050655-1) that permit the unobstructed installation of AS-3900A antenna. Provisions shall be provided for the passage of a 9 ft. antenna cable CG-3855/VRC (A3014031-4). Adequate space allocation and provisions shall be provided in the vehicle cab for installation of LS-671/VRC loudspeaker (A3014065-1) along with speaker cable CX-13292/VRC (A3014038-3), speaker bracket (A3014550-1) and H-250/Handset (5965-00-043-3463) at a point convenient to the driver. All unused cab holes shall be closed with threaded removable fasteners.

3.4.10 HDT Central Tire Inflation System (CTIS)

3.4.10.1 Tire Pressure Control. The CTIS system shall allow the driver to adjust all HDT vehicle tires to any one of four preset tire pressures with and without B-kit (plus underbody protection) installed. To improve off road mobility, provisions shall be provided to adjust and vary tire pressures from the HDT crew cab, with the vehicle in motion. System control shall be mounted within the HDT cab so that the full operating range of Army drivers may activate the system while continuing to operate the truck.

3.4.10.2 Installation. A Central Tire Inflation System (CTIS) shall be an integral element of the HDT and HDT w/MCS.

3.4.10.3 Provision and Storage of Air. The CTIS shall contain necessary compressor and stored air capability to meet the inflation and deflation time requirements as stated herein. CTIS shall be operable with and without an operable spare tire. The system shall provide infinitely repeatable adjustable of air pressures among those specified. System recovery time shall be such that the operations in Paragraph 3.4.10.9 shall be accomplished within the time limits stated immediately subsequent to and other inflation/deflation activity and are included in those stated times.

3.4.10.4 Manual Tire Inflation/Deflation System. The system shall provide for the isolation of any or all HDT tires from the CTIS in the event of CTIS failure for any reason. Valves for manual inflation shall be readily accessible and compatible with the standard on board manual inflation system.

3.4.10.5 Air-Priority System. The CTIS shall incorporate sufficient safeguards to assure that in the event of a tire puncture to one of the rear wheels the punctured tire shall be isolated from the rest of the system with a loss of no more than 10 psi to the other tires. Also air pressure necessary to continue

safe operation of the HDT vehicle shall be available at all times during activation of CTIS or in the event of CTIS failure. Use of brakes and windshield wipers are minimum requirements for safe operation.

3.4.10.6 Speed/Pressure Control and Warning. The CTIS shall include sensing of the HDT vehicle speed and comparing indicated speed to the maximum allowable speed for each control setting. In the event the truck speed exceeds maximum allowable speed for that setting a panel-mounted light shall activate warning the driver of this condition. If average speed exceeds maximum allowable speed for a period of more than one minute, the system shall automatically inflate to the appropriate pressure.

3.4.10.6.1 Speed Detection/Driver Alert. Sensors shall alert the HDT vehicle operator by a flashing amber light whenever speed exceeds that suitable for sustained operation at tire pressures appropriate to mobility requirements. The light shall not activate when in the blackout mode. As a minimum, four pressure settings shall be available to the driver. Settings shall be designated as Emergency, Mud/Snow/Sand, Cross-country, and Highway.

3.4.10.7 Maintenance of Tire Pressure. With the CTIS in operation, tire pressure shall be certified and adjusted at intervals necessary to assure that no more than a 3 psi (0.2 atm.) variation exists between selected and actual pressure except during the inflation/deflation operation caused by the selection of a new tire pressure. With the CTIS not in operation and the HDT engine not running after a twenty four hours, the tire pressure shall not drop below 97% of the pressure which exists before the truck's engine was stopped. No action shall be required of crew personal beyond normal shut down of the truck to meet this requirement. The gas law pressure/temperature relations shall be taken into account when determining compliance with this requirement.

3.4.10.8 Operating Environment. The CTIS shall be fully operational under all operating conditions and environments described in the ATPD 2375 HDT specification.

3.4.10.9 Time to Inflation/Deflation. The CTIS shall be capable of operating within the time constraints as listed below showing the maximum time allowed to complete the operation (minutes: seconds).

Inflation From	**To**	**Time Threshold**	**Time Objective**
Cross Country	Highway	10:00	4:00
Mud & Snow	Cross Country	3:00	2:00
Emergency	Mud & Snow	2:00	1:30
Deflation From	**To**	**Maximum Time Allowed**	**Time Desired**
Highway	Cross-country	4:00	3:00
Cross-country	Mud & Snow	3:00	2:00
Mud & Snow	Emergency	3:00	2:00

3.5 General Design.

3.5.1 Manpower and Personnel Integration (MANPRINT).

3.5.1.1 Safety and Design. The HDT vehicle and furnished accessories shall comply with all FMVSS and FMCSR, applicable to a vehicle of this weight class at the time of manufacture, except as specified herein. The HDT vehicle, parts and components shall be free of sharp projections and/or edges that may cause operator/maintainer injury. HDT operators and maintenance personnel shall not be unknowingly exposed to rotating or moving parts, hot surfaces, electrically energized components,

components containing high pressures, or any other inherently hazardous components or systems. All hand holds and steps shall be an integral and permanent part of the HDT vehicle. Additionally, the steps shall be of sufficient depth to allow crew members to safely ingress/egress the HDT truck in both the A-cab and B-kit configurations. Permanently attached ladder/steps (see paragraph 3.8.11) shall be provided for accessing the dump body. A moveable ladder, to access the dump body when required, shall also be provided which shall be stored in a readily accessible location on the vehicle. All step surfaces and work areas shall be provided with a nonskid surface.

3.5.1.1.1 User Interface. User interface with the HDT vehicle shall be safe, efficient and effective. The vehicle design shall provide for easy access to most components, without the need to first remove other parts and components for access. The use of special tools and special equipment and test devices shall be minimized, with most HDT vehicle maintenance tasks requiring common tools only. The contractor shall ensure that the HDT maintenance tasks can be performed using only those tools available in the General Mechanics Tool Kit (GMTK) and Standard Automotive Tool Set (SATS). The contractor shall notify the Government, in writing, of any HDT maintenance tasks the contractor determines cannot be performed with the above tools. The user interface shall be uncomplicated and respect appropriate design guidance in MIL-STD-1472. The HDT vehicle shall be designed for use by the 5th percentile female to 95th percentile male soldier and must promote ease of use. The HDT vehicle must be compatible with the range of environmentally protective clothing.

3.5.1.1.2 Back Up Alarm. The HDT shall be equipped with a backup alarm of the audible type with manual override conforming to SAE J994, type C. The backup alarm shall be automatically inactivated during use of the blackout lighting system. The backup alarm audible signal shall be distinguishable from surrounding HDT noise level (T).

3.5.1.1.3 Collision Warning System (CWS). The HDT shall be furnished with a CWS offering the latest technology. The CWS shall provide the operator/driver a visual/audible indication when objects are approaching too close to the front and sides of the HDT vehicle. The warnings shall be such to allow sufficient time to avoid impending frontal and side collisions. The CWS central processing unit shall be able to compute closing speeds from 1 to 100 mph (minimum). The front antenna transmitter/receiver shall have a detection range of 1 to 500 feet (minimum). The sensor detection beam shall be capable of side-to-side detection covering no less than 70 degrees. The antenna transmitter and receiver assembly shall be located and mounted on the HDT to preclude any damage when coming close to other vehicles and protected from damage from terrain or natural obstacles. The warning lights shall be disabled when the HDT vehicle is switched to the blackout mode; however, momentary flash of the warning lights during engine start and stop is allowed. The audio alarm shall remain operable during blackout. On/off switch on the display unit for the forward and side sensors shall be provided. The performance of the CWS shall not be degraded during inclement and obscure conditions (e.g. dark, rain, snow, fog, dust, smoke, etc.).

3.5.1.1.4 Ball Inclinometers (Slope Indicator, Tilt Meter). The HDT shall be equipped with an analog (T) or digital/electronic (O) slope and tilt meter warning devices offering visual and audible alerts to warn the operator of a potential vehicle tip over event while parked, while operating on and off-road and while raising a payloaded HDT dump bed. The device shall also warn the HDT operator if they start to exceed the normal operating attitude or slope up/down/side slope that the HDT vehicle has been tested against and shall lockout/disable the dump hydraulic system to prevent vehicle tip over. The device shall be capable of accurate, repeatable and reliable measurements of inclines/declines of 50 degrees or less and shall include a scale reading of 50-0-50 degree units, shall include low light illumination for night operations, shall be damped for heavy vibration and be clearly visible and readable during day and night operations while seated in the operator seat.

3.5.1.1.5 Heads Up Display Drivers Vision Enhancer (DVE). The HDT vehicle shall provide cable and electrical cabling pass-throughs through the vehicle exterior and B-kit for DVE. The contractor shall provide power provisions IAW Table 3.

3.5.1.2 Human Factors. The HDT design and integration shall accommodate operation and maintenance by a target audience of the 5th percentile female through 95th percentile male Soldiers. The

HDT vehicle shall be operable and maintainable by individuals wearing the full range of Army clothing including Arctic and MOPP IV clothing and equipment. All operator tasks are to be with a crew of two, Military Occupational Specialties (MOS) 12N Construction Equipment Operator and passenger. The HDT vehicle should be designed so as to maximize operator and maintainer productivity, with special emphasis on Preventive Maintenance Checks and Services (PMCS), changing of tires, and required travel operations.

3.5.1.2.1 Operators and Maintainers. The HDT capabilities will not generate a new MOS or Additional Skill Identifier (ASI). There will be no increase in aptitude requirements to operate, maintain and support the HDT capabilities. The HDT equipment operators will be MOS 12N, Construction Equipment Operator and MOS 12V, Concrete/Asphalt Equipment Operator. Maintainers for the HDT will be MOS 91L, Construction Equipment Repairer, MOS 919A, Construction Equipment Warrant Officer, MOS 915A, Automotive Maintenance Warrant Officer, MOS 91B, Wheeled Vehicle Mechanic and MOS 91 C, Utilities Equipment Repairer. The HDT shall be designed such that these maintainers shall be capable of operating and maintaining the HDT wearing the full range of Army clothing including Arctic and MOPP IV equipment.

3.5.1.2.2 Preventive Maintenance Checks and Services (PMCS). The time required for the HDT to attain a fully mission capable readiness shall allow for ample time to complete PMCS while not impacting the mission performance. Preventive maintenance shall not exceed 10 minutes for before - operation checks, 10 minutes for after-operation checks, and 30 minutes for weekly preventive PMCS. Replacement of component and modules and all repairs shall occur at the lowest possible level of maintenance and shall not increase the crew's responsibility (T).

3.5.1.3 Air/Sound Pollution.

3.5.1.3.1. Air Quality. The HDT vehicles shall comply with the EPA regulations governing Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines in effect on the date of vehicle manufacture. (See paragraph 3.7.1.2).

3.5.1.3.2 Noise Standard. The HDT vehicle exterior sound level shall conform to the Interstate Motor Carrier Noise Emission Standards of the Environmental Protection Agency when tested IAW DOT Regulations, Part 325 and applicable Army Surgeon General requirements for operator personnel without hearing protection. The steady state noise level at the HDT crew positions shall not exceed 85 dBA IAW SAE J336 (T).

3.5.1.4 Toxic Gas Exposure. HDT operating and maintenance personnel shall not be exposed to concentrations of Carbon Monoxide (CO) in excess of values which will result in Carboxhemoglobin levels in their blood greater than 10 percent. Nitrogen dioxide, ether, ammonia, nitric oxide and sulfur dioxide shall be limited to concentrations not to exceed those specified in the threshold limit values for Chemical Substances in work air by the American Conference of Government Industrial Hygienists.

3.5.1.5 Material. All HDT materials shall be new and unused. Recycled material is acceptable when processed to make new material. Environmental requirements shall apply to materials, components/parts purchased through a subcontractor/vendor, Original Equipment Manufacturer (OEM) parts, and manufactured parts.

3.5.1.5.1 Ozone depleting substance. Class 1 and Class 2 ozone depleting substance shall not be used in the design, manufacture, test, operation or maintenance of the HDT vehicle system.

3.5.1.5.2 Radioactive material. No radioactive material shall be used in any part of the HDT vehicles.

3.5.1.5.3 Hazardous Materials (HAZMAT) Management. Asbestos, beryllium, radioactive materials, hexavalent chromium, (electroplating and coatings), cadmium (electroplating), mercury, or other highly toxic or carcinogenic materials, as defined in 29 CFR 1910.1200, shall not be used in the

manufacture, assembly, maintenance or sustainment of the HDT without prior approval from the Government.

3.5.1.5.4 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion.

3.5.1.5.5 Lead. Lead shall not be used without prior approval of the Government. The use of lead solder may be approved for electrical components where a suitable alternative is not available. Lead-acid batteries may be used without approval from the Government.

3.5.2 Dimensions and Weight. The HDT vehicle dimensions and weight shall be as follows:

a. Overall height shall not exceed 144 inches, and shall be reducible to 128 inches by the crew within 30 minutes using only on-board tools
b. Side load height without side boards shall not exceed 102 inches above ground level.
c. Overall width shall comply with DOT 658.15
d. Overall vehicle length of the HDT shall not exceed 375 inches. Overall vehicle length of the HDT w/MCS shall not exceed 395 inches
e. The HDT gross vehicle weight rating GVWR shall not exceed 100,000 lbs (B-kit installed)

3.5.3 Fuel and Lubrication. The HDT vehicle shall meet all performance requirements using JP-8 (STANAG 1135, F-34), and F-24 standard diesel fuels (T) and lubricants (A-A-52557, MIL-PRF-2104, MIL-PRF-2105, MIL-PRF-10924 and MIL-PRF-46167). These fuels and lubricants shall have no adverse effect on vehicle components or warranty. Grease lubrication fittings shall conform to SAE J534. The HDT must utilize standard Army lubricants and fuels dispensed using standard Army refueling systems (T) for wheeled vehicles. The primary fuel to meet all the HDT performance requirements shall be JP-8 (T), all standard diesel fuels (O)

.

3.5.3.1 Centralized Lubrication System (CLS). By allowing for minimal lubrication points to save the operator time when performing PMCS, the HDT shall be equipped with a centralized lubrication system containing no more than five (5) lubrication points (T), two (2) lubrication points (O). The CLS shall be capable of delivering the industry-recommended amount of lubricant for each component requiring lubrication.

3.5.3.2 Oil Drain Plugs. Drain plugs installed in the engine, transmission, transfer case and axles shall be of the permanent magnet type.

3.6 Performance. The performance requirements specified in Paragraphs 3.6.1 through 3.6.9 shall be met with the HDT at its specified GVW (B-kit installed).

3.6.1 Forward Speed. The HDT shall be capable of sustained travel at GVWR on level primary roads of at least 65 MPH (T).

3.6.2. Mobility Rating Speed (MRS). The HDT shall accommodate the Tactical-Standard MRS IAW the HDT Operational Mode Summary Mission Profile - Paragraph 1.5. Environmental Conditions: Movement Terrain, Quarry and non-Quarry Units) as follows:

Central Europe (T)	Percent Use	Speed
Primary Roads	20%	65 MPH
Secondary Roads	50%	25 MPH
Trails	15%	10 MPH
Off road	15%	5 MPH

Central Europe (O)	Percent Use	Speed
Primary Roads	10%	65 MPH
Secondary Roads	30%	25 MPH
Trails	10%	10 MPH

Off road	50%	5 MPH

Mid-East (T)	Percent Use	Speed
Primary Roads	15%	65 MPH
Secondary Roads	35%	25 MPH
Trails	35%	10 MPH
Off road	15%	5 MPH

Mid-East (O)	Percent Use	Speed
Primary Roads	5%	65 MPH
Secondary Roads	20%	25 MPH
Trails	25%	10 MPH
Off road	50%	5 MPH

3.6.3 Mission Profile. The HDT will be operated over its terrain profile as a percentage of miles against the test courses as follows (See Appendix A - HDT Operational Mode Summary Mission Profile - Paragraph 1.5. Environmental Conditions: Movement Terrain, Quarry and non-Quarry Units):

Terrain	Mileage (%)	Speed Range
Primary Roads	45%	40-65 mph
Secondary Roads	45%	20-25 mph
Cross-Country	10%	5-10 mph

+Max Payload for Primary and Secondary Roads will by 22.5 tons (T)/27 tons (O)
+Max Payload for Trails and Off Road will by 15 tons (T)/20 tons (O)

Seventy-five percent (75%) of the mileage will be at full payload and twenty-five percent (25%) will be half-loaded. Additionally, the HDT at GVW will be tested up to 20% of mileage with the pintle-towed trailer (i.e, LEUT Type II) fully payloaded. (See Table I, Section 4 for description of test courses and test profiles at Aberdeen Proving Ground (APG), MD - Section 4 intentionally excluded from draft ATPD 2375.)

3.6.4 Gradeability and Speeds. The HDT shall climb, stop and hold, start, operate on and crest, headed up and down at GVWR (B-kit installed and no wheel slip) with a longitudinal grade of at least 30% at minimum speed of 2 MPH (2.93 km/hr), with and without a pintle towed fully payloaded LEUT Type II, and without loss of stability, malfunction or damage to the HDT vehicle and LEUT trailer (T). Additionally, the HDT coupled to a fully payloaded LEUT Type II trailer shall climb, stop and hold, start, operate on and crest headed up and headed down a 15% grade without exceeding the suspension travel limit (up or down) of any axle. Ascending a 3% grade, the HDT at GVWR and couple to the fully payloaded LEUT Type II trailer shall maintain a minimum speed of 15 MPH (24 km/h).The HDT vehicles shall maintain sustained speeds on Class I good roads (per SAE J688) at GVW as follows:

Grade	Speed
0%	65 mph
3%	25 mph

3.6.5 Side Slope Operation. The HDT at GVWR, with and without both B-kit and pintle towed trailer (fully payloaded) shall operate in both directions (either side of hill) on side slopes up to 15 percent,with either side of the system up slope), without exceeding the suspension travel limit (up or down) of any axle, and without evidence of faulty lubrication, leakage, other malfunctions or damage to the truck and trailer (T).

3.6.5.1 Vehicle Clearance Circle. The vehicle clearance circle shall not exceed 6 times the vehicle wheelbase when measured per SAE J695. It is desirable that the turning diameter (curb to curb) not exceed 100 feet.

3.6.5.2 Lateral Stability and Lane Change. The HDT at CW and at GVW with B-kit and fully payloaded LEUT trailer when operating on paved highways shall sustain a steady state 0.30g lateral acceleration without any of the wheels leaving the ground. The HDT at GVW with B-kit and fully payloaded LEUT trailer shall be capable of lane changing within a 125 ft (38.1 m) distance from one 15 ft (4.57 m) wide lane to another, pass a 75 ft long (22.86 m) obstacle, and return to the original lane within another 125 ft (38.1 m) distance without any tires leaving the ground.

3.6.6 Climatic Conditions. The HDT, after 24 hour soak at -25 degrees F, shall be capable of starting and operating with full load (15 minute warm-up period) in ambient temperatures from -25 degrees F to +120 degrees F and from sea level through 5,000 feet altitude without the need for cold and hot weather kits. The HDT vehicles shall be capable of starting and operating in ambient temperatures from -25 degrees F to -40 degrees F with arctic kits installed (T), without arctic kits installed (O).

3.6.7 Vehicle-Machine/Equipment Interoperability**.** The HDT shall be interoperable with the Paving Machine Bituminous Material: Diesel Driven Crawler Mounted 12 Foot (LIN N75124) (T) and with asphalt paving machines used by the United States Marine Corps (USMC), United States Air Force (USAF), United States Navy (USN) and used commercially (O). Including rear tires, the HDT components such as the brake chambers etc., shall not interfere with or contact the push rollers on the paving machine during paving operations (T).

3.6.7.1 Dump Loading. The HDT shall accommodate loading by the following equipment: current Army wheel loaders (2,5 yard, Model No. M924; 4.5 yard, Model No. M966A; 5 yard, Model No. M966B; 5 yard) hydraulic excavators (Type I, Model No. M230 and TypeII, Model No. M240), and with ramp or platform; Backhoe Loaders, all Model Nos. M580; High Mobility Engineer Excavator (HMEE), Model No HMEE-I (T) and material handling equipment used by other services (Seabee, USAF Red Horse and USMC) (O).

3.6.7.2 LEUT Type II Companion Trailer. The HDT at GVW shall be capable of pintle-connecting to and safely operating with its payloaded LEUT Type II companion trailer (payload = 10 Ton (T), 15 Ton (O)). The LEUT Type II trailer supports hauling payloads such as Backhoe Loader and Type II Skid Steer Loaders. The HDT shall have a receptacle assembly electrical coupling for attaching lunette trailers to the HDT (T). The HDT ABS and secure lighting shall interoperate with the LEUT's ABS and secure lighting.

3.6.8 Fording. The HDT at GVW and without special equipment and without prior preparation shall be capable of hard bottom fording in salt and fresh water at depths of 20 inches and speeds of at least 5 MPH for not less than five minutes duration under all climatic conditions noted herein, without damage or any need for additional maintenance prior to further operation (T) and 48 inch depth fording (O). Brake release time, IAW FMVSS 571.121, shall be met. Bearing lubricant contaminates as a result of fording shall not exceed .25% by volume.

3.6.9 Ride Quality. The HDT shall demonstrate full controllability by MOS 12N Construction Equipment Operator/MOS 88M driver. There shall be no more than 6 watts average vertical absorbed power at the HDT driver's and passenger's station while negotiating a 0.7 inch Root Mean Square (RMS) course at 15 mph (22 km/hr), a 1.0 in RMS course at 10 mph with the tires at normal highway inflation pressure while at curb weight and GVW. The HDT vehicle at curb weight and at GVW, shall have no more than 2.5g acceleration at the driver's and passenger's station while negotiating half round obstacles of 8 inches in height at a speed of 6 mph (8.8 km/hr) and 4 inches at a speed of 15 mph (22 km/hr).

3.7 Chassis Components.

3.7.1 Power Train. The HDT power train shall include a readily available fuel-efficient electronic controlled commercial diesel engine having sufficient minimum gross power to meet performance at GVWR (includes installed B-kit) and payloaded pintle towed trailer for all specified grades; automatic electronic transmission; front drive axle(s) and 2-speed transfer case; rear drive axles and suitable suspensions for the OMS/MP (Appendix A). The HDT shall be all wheel drive with the same size and

type wheels and tires on all axles. The HDT design shall provide the capability for the vehicle operator to change drive configurations throughout the entire drive range while seated in the HDT cab (T).

3.7.1.2 Engine. The engine shall be of the latest engine technology and shall have sufficient minimum gross power to meet the performance requirements of this specification in all environmental conditions, "except arctic conditions", using JP-8 (F-34) as the primary fuel, which may have up to 3,000 ppm sulfur. In addition to JP-8 fuel, the use of F-24 fuel is approved and acceptable for CONUS operations only. JP-8 will remain the HDT's primary fuel for OCONUS operations and the vehicle shall include appropriate F-24 and JP-8 markings IAW Section 3.4.4. Pollution control technologies that are affected by the sulfur level of JP-8 fuel either in maintenance or life expectancy shall not be used, e.g., externally cooled Exhaust Gas Recirculation (EGR), Nitrogen (NOx) traps, catalytic converters, aftertreatment systems, etc. The HDT is neither subject to EPA Motor Vehicle Heavy Duty Diesel Exhaust emission standards nor the EPA Non-road exhaust emission standards since the HDT vehicle will contain permanent armor protection. This determination is IAW 40 CFR, Sections 85.1703, 89.908, and 1068.225. Contractor shall ensure National Security Exemption labeling requirements are met IAW EPA regulations. In addition, lubricity canisters/filters shall not be required for proper engine operation (O).

3.7.1.3 Fan Clutch. The HDT engine cooling system fan shall be provided with a thermostatically controlled clutch which has a positive lockup (continual operation) in case of control failure.

3.7.1.4 Retarder. An engine retarder with modulated driver control shall be provided which develops at least 70% of the rated horsepower output of the HDT engine.

3.7.1.5 Data Storage and Retrieval. The HDT vehicle shall be equipped with a system capable of accumulating, recording and storing (30 days) vehicle related operational data such as coolant temperature oil temperature, oil pressure, throttle position, timing, fuel pressure and vehicle speed. The data shall be retrievable with theArmy's MSD.

3.7.1.6 Self-Priming Pump. An HDT on board self-priming pump easily accessible to the operator and capable of repriming the fuel system in the event of loss of vacuum shall be provided.

3.7.1.7 Automatic Starting Aid. The HDT vehicle shall be equipped with a fully-automatic starting fluid system that will inject precisely controlled amounts of vaporized starting fluid into the engine's air intake system and prevent engine damage. The system shall operate only when the key is turned to normal start position and the starter is engaged.

3.7.1.8 Reserved

3.7.1.9 Reusable Oil Filter. A permanent, cleanable engine lube oil filtration method shall be provided. This method shall be compatible with the HDT engine.

3.7.1.10 Belt Tensioner System. The HDT vehicle shall be equipped with a belt tensioner system. The system shall automatically adjust the alternator and fan belts to the correct tension.

3.7.1.11 Oil Pan and Radiator Bottom Protection. The HDT shall be furnished with oil pan and radiator lower front and bottom protection from sand abrasion damage and puncturing road debris while operating both on and off road in the environment of the HDT vehicle mission profile specified in the HDT ATPD (T). The HDT vehicle shall be equipped with a durable full metallic material oil pan (T) (plastic and composite material oil pans shall not be used).

3.7.2 Fuel System. The HDT fuel system shall conform to FMCSR 393.65 and 393.67. Fuel lines shall be routed and protected to preclude foreign object contact during operation.

3.7.2.1 Fuel/Water Separator. The HDT shall be equipped with a combination fuel filter and fuel/water separator of the spin-on type with hand-operated drain valve and heating unit. Provisions shall be made for manually repriming the system after opening for any reason.

3.7.3 Fuel Tanks. The HDT shall be equipped with a corrosion resistant top draw fuel tank(s) and shall be capable, with rated payload and towed load, of being operated on internally carried fuel for a minimum of 300 miles (T) or 400 miles (O) before requiring refueling when operated IAW the HDT OMS/MP (Appendix A). The HDT shall be capable of traversing secondary roads and rolling terrain for at least 300 miles at GVWR without refueling (T). The HDT fuel tank(s) shall be capable of accepting 50 gallons per minute (gal/minute) using standard Army refueling equipment. The HDT fuel tank system shall be capable of performing throughout all slope operations as specified herein with fuel tanks only 10% full. The fuel tank(s) shall have all necessary fittings with labeling for directly connecting the arctic heater kit. When more than one fuel tank is furnished, means shall be provided to assure equalized level and draw in the tanks. Internally carried fuel includes all fuel tanks at no more than 95% full with 5% ullage. Fuel tank(s) shall be provided with minimum 3-inch (76.2 mm) diameter safety type tank filler cap or caps. Filler caps shall be located to preclude mud build up and captive chained to filler neck. Removable strainers and drain plug(s) are required. The fuel tank/line venting system shall not be combined or inter-connected with any other vent system. Fuel tank fill ports shall be capable of receiving fuel-dispensing nozzles of a minimum of 2 inches (50.3 mm) in diameter.

3.7.3.1 Fuel Level Sending Unit (O). The HDT shall be equipped with an electronic unit that incorporates no moving parts. System shall be accurate to within 3% volume.

3.7.3.2 Fuel Tank Protection. The HDT fuel tank(s) shall be located on the vehicle in a protected zone away from the line of sight of snipers (T) or shall be protected with an armored material or other material jacket (i.e., extinguishing or/and ballistic) (O). Armor protection shall be IAW classified MRAP CPD v1.1 Annex C. Extinguishing material jacket shall be IAW requirements in Appendix D.

3.7.4 Engine Air Induction and Filtration System. The HDT shall be furnished with a high performance, high capacity engine air induction and filtration system that allows for long-term HDT operations in hot desert dusty environments (at idle and during normal driving/operation) without the need to frequently maintain and service the filtration system and filter element(s). To markedly reduce traditional air filter/element maintenance and service intervals for on road and off road operations in extreme sandy and dusty working environments, the air filtration system shall be capable of filtering and holding (without the need to frequently empty) large volumes of contaminates found in worldwide climatic conditions and military environments. The HDT air induction and filtration system design shall improve air filtration efficiency both at high engine speed and for scavenge airflow delivered to the air cleaner at low engine speeds. All air filters and elements shall be directly accessible (with and without armor B-kit installed) and quickly serviceable by the operator/maintainer/crew (T). The air induction and filtration system shall be furnished complete and installed from the air inlet to the intake opening on the engine assembly. It shall prevent the entrance of foreign matter during vehicle operations and conform to engine manufacturer's recommendations. The HDT air induction and filtration system shall be such that no leaking or water entry due to fording or splash shall occur. The air cleaner at a minimum shall meet the requirements of MIL-PRF-62048.

3.7.5 Cooling System. The HDT cooling system shall provide sufficient engine cooling and prevent engine overheating throughout the HDT's full mobility and mission profile at GVW. The cooling system shall be capable of continuous de-aeration when tested IAW SAE J1436, paragraph 5.3. The HDT engine coolant system shall be serviced with a solution of ethylene glycol conforming to A-A-52624 and water in equal parts by volume. If necessary, a larger radiator and vehicle hood shall be provided.

3.7.5.1 Coolant Filter with Inhibitor. A coolant filter which provides corrosion and scale inhibitor shall be provided (liquid cooled engine).

3.7.5.2 Draining. Radiator(s) and engine block shall be provided with drain(s) capable of removing, by gravity, all of the cooling fluid (liquid cooled engine).

3.7.6 Exhaust System. Exhaust mufflers and tailpipes shall be corrosion resistant and shall be furnished with guards to prevent personnel from contacting the hot surfaces. Entry of rain water shall be prevented by the design of the exhaust system when the vehicle is not operating. The portion of the

exhaust system adjacent to the fuel tank cap shall be isolated to prevent the tank cap surface from reaching temperatures over 140 degrees. The exhaust system shall conform to FMCSR 393.83.

3.7.7 Automatic Electronic Transmission. The HDT shall be equipped with a new automatic electronic transmission which meets the performance specification as stated herein and with all applicable federal safety standards at the time of vehicle manufacture. The transmission shall shift automatically in all forward ranges, provide smooth, continuous, uninterrupted power transfer, and require no operator action uncommon to standard, commercially available automatic transmissions.

3.7.7.1 Inhibitor System. A reverse and down shift inhibitor system shall be provided which prevents driver shift control action from over speeding or damaging engine, transmission, or drive train components.

3.7.7.2 Transmission Filter. A readily accessible transmission filter, as recommended by the transmission manufacturer for the intended application, shall be provided.

3.7.7.3 Transmission Control System. The automatic transmission shall feature an electronic control system. The gear selector shall be located within easy reach of the HDT driver/operator IAW applicable FMVSS guidance. The shift indicator shall be easily visible and illuminated IAW applicable FVMSS guidance to clearly display the gear range selected.

3.7.7.4 Cruise Control. The engine shall not have cruise control capabilities.

3.7.8 Power Take-Off (PTO) Protection. Equipment shall be provided to prevent engine throttle and PTO engagement unless transmissionis in neutral.

3.7.9 Transfer Case. The HDT shall be equipped with no less than a 2-speed transfer case to provide on/off drive to the front axle. One speed shall be used for low speed, high torque operations (i.e., working off road with heavy dump loads, while dumping, and while interoperating at slow speed with an asphalt paver, etc.). The inter-axle differential lock/unlock control shall also control the engagement and disengagement of the front wheel drive. A transfer case oil temperature gage shall be provided on the cab dash. For vehicle recovery, the transfer case shall have a neutral shift position.

3.7.10 Suspension and Axles. The HDT vehicle shall be equipped with front and rear axles and suspension systems rated for maximum GVW (B-kit installed) and shall be fully capable for Army use in accordance with the HDT's mobility and mission profiles. All axles shall be properly vented and equipped with lubricated wheel bearings and seals adequate to meet fording requirements.

3.7.10.1 Front Axles. The HDT vehicle shall be equipped with one or more front drive steer axles and a suspension system with components having a rated capacity at least equal to the maximum load that can be imposed on each member measured at the ground. The front axle weight rating (FAWR) shall also accommodate the weight of the armor B-kit without overloading the front axle(s) and suspension at maximum payloads.

3.7.10.2 Rear Drive Axles and Suspension. The HDT vehicle shall be equipped with two or more rear drive axles and suspension systems with components having a rated capacity at least equal to the maximum load that can be imposed on each member. The rear axles on the vehicle shall be no less than the four-wheel type (T), complete with axles, suspension, interaxle differential with lock-up and all other necessary parts. The rear axle weight rating (RAWR) shall also accommodate the weight of the armor B-kit without overloading the rear axle(s) and suspension at maximum payloads.

3.7.10.2.1 Suspension. The suspension shall limit actual axle loads to 120% of their rated capacity when either one side or one axle row travels over a 10 x 10 inch (25.4 cm) square block, and a 10 inch deep x 36 inch wide (25.4 x 91.44 cm) ditch at 3 mph (4.827 km/h). The suspension design shall limit vertical natural frequency of the spring mass to within 1.5 to 2.0 hertz at gross vehicle weight.

3.7.10.2.1 Differential(s). The HDT shall be equipped with appropriate inter-axle differential(s) for reliable operation within the environment specified in the HDT OMS/MP (T). Forward-rear drive axles shall be equipped with automatic locking differentials. The differential(s) shall permit differential action to compensate for wheel speed differences.

3.7.10.3 Hubs. All axles shall be equipped with steel/ironhubs with either all hub piloted or all stud piloted and safety wheel nuts to prevent the nuts from loosening. Aluminum piloted-hubs and standard lug nuts are unacceptable and shall not be used. The HDT shall not have any mixing of stud piloted and hub piloted.

3.7.10.4 Reserved

3.7.11 Permanent Lube Driveline. The HDT vehicle shall be furnished with a permanently lubricated driveline(s). The u-joint and slip section of the driveline(s) shall be permanently greased and sealed for life.

3.7.12 Wheels, Rims, and Tires. Steel rims and tire ratings shall conform to Tire and Rim Association recommendations for the type and size of tires furnished.

3.7.12.1 Tires. The HDT vehicle shall be equipped with steel belted radial tires and mounted onto either all stud piloted or all hub-piloted steel wheels. The HDT tires shall be of the continuous duty type capable of sustained speeds at vehicle maximum speed and sustained off road operations at reduced speed. Tire tread design shall be acceptable for both on and off road use, with thread patterns appropriate for dump truck off road mobility and construction job site operations. Valve caps shall be provided and all tires shall be equipped with valve extensions and shall be so mounted as to permit checking tire pressure and inflation using only on vehicle equipment. Tires shall be of rated capacity at least equal to the load imposed on each tire, measured at each wheel, at the ground, with vehicle loaded to the specified maximum payload. A minimum tire tread life of 20,000 miles is required (T), 30,000 miles (O). Tires shall be compatible with tire-changing equipment presently in the current Army inventory. The tires shall be of the run flat type (T). Tires shall be compatible with mobility enhancers (i.e. CTIS, Traction Control). If tire pressure must be varied to improve off road mobility, provisions shall be available to adjust tire pressures from the cab, with the vehicle in motion.

3.7.12.2 Spare Tire/Wheel Assembly, Carrier and Hoist. The HDT shall be equipped with a spare tire/wheel assembly (identical to vehicle tire set) easily accessible and able to be quickly and safely removed and replaced from its stowed position within 10:0 minutes (T) or 5:0 minutes (O). An independent device shall be provided on each vehicle to facilitate spare tire loading and unloading from its stowed position by a single person (MOS 12N, Construction Equipment Operator). The spare tire/wheel assembly will be able to be installed at any wheel location (T).

3.7.12.3 Tire Changing Equipment. The HDT shall be equipped with on-board tire changing equipment (i.e., air gun, lug nut wrench and handle, jack, etc.) for safely removing and installing the wheel/tire assembly on the axles with the HDT empty by a crew 5th percentile female through 95th percentile male soldier (MOS 12N/V) (T). The crew of the HDT shall be able to perform a single tire changing operation within 1 hour (T), within 30 minutes (O).

3.7.12.4 On Vehicle Air Supply. An acceptable air supply IAW FVMSS 121 shall be provided at the passenger side of the HDT vehicle for safe operation of pneumatic tools (i.e., the air ratchets, etc.), hoses and vehicle tire inflator. The air supply access point shall be clearly labeled and identifiable, include a quick disconnect coupling (w/dust cover) and shall accommodate pneumatic tools, hoses and fittings. The air ratchet and inflator hose length shall be suitable for servicing tires on both sides of the HDT and LEUT companion trailer. Tire lug nut socket(s), air ratchet, hoses and tire inflator shall be identified as BII and shall be called out by NSN and quantity.

3.7.12.5 Run-Flat Capability (O). The run-flat capability shall permit safe driving after loss of air pressure in any two tires (T) (all tires (O)) for at least 30 miles (T) (60 miles – (O)) with speed reduction (T), without speed reduction (O), over the HDT OMS/MP terrain.

3.7.12.6 Limp Home Capability. The loss of the function of one wheel (T), (two wheels (O)) shall not impede the HDT from driving 30 miles (T) (60 miles (O) with speed reduction (T), without speed reduction (O) over the OMS/MP terrain. This capability shall be for emergency operation only in case of wheel bearing failure, damaged wheel, inability to change wheel/tire.

3.7.13 Electrical System. Electrical system shall be IAW FMCSR 393.27 through 393.33 and SAE J2202 and SAE-J163. The HDT shall be equipped with a vehicular electrical system of the commercial, heavy-duty type having a 12/24-volt system. The 12/24-volt system shall be stepped down to 12-volts from a primary 24-volt vehicle power source (T). The lighting system shall be 12 volts IAW FMVSS 108. The HDT starting system shall be 24 volts. The HDT lights and reflectors shall be located and mounted so as to preclude any damage when interfacing with other vehicles and protected from damage of terrain or natural obstacles. The HDT backup lights shall be IAW SAE J593. Hazard flashers shall be provided and the brake lights shall take precedence over the hazard flashers when used in combination. Cab interior lights shall have a variable brightness control. The circuit breakers shall not be automatic reset type. The HDT vehicle shall be equipped throughout with easily assessable and quickly replaceable modular-type electrical harnesses, if available. Circuits and components shall be protected from corrosion by the use of corrosion resisting materials or by the application of corrosion resisting compound that is readily removable for maintenance. The HDT vehicle shall be furnished with an alternator with sufficient output and reserve to power the vehicle and all accessory equipment defined in 3.4.9.1.3. and related paragraphs throughout ATPD 2375. To prevent overcharge of Absorbed Glass Mat (AGM) batteries, a load sensing capability and temperature compensation shall be included in the battery charging circuit, if required. The HDT shall have a receptacle assembly electrical coupling for attaching a trailer to the HDT (T).

3.7.13.1 Vehicle Power and Reserve Power. The HDT power source (i.e., batteries, alternator, generator and/or fuel cell, etc.) shall support the individual vehicle electrical requirements and must be capable of supplying additional power to support present and emerging military systems.

3.7.13.2 Engine Starting System. The HDT shall be furnished with an all battery 24-volt engine starting system (T) or with a commercially available Capacitor Starting System with temperature and power management (O) or with the currently available Government designed and approved Capacitor Engine Starting System (CESS) (O).

3.7.13.3 Batteries. The HDT batteries shall meet current US and NATO military standard requirements for both configuration and performance and shall be in sufficient quantities to power vehicle starting and electrical performance requirements in all climatic conditions. The vehicle shall be furnished with the Army 6TAGM (Hawker Armasafe Plus Valve Relief Lead Acid (VRLA) maintenance-free) batteries. Batteries shall conform to STANAG 4015 and ATPD 2206R6 where applicable, and MIL-PER-32143. Batteries shall be readily accessible for service and inspection. A non-corrosive, vented battery box shall be provided and shall be capable of containing the sealed batteries with from the environment and contaminates. Battery cables shall have sufficient length to accommodate and connect to other types of Army standard batteries required during long term vehicle storage.

3.7.13.3.1 Battery Charging System. For optimimal battery charging, the HDT battery charging system shall include load sensing and temperature-compensated voltage regulation with battery compartment sensing for proper charging of 6TAGM (Hawker) batteries (T). To address the different battery chemistries found in all of the various Army battery types (6 Tadiran Lithium (TL), 6 Tubular Maintenance Free (TMF), 6TAGM, and 6TGEL batteries), the battery charging system shall be capable of providing battery temperature monitoring, temperature compensation and modified charge curves (O).

3.7.13.3.2 Battery Shut-Off Switch. The HDT vehicle shall be furnished with a battery shut-off switch placed inside the cab that, when activated, disconnects power to all systems in the truck and towed

trailer. The switch shall be capable of handling all electrical systems. Switch shall have a failsafe system that prevents damage for shutoff. The on/off position of the switch shall be clearly identified.

3.7.13.4 NATO Slave Receptacle and Cable. The HDT vehicle shall be provided with a NATO electrical slave receptacle with electrical capability to jump-start vehicles with 24 volt starting systems (T). The receptacle shall be IAW STANAG 4074 (Type 1 receptacle) and located so as to preclude damage, corrosion or contamination, and tripping hazards upon entering or exiting the cab. The HDT vehicle shall be provided with a 12 ft. NATO Intervehicle Power Cable IAW STANAG 4074 with Type 1 plugs.

3.7.13.5 Electronic Strobe Warning Light. The HDT vehicle shall be provided with one (1) electronic strobe warning light (NSN 6220-01-495-2851) in the vehicle BII and shall be able to be installed and removed from the vehicle using BII only (T). The vehicle shall have the mounting bracket, pre-drilled holes and shall be pre-wired for installation of the light. The warning light shall be visible for 360-degrees. The HDT driver/crew must be able to install the light within 10 minutes using only BII tools. A separate control switch located on the truck instrument panel shall be furnished in all vehicles. Electrical hook-up shall be designed to preclude warning light operation during blackout conditions.

3.7.13.6 Work Lamps and Utility Outlets. The HDT shall be equipped with four each sealed beam flood lamps (two mounted and two portable) and electrical utility/convenient outlets. Each outlet shall be labeled 12 or 24 volts, as appropriate, and protected with a cap or cover.

3.7.13.6.1 Work Lamps. Lamps and mounting shall be IAW SAE J598.

a. Two 12-volt lamps, each not less than 4 inches in diameter and 1500 candlepower minimum with stone shields shall be swivel mounted on the rear of the vehicle such that they illuminate the dump bed and immediate working areas at the rear, inside dump and sides of vehicles. The on/off switch shall be located in the cab.

b. Two 12-volt work lamps shall be portable and shall be provided with 25 feet of cord. Electrical power shall be obtained from the utility outlets. On/off switches shall be provided on the lamps. The two portable lights shall be placed in the stowage box when not in use.

3.7.13.6.2 Utility Outlets. No less than two 12-volt outlets and one 24-volt outlet with protective covers and on/off switches shall be provided outside the HDT cab for plugging in flashing warning lights, mounted water ration heater and similar electrical devices (T). The outlets shall be 30 A fused protected and clearly marked each with respective voltage output. A grounding circuit autonomous and separate from the vehicle chassis shall be provided.

3.7.13.6.3 Convenience Outlets. A minimum of two fused protected convenience outlets (one 12-volt outlet and one 24-volt outlet, 15 amps including on/off switch) shall be provided and marked as power sources for portable electrical equipment in the HDT cab compartment. Each outlet shall be labeled 12 or 24 volts, as appropriate, and protected with a cap or cover. If necessary, a grounding circuit shall be autonomous and separate from the chassis.

3.7.13.6.4 AC Clean Electrical Power. Electrical power source outlet for 110v AC, 15 amp shall be provided in the cab compartment and outside the cab with minimum interference to the occupants with outlets being easily accessible (T=O).

3.7.13.7 Secure Lighting. The HDT vehicle shall be equipped with LED blackout lighting in accordance with MIL-STD-1179. Blackout lighting shall be controlled by a switch in easy reach of the operator. Blackout lighting shall prevent the illumination of any light not required for safe vehicle operation. Means to prevent accidental disengagement of the blackout system shall be provided. Lights that are necessary for safe vehicle operation shall be limited to the visible portion of the electromagnetic spectrum between 380 to 700 nanometers. Peak emission in the infrared 700 to 1200 nanometer region shall be restricted to less than one percent relative to that measured in the visible region (380 to 700 nanometers) for any given secure

blackout light source. Colored warning lights shall be maintained as necessary while meeting the above requirements.

3.7.13.7.1 Lock Out. When in use, the secure light shall automatically lock out all regular service lights, electronic horn and back up alarm (T).

3.7.13.8 Electromagnetic Emission Interference (EMI). The HDT vehicle shall comply with applicable EMI and electromagnetic emission susceptibility requirements of MIL-STD-461 and MIL-STD-464.

3.7.13.8.1 Electromagnetic Environmental Effects (E3). The HDT shall be hardened to the maximum extent practical to reduce the effects of all expected E3, e.g. Electromagnetic Radiation (EMR), Electronic Counter Countermeasures (ECCM), Hazard of Electromagnetic Radiation to Personnel (HERP) ~~etc.~~ (T). It is highly desired that the HDT be hardened and remain operationally effective after exposure to E3, to maintain its usefulness after a potential exposure to E3 on the future battlefield. MIL-STD-464C shall be used at the platform level and MIL-STD-461F shall be used at the subsystem/component level to determine areas of needed hardening and identify risks.

3.7.13.9 Day-Time Running Lights. The HDT vehicle shall be furnished with day-time running lights. The lights shall be disabled when the vehicle is switched to the blackout mode.

3.7.13.9.1 LED Lighting. The HDT vehicle shall be equipped with LED headlights, marker, clearance and tail lights in accordance with MIL-STD-1179 and FMVSS 108 (T). The LED headlights shall have an operational service life (no burnout) in both hot and cold ambient temperatures of not less than 400 hours (T) or 1000 hours with venting, cooling fan or heat sink to keep LED junction temperatures low at high power levels and maintain relatively stable LED temperatures to ensure constant light output (O). A means shall be provided to prevent prolonged LED headlight operation above the maximum junction temperature and in very cold temperatures (below -4 degrees F (20 degrees C)) to prevent the LED's light output increasing beyond the regulated maximum. The LED head lamps shall generate sufficient brightness and output to produce a satisfactory beam pattern and beam distance IAW FMSVSS 108.

3.7.13.10 Horn. Standard air horn(s) and standard electrical city horn(s) for this class of vehicle shall be furnished.

3.7.14 Brake Configuration. Brakes shall conform to Federal Motor Vehicles Safety Standards (FMVSS) 571.121 and Federal Motor Carriers Safety Regulations (FMCSR) 393.40 through 393.42 (b), 393.43, and 393.45 through 393.52, and 393.55. All brakes shall be releasable from the cab in the tactical environment per FMVSS 393.41.c. Brake system shall be designed to minimize exposure to "off-road hazards" and maximize ground clearance. In case of a single point failure half of the system shall be able to build and maintain pressure as a limp home mode capability (objective).

3.7.14.1 ABS Brakes. The HDT shall be equipped with no less than a 4-channel Antilock Braking System (T), 6-channel ABS (O). The ABS shall meet the requirements for brake performance specified within FMVSS 571.121 regulation for maximum GVW (B-kit installed). If differences between GVW in A-cab and B-kit configuration necessitate use of multiple brake shoe sizes, both brake shoes sizes shall be compatible with the same base brake assembly. HDT vehicles delivered in A-cab configuration shall be delivered with brake shoes sized to meet the requirements for brake performance specified within FMVSS 571.121 regulation in that configuration. The system shall have built in test for troubleshooting and crew indication. The diagnostic information shall display system error either on board or through the SAE J1587/J1939 data bus. The brake system shall conform to Federal Motor Carrier Safety Regulations 393.40 through 393.42(b), 393.43 and 393.45 through 393.52. The brake system shall provide acceptable brake timing between the HDT truck and companion trailer. The means to decrease the front axle braking force shall conform to Section 393.48. The brake system shall otherwise comply as a system with FMVSS 121. Drum brakes and disc brakes are acceptable to meet the requirement. The HDT ABS shall interface and operate with pintle towed (lunette) trailers equipped with and without ABS. The air compressor shall be sized to deliver the full range of air requirements for the

HDT and companion trailer. Air hoses/lines shall reach to the authorized lunette trailers and connect to the trailer brake system. The air lines and electrical connectors shall be rigidly mounted in a protected location at the rear end of the truck frame and located to facilitate easy connection of mating line/harness from the trailer. The wiring harness and connector to mate with the electrical system on the lunette trailers shall be provided and shall interface in the same location as the air brake line interface. The interface connector location shall be in accordance with SAE J849, 12 pin, 24-volt plug and receptacle. The HDT ABS shall have full functionality in 24-volt blackout operation with and without trailers equipped with ABS. In 24-volt blackout operation, the HDT ABS shall be fully functional with the trailer ABS.

3.7.14.1.1 Air Dryer System. The HDT shall be furnished with an air dryer system with an automatic drain valve to minimize condensation from forming in the air reservoir when a 30°F drop in the system air temperature occurs. An electrical heating element shall be provided in the air dryer to permit functioning below 32°F.

3.7.14.2 Air Connectors (Front of Vehicle). Glad hand hose couplers IAW SAE J318 shall be furnished with cover assemblies and cover-securing chains. Front glad hand hose couplers shall be for receiving air only. These connectors shall allow operation of the vehicle's brakes from the towing vehicle. Glad hands hose couplers shall each have a lever to completely shut off air flow when not needed (T). Glad hand hose couplers shall be color coded and tagged.

3.7.14.3 Brakes for Pintle/Lunette Towed Trailers. Air brake hose couplers (glad hands) with cover assemblies and cover securing chains shall be provided at the rear of the HDT vehicle per SAE J849 to interface with pintle/lunette towed trailers. Glad hands shall each have a lever to completely shut off air flow when not needed. The glad hands shall be color coded and tagged (T).

3.7.14.4 Brake Shields. Shields for the front and rear brakes shall be provided to minimize the amount debris entering the brake drums, if used.

3.7.14.5 Air Reservoir. Each HDT air reservoir shall be equipped with an automatic drain valve.

3.7.14.6 Brake Wear Indicator (O). The HDT shall be equipped with a warning system that allow the operator to make a determination of the remaining brake pads/disk life IAW brake manufacturer's pad/disk wear guidelines.

3.7.15 Cab. The HDT original equipment manufacturer (OEM) shall furnish a heavy-duty, commercial model, two person rear window cab . The ~~new~~ cab shall be the widest OEM cab available for maximizing driver and passenger space (T) or a commercially available cab between 84 inches and 94 inches wide from door to door outside dimension (O). The cab shall include a cab extension no less than 16.0 inches in length for storage of crew gear behind the seats. The HDT cab shall include a Power Distribution Module (PDM) and heavy duty (longer life) chassis harnesses. During the initial twenty years (T) or thirty years (O) of operation there shall be no perforation or other damage to the cab shell and related structural components caused by corrosion and requiring repair or replacement of parts. The HDT passenger door, in addition to the normal window, shall have a fresnel lens in the lower part of the door that shall permit the driver to see a vehicle, pedestrians and other objects which are to the right of the vehicle. Provisions shall be provided on each side of cab to assist personnel in climbing onto the vehicle rear deck, if so equipped. Both doors shall be provided with an integral heavy duty key lock. Two keys for each vehicle shall be provided. The doors and ignition shall utilize the same key and be interchangeable with all other HDT vehicles. The HDT hood shall be provided with a means for securing it in the open position. The HDT cab windshield, door windows and rear window shall be tinted. The cab interior and upholstery color shall be black. Sun visors for both driver and passenger shall be provided. The cab shall have fresh air vents and heater and defroster capable of providing adequate heat and frost-free window visibility in climatic conditions down to -25 degrees F, with and without B-kit installed. The OEM standard cab shall accommodate the requirement for the B-kit emergency ingress/egress outlined at Paragraph 3.9.6.

3.7.15.1 Cab Rear Window. The cab rear window with an outside guard shall be provided. The guard shall allow for ease of cleaning outside of window. The window shall be of a size that will allow driver to have a full vision of vehicle rear area.

3.7.15.2 Cab Seats. The driver and passenger seats shall be of the air ride type, individually adjustable and ergonomically designed to provide appropriate leg, back, shoulder, and head support. The height, fore and aft seat position, back angle, and seat cushion tilt shall be adjustable. Seats shall be upholstered and the driver and passenger seats shall be individually adjustable. The seats shall be fully adjustable both fore and aft and vertically to accommodate the full range of drivers (MOS 12N, MOS12V, MOS 88M). The passenger's seat shall give a ride equal to that of the driver's seat. The seat and restraint systems shall accommodate a 5th percentile female to 95th percentile male soldier wearing full combat gear (to include LBV, personal body armor, and protective mask) and individual MOPP IV protective gear, without interfering with vehicle or crew operations (T).

3.7.15.3 Occupant Crash Protection. The HDT vehicle shall be equipped with occupant crash protection, seat belts and shoulder restraints (minimum three point restraints) conforming to FMVSS 208, 209 and 210 shall be provided for each seated crewmember. Seat belt anchors and retarders shall conform to FMVSS 208, 209 and 210 (T). The vehicle shall be equipped with self-actuating air bag systems that provide protection for both operator and passenger. Vehicle operators must be able to turn air bag system on and off (O).

3.7.15.4 Cab Accessories and Equipment. The following minimum accessories and equipment shall be furnished on each HDT vehicle:

a) voltmeter
b) fuel gage
c) engine oil pressure gage with warning device
d) engine coolant temperature gage with warning device
e) speedometer with odometer
f) tachometer
g) air pressure gage
h) low air pressure warning buzzer and light
i) transmission oil temperature
j) air filter restriction indicator
k) interior dome light
l) map lights mounted on each side of the cab with individual switches and directed to the lap of the respective occupant
m) instrument and lighting
n) two large cup holders each having sufficient size (depth and diameter) to accommodate the range of conventional cups and bottles from small to large and prevent tipping and spillage
o) Reserved
p) 12-volt outlet in dash (SAE J563)
q) transfer oil temperature gage,
r) PTO engagement light
s) forward overhead console

Gages and meters shall have color coding on the face scale indicators to convey such information as: desirable operating range (green); dangerous operating level (red); caution, undesirable or ineffective usage (yellow).

3.7.15.5 Cab Climate Control. The HDT cab shall be climate-controlled equipped with a high performance HVAC systemThe HDT shall be equipped with a heater, blower and defroster. The fresh air heater shall be capable of raising the average cab temperature from –10 to +50 degrees F (-23 to +10 degrees C) within 30 minutes (T) after the engine is started. Windshield and side window defrosting and defogging systems shall operate at ambient temperatures of down to minus 25 degrees F (-32 degrees C) within 45 minutes (T). The windshield must be capable of being defrosted within 30 minutes in accordance with SAE J382 with and without B-kit installed, except that ambient temperature shall be at minus 40 degrees F with the arctic heater kit and minus 25 degrees F (-32 degrees C) without

arctic heater kit. The blower shall be operable independent of the heater. Windshield defrosting requirements shall be maintained at a speed of 50 mph and shall allow windows to remain clear (no fogging or frosting of windows is acceptable). The B-kit ballistic windshield shall be capable of meeting the same above defrost and environmental requirements. A supplemental electronic heating element shall be allowed to meet ATPD 2352R for Transparent Armor.

3.7.15.6 Air Conditioning. A cooling system for the cab shall be installed that has the capability of achieving an 90 degree F average crew compartment corrected effective temperature when operated in a 120 degree F. ambient temperature environment within 60 minutes.

3.7.15.7 Windshield Wipers and Washers. A standard commercial windshield wiper system capable of being removable and replaceable onto installed B-kits and fully functional shall be provided. The HDT vehicles shall be equipped with windshield washers and intermittent-speed windshield wipers IAW SAE J198 and SAE J942. A minimum 3 quart washer reservoir shall be furnished.

3.7.15.8 Cab Visibility. Operators shall have unrestricted visibility to the sides of the HDT (with and without B-kit installed) while seated in the operator's seat inside the cab and the device must be equipped with electric defrost and be remotely controllable from the operator's seat with and without B-kit installed (T)

3.7.15.9 Rearview Mirrors. The vehicle shall be equipped with remote controlled, heated rearview mirrors. Mirrors shall provide the driver a clear view of along the sides of dump body from ground to top of payloads to rear of vehicle, including towed lunette trailer. Mirrors shall comply with FMVSS 111 and have both a flat and convex surface (minimum 6-inch diameter) enclosed in separate housing. Each mirror assembly shall be capable of folding against the side of cab, retracting upon impact with brush. Mirrors shall be suitable for installation and use with the B-kit installed.

3.7.15.10 Spotter Mirror. A spotter mirror (minimum 6-inch diameter) shall be mounted on the front left side to provide visibility across the front of the HDT vehicle. These mirrors shall be placed so that the grille and brush guards on the bumper will serve as protection.

3.7.15.11 Reserved

3.7.16 Steering. Power steering shall be furnished and have full limit steer when the HDT is stationary. In the event power assist is lost, the HDT shall be manually steerable and capable of being brought to a safe stop under all payload conditions. Adjustable tilt/telescope steering shall be furnished.

3.7.17 Front Bumper. A heavy duty type front bumper shall be provided. If the contractor selects the front bumper for installation of the front lifting and tiedown provisions, the bumper and supporting members shall be capable of resisting, without failure, the lifting requirements of MIL-STD-209, with armor A-cab and B-kit installed on the vehicle. A heavy duty radiator grille guard shall be provided. Brush guard shall also protect blackout lights.

3.7.18 Stowage. Stowage areas shall be provided with a latching device, weather seals and baffled drains which will prevent the entrance of water and dust.

3.7.18.1 Equipment Storage. A stowage box shall be provided to accommodate the HDT electrical cables and air hoses, slave cable, portable work lamps, tire changing equipment and items listed in paragraph 3.7.19, with the exception of the fire extinguisher and first aid kit. Standard commercial tire chain holders shall also be provided for 4 or more single standard commercial tire chains for rear axles' dual tires.

3.7.18.2 Individual Equipment Storage. The HDT shall provide stowage compartments that are weather proof, water and dust tight with baffled drains, securable and large enough to store A and B bags for two soldiers (T). The HDT cab shall provide adequate stowage space for the protective mask, MOPP gear and body armor (T). (See "cab extension", paragraph 3.7.15 Cab)

3.7.19 Basic Issue Items (BII) (On-Vehicle Tools). The contractor shall provide BII for equipment operation and for operator maintenance of the vehicle and dump bed system. As a minimum, the BII shall consist of those items that are required to perform "On Board" PCMS. BII shall also include the following items: 1) Army approved First Aid kit; 2) fire extinguisher; 3) Warning, Triangles; 4) Chock Blocks; 5) Warning Light; 6) Log Book Binder; 7) Pad Locks sufficient to secure on board storage; 8) 25 ft, 12V power cable and a 40 ft. air hose for on-board tire inflator. The Contractor shall identify and include additional BII items only as needed. The HDT shall have a lockable stowage area to hold the BII (T). The following BII table is an example and guide for on-vehicle tools that an operator might typically require to perform Preventive Maintenance, Checks and Services (PMCS) on the HDT dump truck vehicle.

Item	**Qty.**
Bag, Pamphlet	1
Bag, Tool	1
Chock, Wheel	2
Gauge, Tire - self-contained (10 to 120 psi) suitable for checking tire pressure including the inside duals	1
Hammer, Hand	1
Handle, Lug Wrench	1
Handle, Wrench	1
Knife, Scraping	1
Pliers, Slip joint	1
Screwdriver, Cross tip	1
Screwdriver, Flat Tip	1
Wrench, Adjustable, 8 in	1
Warning Device Kit - highway, triangular, reflective, Set 3, FMVSS 125	1
Wrench, Socket	1
Wrench, Socket, 1/2 in drive, 15/16 in.	1
Wrench, Socket, 1/2 in drive, 1-1/2 in.	1
Work Lights	1
Gauge Complete Dual Head Chuck 15" hose	1
Binder, loose-leaf	1
Brush, Wire, Scratch	1
Cable Assy, Power, 25 ft, 12 Volt	1
Cable Assy, 12 ft, 24 Volt	1
Extinguisher, Fire – No less than 10 B:C IAW FMCSR 393.95	1
Hose, Pneumatic, 50 ft, with quick disconnect coupling and dual head air chuck and necessary fittings to inflate (using the vehicle air system) the chassis tires.	1
Jack, Hydraulic, Vehicle	1
Kit, First Aid - IAW drawing 11677011 or equivalent mounted or stowed in cab easily accessible to crew personnel	1
Electronic Strobe Light, Warning - IAW SAE J1318 Class 1, Class 2 and Class 3 (NSN 6220-01-495-2851)	1
Padlock, Doors and Stowage	4

Wrench, Impact , 1/2 in dr.	1
Case w/ impact wrench, oil and socket	1
Pioneer Tool Bracket, NSN 2540-01-175-7257. The vehicles shall have attachment points for installation of the pioneer tool bracket. The bracket shall be located in an accessible location.	1
Shovel, NSN 5120-00-293-3336.	1
NATO Slave Cable	1

3.7.20 Rear Fenders. Quarter fenders with solid support brackets shall be provided ahead of the HDT forward most rear wheels to prevent splash to the cab.

3.7.21 Mud Flaps. Mud flaps shall be installed to the rear of the rear wheels and fixed anti-sail mud flaps shall be installed to the rear of the front wheels. The mud flaps shall be black without markings. Mud flap installation at the rear wheel shall conform to SAE J682. Provisions shall be provided to prevent damage to the rear mud flaps during dumping operations.

3.7.22 Pintle. An adjustable (vertical) swivel type towing pintle IAW SAE J849 shall be furnished at the rear of the HDT vehicle for a minimum 60,000 lbs drawbar pull and shall be suitable for attaching lunette style trailers (T). The HDT pintle assembly shall be furnished with mounting flanges and lubricating fittings.

3.8 Dump Body Design

3.8.1 Corrosion Control. The HDT dump body shall be capable of operation for a total service life of twenty (20) years (T) or thirty (30) years (O) which can include varying or extended periods in a corrosion hazard military environment involving high humidity, salt spray, road de-icing chemicals and atmospheric contamination. During the initial fifteen (15) years there shall be no perforation or other damage caused by corrosion requiring repair or replacement of parts. Such capability shall be achieved by a combination of production techniques,
materials selection and design features. The dump body design shall include sloped corner pillars, braces and rub rails; full/continuous welding; chromed cylinder shaft (hoist) and boxed top rails.

3.8.2 Dump Body Capacity. The HDT shall have an extra-heavy-duty (severe duty) COTS type dump body and reinforced dump floor (T). The dump body structure shall be capable of carrying a 22.5 ton payload. The volume capacity of the structure shall have a water level capacity of 16 cubic yards (minimum struck) and a nominal struck capacity of 18 cubic yards with side boards attached. The HDT is intended for severe usage compatible with the HDT OMS/MP (see Appendix A). As part of its quarry mission, the HDT and HDT dump body shall accommodate repeated shock loads produced, for example, from large boulders dropped into the dump body (T).

3.8.2.1. Over Load Sensor (OLS) System. The HDT OLS system shall incrementally alert the operator as the dump bed load capacity is approached. The OLS system shall automatically switch off when the vehicle moves (T). The OLS system shall provide numeric readouts of weight from the start of loading (O).

3.8.3 Floor. The dump body floor shall be not less than 1/4 inch abrasion resistant steel conforming to not less than 400 BHN and 145,000 psi yield strength. The floor plate shall be a one piece sheet (no weld joints). A four inch (minimum) floor to side radius shall be provided. The dump body and dump body floor and related support structure shall be robust and durable to support the HDT quarry mission.

3.8.3.1 Heated Dump floor. The HDT shall be furnished with a heated dump bed floor capable of maintaining a dump body

temperature range of 300 to 375 degrees F when loaded with material. The system shall include an inside cab manual shut off, in-cab temperature reading devices for the heated dump bed floor and dump bed material, and shall be operated and monitored from the driver's position (T). The heated dump bed floor shall be capable of manual shut off from outside the cab at the rear of the vehicle.

3.8.4 Head Sheet. The front head shall not be less than 3116, AR400 400 BHN 145,000 psi yield strength steel. The front head shall be capable of withstanding a horizontal static load equal to one-half the payload capacity of the vehicle without permanent distortion. The head sheet shall not be less than eight inches higher than the body sides. The body front shall support the full bearing load of the cab protector.

3.8.5 Sides. The sides, top-rail, and rub rail shall be formed from no less than 3116, AR400 400 BHN 145,000 psi yield strength steel. The number of braces and brace design shall be consistent with the body length and loading of the maximum payload capacity. Sloped front and rear corner pillars shall be provided. Sides shall have pockets provided for insertion of sideboards. To protect the dump body lower edge during truck lifting operations, radiised (3-inch minimum) cable guides shall be provided on the side support beams. The guides shall be able to accommodate up to 2-inch diameter lifting slings. The guides shall prevent the lifting slings from slipping fore or aft while under load when the lifting sling is 15 degrees off vertical. The guides shall be positioned on center with the rear lifting provisions and not add to the dump body width.

3.8.6 Dump Underbody. The underbody construction consisting of longitudinal sills and crossmembers shall provide a body structure capable of supporting a uniformly distributed load of not less than 500 pounds per square foot of floor area throughout the full lift range. The dump body underbody shall be robust and durable to support the HDT quarry mission.

3.8.7 Cab Protector and Load Cover. A cab protector shall be attached to the front end of the dump body. The cab protector shall extend the full width of the cab and shall extend not less than 50 inches forward from the front of the dump body. The cab protector shall be no less than 3116, AR400 400 BHN 145, 000 psi yield strength steel. The cab protector shall be capable of supporting an evenly distributed load of not less than 2,000 lbs. The cab protector is not intended to be used for additional payload capacity. The HDT shall have an automatic load cover (T). (See paragraph 3.8.18.2)

3.8.8 Tailgate. The 9 panel tailgate panel shall be constructed of not less than 3116, AR400 400 BHN 145, 000 psi yield strength steel . The tailgate shall not be less than eight inches higher than the sides. The tailgate shall be double acting, opening from the top and bottom and be controlled from a seated driver in the cab. Chain slot brackets shall be provided on the rear corner pillars to hold the tailgate open for spreading or in a horizontal position level with the dump body floor. The tailgate shall be sufficiently reinforced to withstand the HDT quarry and non quarry missions to minimize permanent deformation to the tailgate panel during dumping operations. The tailgate design shall have dirt shedding rub rails and braces.

3.8.8.1 Tailgate Lock. An air operated tailgate lock system controlled by the operator in the cab shall be supplied. The air system shall lock the tailgate in the latched position and shall prevent the tailgate from opening with loss of air pressure. An air cylinder shall be retracted when the tailgate is latched. The system shall provide a pressure protection valve.

3.8.8.2 Hardware and Latch. The HDT tailgate hardware shall be capable of withstanding impacts during dumping operations without deformation. The latches shall be made of one inch material (minimum) and be attached to a single cross shaft. Self-lubricating composite bearings for the tailgate hinge and pivot points shall be provided.

3.8.8.3 Spill Shield Kit. The HDT shall be equipped with a 12" Spill Shield located on the rear of the dump body, below the tailgate, on the bottom rub rail. Bracing shall be provided to attach to the rear corner pillars of the HDT dump body. The spill shield kit can be a welded, or bolt on application, and shall extend the length of the dump body to force materials away from the rear of the tires. Spill shield shall be made of no less than 3116, AR400 400 BHN 145, 000 psi yield strength steel.

3.8.9 Material Control System (MCS) Tailgate. The MCS shall be capable of being fully controlled and operated from inside the cab by the operator while seated in the driver's seat of the vehicle and by the operator while outside the cab using MCS remote controls. The HDT MCS shall be capable of being installed and removed at the field maintenance level. All HDTs shall be configured with required MCS electrical and air connections at the rear to allow MCS tailgates to be removed from one HDT to another when necessary (T). When an HDT w/MCS is specified, an MCS tailgate shall be provided in lieu of the 9 panel tailgate (paragraph 3.8.8). The MCS shall perform as a standard top hinged dump gate and shall include a material control system. The MCS shall consist of four material flow control gates; power operated from in-cab controls as well as remote unit; and gates shall be individually controlled for single or multiple selection. Receptacles with protective cover for the remote unit shall be furnished on both sides of the HDT truck. The remote unit must deactivate the in-cab controls when connected to the receptacle.

3.8.10 Standard and Material Control System (MCS) Tailgate Interchangeability. The HDT and HDT w/MCS shall be furnished with necessary interface hardware which allows the use of the standard tailgate (paragraph 3.8.8) or the MCS tailgate (paragraph 3.8.9) in either vehicle. The standard HDT shall be furnished with MCS interface requirements such as in-cab controls, remote control receptacles, air hoses, electrical wiring, and air and electrical quick-disconnect couplings. The MCS interface couplings shall be secured and protected from debris.

3.8.11 Access Steps. A minimum of two non-skid steps on the outside shall be installed IAW SAE J185 on the left front side of the dump body. The steps shall accommodate personnel clothed in standard issue arctic and MOPP protective clothing (T).

3.8.12 Travel Lock. A positive means of securing the dump body to the truck chassis shall be provided to prevent the dump body from tilting during truck lifting operations. The power take-off PTO shall be inoperable when the travel lock is in place.

3.8.13 Cargo Tiedowns. Longitudinal cargo tiedown bars shall be provided on each side of the dump body (exterior). Spacing of the support brackets for the bars shall be uniform and not be more than 18 inches apart. The bars shall be located 6 inches from the dump body floor. Clearance of at least 2 inches around the bar shall be provided. Each segment (between support brackets) shall withstand a force of 200 lbs. in the vertical, longitudinal and lateral directions. No visible permanent deformation or set of the provision or other equipment structural components shall occur as a result of the application of the loads to the tiedown bars.

3.8.14 Safety Props. Mechanical body props shall be permanently attached to the HDT dump body, hoist or truck frame. The body props shall securely hold the body in the up position for service or repair. The body props shall be dual safety braces to support the dump body (empty). The body props shall not interfere with the operation of the dump body under any operating conditions.

3.8.15 Dump Body Switch. A body up switch shall be installed with a body up indicator light mounted in the cab of the truck within easy sight of the operator.

3.8.16 Dump Body Control Lever. The hoist control lever shall contain a detent (lock-out) which will prevent accidental engagement.

3.8.17 Hydraulic System.

3.8.17.1 Hydraulic System. The hydraulic system shall be compatible with the vehicle power take-off. The pump and valves shall be the manufacturers standard, if equivalent to components specified herein, for the hoist model furnished. The system shall incorporate a pressure relief device to prevent build-up of pressures exceeding the rating of any component. Hydraulic hoses shall be single or double wire braid, rubber covered, conforming to SAE J517, and hose fittings shall conform to SAE J516. The hydraulic system shall incorporate a filtration system conforming to SAE J931.

3.8.17.2 Hydraulic Hoist. A hydraulic telescoping hoist or underbody hoist shall be provided and shall conform to the National Truck Equipment Association 50 degree dump angle and comply with SAE J1333, SAE J1334, SAE J1335, and SAE J1336. A hoist stabilizing system shall be provided to allow stable dumping operations when the vehicle is operating IAW the HDT OMS/MP (Appendix A). Double acting hydraulics (power up/power down) shall be provided. Bearing surfaces within the telescoping hoist assembly shall have maintenance free self-lubricating surfaces. The hoist system shall be capable of safely lowering the raised body by gravity when the pump is disabled. The hydraulic hoist shall be operational in all gears including neutral.

3.8.17.3 Hydraulic Pump. Combination pump and valve or pump with separate valve with 3 position valve to raise, hold and lower shall be provided. The maximum cycle times at 1200 rpm (max) and rated payload shall be 40 seconds (T) 30 seconds (O) in the full lift cycle and 30 seconds (T) 20 seconds (O) in the lowering cycle.

3.8.17.4 Hydraulic Reservoir. The hydraulic reservoir shall have an air breather and internal baffles to preclude foaming and capacity to match the system. It shall have a filler cap chained to the strainer in the filler neck with "HYD RES" marked on or near the reservoir cap and a self-sealing dipstick or sealed and guarded oil level indicator with a fill line marking.

3.8.17.5 Hydraulic Controls. A dump body raise and lower control assembly shall be provided which is accessible to the operator while seated in the cab.

3.8.18 Accessories.

3.8.18.1 Sideboards. Oak sideboards (heat treated to a core temperature of 56 degrees Celsius for a minimum of 30 minutes) and sideboard guides, 2x8 inch minimum, shall be provided (T). The number of sideboard guides shall be consistent with the dump body length and loading of the maximum payload capacity. The sideboards shall be removable by a 5th percentile female within 15 minutes using only on-board tools.

3.8.18.2 Load Cover. A spring-loaded catapult activated tarpaulin system or similar sized to completely cover a heaped payload shall be provided. The tarpaulin assembly shall not interfere with loading the dump truck. Tarpaulin shall not adhere to or be damaged by hot-mix asphalt, and shall conform to the Government's three color camouflage pattern. The tarpaulin shall retract in a manner as to prevent stones and debris which may collect on the top of the tarpaulin from being rolled into the stored tarpaulin.

3.9 HDT Armoring Concept. The HDT armoring solution shall follow the integrated A-cab / B-kit design concept. Integrated A-cab armor shall be included as a permanent part/system of the HDT production baseline configuration. The HDT B-kit shall be capable of being installed and removed, depending on mission requirements. The B-kit shall be designed to enable the vehicle to meet the performance requirements of the HDT Automotive Tank Purchase Description ATPD 2375 with the armoring solution installed. The HDT shall incorporate an armoring concept through integration of the HDT OEM A-cab solution (as further defined below) that shall be capable of accepting the HDT OEM-designed B-kit, which in combination shall meet the threat requirements. The HDT vehicle configured with integrated A-cab and installed B-kit shall not adversely affect overall vehicle performance and safety when operated IAW the HDT's required mobility and mission profiles. The combined weights of the A-cab and B-kit (when added to the HDT vehicle) shall not allow the HDT GVWR to be exceeded. Any armor materials used shall comply with the appropriate MIL-DTL or MIL-STD for those particular material types. The HDT armoring solution shall be supported by contractor modeling and simulation (M&S) and follow-on validation testing at a government test facility, which will leverage this work in optimizing the HDT armoring solution.

3.9.1 Integrated A-cab. The HDT A-cab and B-kit designs shall provide integral protection for the crew from various blast, shock, fragment, bullet, and related acceleration effects. The HDT integrated A-cab shall be an included part of the HDT production configuration and shall have the ability to accept the

B-kit, which together shall provide the Threshold (T) or greater (O) protection levels identified in the HDT Classified Annex C.

3.9.2 A-cab Armor Solution: The A-cab is the cab structure, with mounting points, plus inherent armor. The A-cab armor solution shall consist of robust cab-to-frame supports with mounting points, plus inherent armor permanently installed at vehicle production, which together function as a system capable of supporting and carrying the weight of the B-kit while providing the threat protection throughout the HDT's required mobility and mission profiles. Inherent armor is defined as those hard to install armor sections/panels (i.e. armor floor plates and armor firewalls) which can only be mounted to the vehicle on the production line, and cannot be mounted by soldiers in the field and that allow for the HDT to be ready to accept the OEM designed and developed B-kit when installed in the field by the soldier. The HDT OEM standard cab will be used with the B-kit and is not removed from the vehicle when the B-kit is installed onto the A-cab.

3.9.3 A-cab. The A-cab shall consist of armor components that cannot be field-installed and related armor support structures/mounting provisions (i.e., all necessary appurtenances etc.,) needed to mount the B-kit to the A-cab and to the HDT vehicle The A-cab configuration also includes permanent vehicle chassis upgrades required to accommodate the additional weight and dynamic loading of the A-cab and B-kit installed on the vehicle. The A-cab design and performance shall be sufficient to meet the force protection /survivability capabilities against specific threat(s) identitfied in the HDT Classified Annex C. As a minimum, the A-cab shall include:

1. An armored firewall between the engine and crew compartments (permanently installed at vehicle production).
2. A sufficiently strong and robust armored cab floor/deck (permanently installed at vehicle production) capable of carrying and securing the B-kit
3. Cab to frame supports and related structures capable of accepting, securing and handling the design weights of the A-cab and the B-kit.
4. Other hardware as may be required to facilitate field installation of the B-kitarmor solution.

3.9.4 The HDT vehicle contractor shall make an earnest effort to provide no less than 25 years (T) or 30 years (O) of service without corrosion for all components of the A-cab and B-kit. As a minimum the A-cab and B-kit shall be capable of operation for a total service life of twenty five years or more, which can include varying or extended periods in a corrosion hazard military environment involving high humidity, salt spray, road de-icing chemicals and atmospheric contamination.

3.9.5 During the initial 15 years there shall be no perforation or other damage caused by corrosion requiring repair or replacement of any armor parts. Such capability shall be achieved by a combination of production techniques, materials and special coatings selection and design features. Joints shall be designed to prevent the penetration and entrapment of corrosion-causing moisture. All aluminum and steel parts shall be pretreated and primed. Steel and aluminum parts mated together shall have an added galvanic coating and/or isolation film applied between the mating services to prevent galvanic reaction. The A-cab shall be integrated during vehicle production to allow for expedient acceptance of the contractor designed and developed, and government-approved armor B-kit. The A-cab and B-kit shall not interfere with crew operations and vehicle components, or with installation and usage of C4ISR or safety equipment.

3.9.6 B-kit Armoring Solution: All scalable ("field mountable and dismountable") components covering the vehicle cab and underbody that shall meet the threat levels identified in the Classified Annex C for the Mine-Resistant, Ambush-Protected Capabilities Production Document (CPD) version 1.1 at the CAT I, II, and III levels as a Threshold level of protection (T). The B-kit shall encompass any solution, armor and non-armor (i.e., steel, aluminum, composite, etc.), or combination of solutions that meet threshold or objective protection requirements. Unlike the integrated A-cab, B-kits are not installed at vehicle production and are installed in the field to the HDT vehicles by the soldier or by Government Field Service Representatives (FSR) contractors. B-kits shall be designed to be removable, replaceable and interchangeable on any HDT vehicle as needed, and shall allow for rapid, easy and unobstructed emergency ingress/egress either to or from the cab within 45 seconds (T), 20 seconds (O) with the B-kit

installed to the HDT. The B-kit doors shall not serve as the only emergency path of ingress/egress The crew shall not require the use of any common tools and special tools for purposes of B-kit emergency ingress/egress.

3.9.7 B-kit Protection. The HDT shall incorporate a modular armoring strategy to fulfill urgent in-theater needs. The HDT A-cab configured base vehicle shall have the ability to accept a modular armor B-kit. The B-kit consists of supplemental armor panels in a combination of opaque and transparent armor and miscellaneous components as required. The HDT armoring solution is focused on protecting tactical wheeled vehicle (TWV) crews and passengers, and is limited to vehicle cab/body modifications to achieve full occupant protection. The B-kit shall provide crew protection at the front, sides, floor, rear, and top of the crew compartment (cab) and protection of the vehicle undercarriage below the crew compartment (T). The B-kit blast-resistant underbody shall provide a direct barrier between explosives detonated beneath the vehicle and the crew compartment. The protection barrier (not to be confused with the A-cab) shall both dissipate and impede the blast while deflecting the energy and associated fragments away from the crew. This solution shall provide adequate distance (i.e. raised chassis or other means, etc.) between the blast and vehicle to allow maximum energy dissipation before contacting the protection barrier. The solution shall also prevent the trapping of the blast energy directly below or the funneling of the blast energy into the crew compartment. Driveline and chassis components shall be included in the solution to reduce the potential of transferring energy into the crew compartment and compromising overall protection level. The installed B-kit underbody protection shall not hinder the functionality and performance of the vehicle. To address the associated blast shock wave that pass through the crew, the B-kit shall be furnished with MRAP level blast seats with integral battery backup power supply that can be installed at the time of B-kit installation. To mitigate crew foot and leg injuries the B-kit shall be equipped with blast floor mat(s) (T) or a crew ripple (crumple) floor (O). Roadside bomb blasts put vehicle crews through two shockwaves/impacts, one that propels the vehicle up into the air and another when it slams back on the ground. The blast floor mat(s) shall be able to regain its original shape and size within microseconds of the first impact to be ready for the second (T=O).

3.9.8 Levels of Protection. The A-cab and B-kit required levels of protection are identified in the HDT Classified Annex C and are available upon request through contacting lisa.gerasimidis.civ@mail.mil. Responses must include a recipient that maintains the appropriate security clearance level to receive the HDT Classified Annex C as well as an authorized secure email address or secure mailing address.

3.9.9 Threshold structural support parameters for opaque and transparent armor shall be sufficient to support an armor package capable of meeting survivability requirements defined in the HDT Classified Annex C. The HDT B-kit will be installed after production and fielding of the vehicle. Exceptions to these requirements which cannot be met due to a tailored armor solution may be requested by the OEM/contractor and final approval for those exceptions will be given by the Government.

3.9.10 B-kit Design. The B-kit design shall allow the crew compartment protection and undercarriage protection to be independently installed, maintained and removed without compromising the ballistic protection provided by either one. The HDT shall be capable of operating with both protections installed to the vehicle or with only one or the other protections installed to the vehicle.

3.9.10.1 B-kit Ballistic Glass/Transparent Armor (TA). The B-kit shall contain TA glass IAW ATPD 2352T at the front, sides and rear of the armored crew compartment and shall be a Class 3A or higher TA. The TA glass shall be made of visibly clear glass called "low iron" glass. To reduce stress risers in the TA glass, TA frame corner edges and and TA glass corner edges shall be rounded with a raduised edge(s). The TA glass shall be potted into window frames with PR-1425CF Class B sealant (PPG, PRC-Desoto) or equivalent. The interface of the sealant shall not promote TA glass delamination. The use of an approximately ¼ inch gap between the TA glass and the frame to allow for sealant material is acceptable, and shall isolate the TA glass from direct contact with the frame. TA glass shall be potted in accordance with acceptable industry practice of same.

3.9.10.2 B-kit Transparent Glass Frontal, Side and Rear Visibility. The B-kit TA shall be dimensionally sized IAW Federal Motor Vehicles Safety Standards (FMVSS) applicable to commercial

dump truck cab glass to allow as much as possible (without compromising the TA protection levels) unobstructed and clear visibility at the front, sides and rear (if applicable) of the HDT from inside the crew compartment with B-kit installed. The contractor shall recognize that a larger TA window adds weight to the vehicle and reduces survivability. The contractor shall consider TA location(s) as possible solutions to the emergency ingress and egress requirement identified at Paragraph 3.9.6 .

3.9.10.3 On-Vehicle Component Relocation, Removal and Replacement. The B-kit placement on the HDT shall require "minimal removal and replacement" of other on-vehicle components (i.e., stowage boxes, air tanks, steps, fuel and air lines, etc.) prior to installation and removal of the B-kit (T) or shall require "no removal and replacement" of any on-vehicle components prior to installation and removal of the B-kit (O). The HDT design with B-kit installed shall allow easy access to vehicle components (i.e., engine, transmission, filters etc.) for purposes of maintenance and to perform the HDT Preventative Maintenance and Services (PMCS) (T) or to perform the HDT PMCS within allotted specified PMCS times (O). The addition of an armor solution to the HDT shall not increase preventive or scheduled maintenance performance times or add a requirement for tools outside the use of the Standard Army Tool Set (SATS). Relocation of on-vehicle components to different locations on the vehicle or from their original approved locations to facilitate installation of the B-kit is not permitted

3.10 B-kit Installation and Removal. The B-kit shall be capable of being installed, maintained and removed, depending on mission requirements, at the Field Level Maintenance utilizing the Forward Repair System (FRS). The HDT shall meet the following installation and removal times for the B-kit:

a. B-Kit Installation (includes kit unpacking): 30 Man-hours (T) or 20 Man-hours (O)

b. B-kit Removal (excludes kit repacking): 24 Man-hours (T) or 16.0 Man-hours (O)

3.10.1 B-kit Maintenance. The HDT B-kit shall require no maintenance beyond standard Preventive Maintenance Checks (PMC) performed by the operator using onboard tools. Replaceable parts shall permit field level replacement of portions of ballistic solutions without special tools or unique skills.

3.10.2 B-kit Maintenance Vehicle Impact. When parts of the B-kit must be removed for maintenance, they shall be removed and reinstalled so as not to increase the HDT maintenance ratio beyond the requirement.

3.10.3 B-kit Storage. The HDT B-kit solution shall be designed for storage for extended periods of time (60 month minimum) without adverse effects from weather (to include ice and blowing snow and sand), humidity, temperature, or sunlight in hot, basic, and cold climates as defined in AR 70-38, without additional preparation or preservation equipment.

3.11 Workmanship. Workmanship shall be of such quality as to assure that the HDT vehicle and its components are free of defects that compromise, limit or reduce the capability of the vehicle in the performance of its intended use. Defective components or parts and assemblies which have been repaired or modified to overcome deficiencies shall not be furnished. Welded, bolted and riveted construction utilized shall be in accordance with the highest standards of the industry. All components used in the assembly of the HDT vehicle shall be new. All fuels, lubricants, and hydraulic fluids provided shall be clean and filtered IAW their intended use.

3.11.1 Welding Steels. All arc welding of steels shall be in accordance with AWS D1.1.

3.11.2 Welding Aluminum. All arc welding of aluminum shall be in accordance with AWS D1.2.

3.11.3 Welder Qualification. Qualification of all arc welders and automated welders shall be accordance with AWS D1.1 and AWS D1.2.

3.12 Servicing and Adjusting. Prior to acceptance of the vehicles by the Government, the vehicle OEM shall service and adjust each vehicle including at least the following:

a) Focusing of lights
b) Adjustment of engine and transmission
c) Adjustment of electrical and brake systems
d) Alignment of steering and front wheels
e) Inflation of all tires to correct pressures
f) Complete lubrication of chassis, engine, running gear, and mounted equipment with standard commercial lubricants
g) Filling of windshield washer reservoir with water and low temperature and corrosion protection additives
h) Check of wheel lug nut torque
i) Check of the continuity of the electrical system including filling and charging of vehicles
j) A minimum of 25 gallons of fuel shall be provided in each vehicle's fuel tank
k) Alignment and adjustment of Collision Avoidance System antenna systems

4. VERIFICATION.

4.1 Classification of Verifications.

a. First Production Vehicle Inspection (FPVI) (See 4.1.1.1)
b. Production Verification Test (PVT) (See 4.1.1.2)
c. Conformance Acceptance Test (CAT) (See 4.1.2)
d. Control Test (CT) (See 4.1.3)
e. Follow On Production Test (FPT) (See 4.1.4)

4.1.1 First Article Test. First Article Testing consists of FPVI and PVT.

4.1.1.1 FPVI. The Government will select 6 HDTs for FPVI. The units selected shall be subject to inspection by both the contractor and the government IAW clauses of the contract and Table VII of this ATPD. The HDTs selected shall be operated for a distance of not less than 50 miles on a course equivalent to the secondary roads described in the OMS/MP. At time of said inspection, the contractor shall make available to the government representatives, all records of prior inspections, tests, qualified product lists (QPL) documentation, vendor quality requirements, drawings, and certifications.

(a) FPVI Failure. Failure of the HDTs as the result of any deficiencies found during, or as a result of, the FPVI shall be cause for rejection of the HDTs. Further, the Government may refuse acceptance of HDTs until the deficiencies have been eliminated. Any deficiencies found during or as a result of the FPVI shall be assumed by the government to exist on all HDTs built up through the date the deficiencies are found. Documented deficiencies on all HDTs shall be corrected by the contractor at no cost to the Government.

4.1.1.2 Production Verification Test. To determine conformance to performance requirements in section 3, the HDTs (as specified in the contract) will be selected and subjected to examination (see Table VII). The selected HDTs shall be subjected to performance tests and Reliability/Maintainability (R/M) testing of 12,000 miles per vehicle at a Government test site. The PVT test sequence shall be established by the Government test site.

(a) Test Failure. Failure of the HDT as the result of any deficiency of workmanship or materials found during, or as a result of performance testing or the 12,000-mile RAM test, shall be cause for rejection of the HDT. Further, the Government may refuse acceptance of production HDTs until the deficiency has been eliminated. Any deficiency found during, or as a result of, the Performance Testing or the 12,000 mile RAM test shall be assumed by the Government to exist on all HDTs built up through the date the deficiency is found. Documented deficiencies on all HDTs shall be corrected by the contractor at no cost to the Government.

4.1.2 Conformance Acceptance Test. To determine conformance to Section 3, each production HDT shall be examined as specified in 4.1.3(a) and operated for a distance of not less than 5 miles

without payload, by the contractor. HDT shall be completely assembled and serviced. Acceptance tests shall be those specified in Table VII. Performance of HDT shall be demonstrated on smooth hard surfaced roads. After completion of the 5-mile road test, the HDT shall be examined for lubrication leakage and other deficiencies.

(a) Inspection Provisions.

(1) Lot Size. An inspection lot shall consist of all HDTs from the identified production period of one month's production submitted at one time for examination and test.

(2) Sampling for Inspection. For the purposes of visual, dimensional, and primary functional inspection, a representative sample shall be selected from each inspection lot. Before sampling, the contractor shall 100 percent inspect the first 10 HDTs to establish a process average, to allow normal sampling in accordance with ANSI/ASQC Z1.4.

(3) Examinations. Examinations shall consist of visual, dimensional, and primary functions of the HDT for conformance to applicable drawings and this PD. Examinations shall be performed against Table VII herein. These examinations shall be performed during all phases of manufacturing and subsequent to road test.

(4) Acceptance Inspection Failure. If the HDT fails to pass any evaluation parameter specified herein, the Government will stop acceptance of subsequent HDTs until evidence has been provided by the contractor that corrective actions have been accomplished.

(5) Certification. The supplier and his component sub-suppliers shall certify that the chassis, components and materials conform to the requirements specified herein IAW MIL-STD-1180. A list of components to be certified is set forth in the solicitation. In addition, the supplier shall be responsible for certifying that each item annotated in Table VII has met the requirements as specified in the solicitation.

4.1.3 Control Test. The Government shall select, at random, one of each 20 HDTs produced or one from each month's production for a control test IAW Table VII. The HDT selected shall be operated for a distance of 50 miles by the Contractor. The trailer shall be at the maximum payload or maximum gross combined weight allowed for the state where the test is to be conducted. All operational components and assemblies shall be tested and results documented.

(a) Test Failure. Failure of the HDT as the result of any deficiency found during, or as a result of the control test, shall be cause for rejection of the HDT. Further, the Government may refuse acceptance of production HDTs until the deficiency has been eliminated. Any deficiency found during, or as a result of the control test shall be assumed by the Government to exist on all HDTs built subsequent to the previous acceptable control test HDT or similarly defective unless evidence satisfactory to the Contracting Officer is furnished by the Contractor that they are not similarly deficient. Documented deficiencies on all HDTs shall be corrected by the contractor at no cost to the Government.

4.1.4 Follow On Production Test (FPT). The Government reserves the right to conduct a FPT at a Government test facility. At the Government's discretion, the Government will randomly select one (1) HDT from the production quantity for test. An FPT may be conducted each ordering period.

(a) Test Failure. Failure of the FPT HDT (s) to meet any requirements specified, during, and as a result of the examination and test, shall be cause for rejection of the FPT HDT(s). Acceptance of production units shall be discontinued until evidence has been provided by the contractor that corrective action has been taken to eliminate the deficiencies. If the deficiency is design in nature, all vehicles shall be considered similarly affected. Correction of such deficiencies shall be accomplished by the contractor at no cost to the Government on units previously accepted or produced under the contract. Deficiencies found as a result of the FPT will be considered prima facie evidence that all units accepted prior to the completion of the FPT are similarly deficient unless evidence to the contrary is furnished by the contractor and such evidence is acceptable to the Contracting Officer.

4.2 Methods of Verification. Methods utilized to accomplish verifications include:

a. Analysis. An element of verifications that utilize established technical or mathematical models or simulations, algorithms, charts, graphs, circuit diagrams, or other scientific principles and procedures to provide evidence that stated requirements were met. This shall include DOT, SAE, and EPA.

b. Demonstration. An element of verifications which generally denotes the actual operations, adjustment, or re-configurations of items to provide evidence that the designed functions were accomplished under specific scenarios. The items may be instrumented and quantitative limits of performance monitored.

c. Examination. An element of verification and inspection consisting of investigation, without the use of special laboratory appliances or procedures, of items to determine conformance to those specified requirements which can be determined by such investigations. Examination is generally nondestructive and typically includes the use of sight, hearing, smell, touch, and taste; simple physical manipulation; mechanical and electrical gauging, measurement, material certification and other forms of investigation.

d. Test. An element of verification and inspection which generally determines, by technical means, the properties or elements of items, including functional operation, and involves the application of established scientific principles and procedures.

4.2.1 Basis for Acceptance. Test samples shall meet all test and verification criteria.

Table IV Requirement Verification Cross Reference Table

Requirement	Verification	Title	A	D	E	T	Cert	FPVI	PVT	CAT	CT	FPT
3.1	4.3.1	First Article Test	X	X	X	X			X			
3.2.1	4.4.1	Mission Reliability (Chassis)	X	X	X	X			X			X
3.2.2	4.4.2	Mission Reliability (Dump Body)	X	X	X	X			X			X
3.2.3	4.4.3	Maintainability (Chassis)	X	X	X	X			X			X
3.2.4	4.4.4	Maintainability (Dump Body)	X	X	X	X			X			X
3.3	4.5	Standard Vehicles and/or Component Parts and Accessories	X	X	X	X	X	X	X	X	X	X
3.3.1	4.5.1	Ratings	X	X	X	X	X	X	X	X		X
3.3.2	4.5.2	Commonality	X	X	X	X	X	X	X	X		X
3.3.3	4.5.3	Computer Resource Support	X	X	X	X			X	X		X
3.3.4	4.5.4	Design Interface	X	X	X	X			X	X		X
3.3.5	4.5.5	Condition Based Maintenance Plus (CBM)	X	X	X	X			X	X		X
3.3.6	4.5.6	Platform Re-Generation Maximum	X	X	X	X			X	X		X
3.4		Special Requirements	X	X	X	X			X	X		X
3.4.1	4.6.1	Capabilities	X	X	X	X			X	X		X
3.4.1.1	4.6.1.1	Force Protection	X	X	X	X			X	X		X
3.4.1.3	4.6.1.2	Payload	X	X	X	X			X		X	X
3.4.1.4	4.6.1.3	Vehicle Recovery	X	X	X	X			X		X	X

3.4.2	4.6.2	Painting	X	X	X	X	X	X	X	X	X	X
3.4.3	4.6.3	Corrosion Protection	X	X	X	X	X	X	X	X	X	X
3.4.4	4.6.4	Markings	X	X	X	X	X	X	X	X	X	X
3.4.5		Instruction, Caution, Identification, Lubricating, Operating, and Data Plates	X	X	X	X	X	X	X	X	X	X
3.4.6	4.6.5	Transportability	X	X	X	X		X	X			X
3.4.6.1	4.6.5.1	Highway	X	X	X	X		X	X			X
3.4.6.2	4.6.5.2	Overall Clearances	X	X	X	X		X	X			X
3.4.6.3	4.6.5.3	Roll-On/Roll-Off	X	X	X	X		X	X			X
3.4.6.4	4.6.5.4	Rail Transport	X	X	X	X			X			X
3.4.6.5	4.6.5.5	Rail Impact	X	X	X	X			X			X
3.4.6.6	4.6.5.6	Water	X	X	X	X		X	X			X
3.4.6.7	4.6.5.7	Fixed-wing Aircraft	X	X	X				X			X
3.4.6.8	4.6.5.8	Lifting and Tiedown Provisions	X	X	X	X		X	X	X		X
3.4.6.9	4.6.5.9	Towing Eyes	X	X	X	X		X	X	X		X
3.4.7		Kits	X	X	X	X		X	X	X		X
3.4.7.1	4.7.1	Mounting Kit, M 13 Decontamination Apparatus	X	X	X	X		X	X	X		X
3.4.7.3	4.7.2	Arctic Heater Kit, Engine and Personnel	X	X	X	X	X	X	X	X	X	X
3.4.7.4	4.7.3	Fog Lights	X	X	X	X	X	X	X	X	X	X
3.4.7.5	4.7.4	Mounting Kit Rifle, MOPP Gear and Body Armor	X	X	X	X			X	X		X
3.4.7.7	4.7.5	M22 Automatic Chemical Agent Alarm	X	X	X	X			X	X		X
3.4.8	4.7.6	High-Altitude Electromagnetic Pulse (HEMP)	X						X			
3.4.9	4.7.7	Command, Control, Communications, Computer & Intelligence (C4I	X	X	X	X			X	X		X
3.4.9.1	4.7.7.1	Communication and Situation Awareness Equipment Space and Mounting Points.	X	X	X	X			X	X		X
3.4.9.1.1	4.7.7.1.1	Identifying Friend or Foe (IFF).	X	X	X	X			X	X		X
3.4.9.1.2	4.7.7.1.2	Radio frequency Automatic Identification Technology (RF AIT).	X	X	X	X			X	X		X
3.4.9.1.3	4.7.7.1.3	Force XXI Battle Command Brigade & Below (FBCB2)	X	X	X	X			X	X		X
3.4.9.1.4	4.7.7.1.4	Auxiliary Power Connections	X	X	X	X	X	X	X	X	X	X
3.4.9.1.5	4.7.7.1.5	Movement Tracking System (MTS)	X	X	X	X			X	X		X

		w/GPS										
3.4.9.1.6	4.7.7.1.6	Vehicle Computing System (VCS)	X	X	X	X			X	X		X
3.4.9.1.7	4.7.7.1.7	Test Measurement and Diagnostic Equipment (TMDE)	X	X	X	X			X	X		X
3.4.9.1.8	4.7.7.1.8	SINGARS Radio Set	X	X	X	X			X	X		X
3.4.10	4.7.8	HDT Central Tire Inflation System (CTIS)	X	X	X	X	X	X	X	X	X	X
3.4.10.1	4.7.8.1	Tire Pressure Control	X	X	X	X	X	X	X	X	X	X
3.4.10.2	4.7.8.2	Installation	X	X	X	X	X	X	X	X	X	X
3.4.10.3	4.7.8.3	Provision and Storage of Air	X	X	X	X	X	X	X	X	X	X
3.4.10.4	4.7.8.4	Manual Tire Inflation/Deflation System	X	X	X	X	X	X	X	X	X	X
3.4.10.5	4.7.8.5	Air-Priority System	X	X	X	X	X	X	X	X	X	X
3.4.10.6	4.7.8.6	Speed/Pressure Control and Warning	X	X	X	X	X	X	X	X	X	X
3.4.10.6.1	4.7.8.6.1	Speed Detection/Driver Alert	X	X	X	X	X	X	X	X	X	X
3.4.10.7	4.7.8.7	Maintenance of Tire Pressure	X	X	X	X	X	X	X	X	X	X
3.4.10.8	4.7.8.8	Operating Environment	X	X	X	X		X	X	X	X	X
3.4.10.9	4.7.8.9	Time to Inflation/Deflation	X	X	X	X	X	X	X	X	X	X
3.5.1		Manpower and Personnel Integration (MANPRINT).	X	X	X	X				X		X
3.5.1.1	4.8.1.1	Safety and Design	X	X	X	X	X	X	X	X	X	X
3.5.1.1.1	4.8.1.1.1	User Interface	X	X	X	X			X	X		X
3.5.1.1.2	4.8.1.1.2	Back Up Alarm	X	X	X	X	X	X	X	X	X	X
3.5.1.1.3	4.8.1.1.3	Collision Warning System	X	X	X	X	X	X	X	X	X	X
3.5.1.1.4	4.8.1.1.4	Ball Inclinometers (Slope Indicator, Tilt Meter)	X	X	X	X	X	X	X	X	X	X
3.5.1.1.5	4.8.1.1.5	Heads Up Display Drivers Vision Enhancer (DVE)	X	X	X	X	X	X	X	X	X	X
3.5.1.2	4.8.1.2	Human Factors	X	X	X	X	X	X	X			X
3.5.1.2.1	4.8.1.2.1	Operators and Maintainers	X	X	X	X			X			X
3.5.1.2.2	4.8.1.2.2	Preventive Maintenance Checks and Services (PMCS)	X	X	X	X			X			X
3.5.1.3		Air/Sound Pollution	X	X	X	X	X	X	X	X	X	X
3.5.1.3.1	4.8.1.3.1	Air Quality	X	X	X	X	X	X	X	X	X	X
3.5.1.3.2	4.8.1.3.2	Noise Standard	X	X	X	X	X	X	X	X	X	X
3.5.1.4	4.8.1.4	Toxic Gas Exposure	X	X	X	X	X	X	X	X	X	X
3.5.1.5	4.8.1.5	Material	X	X	X	X	X	X	X			X
3.5.1.5.1	4.8.1.5.1	Ozone Depleting Substance	X	X	X	X	X	X				X
3.5.1.5.2	4.8.1.5.2	Radioactive Material	X	X	X	X	X	X				X
3.5.1.5.3	4.8.1.5.3	Hazardous	X	X	X	X	X	X				X

		Materials (HAZMAT) Management										
3.5.1.5.4	4.8.1.5.4	Dissimilar Metals	X	X	X	X	X	X	X			X
3.5.1.5.5	4.8.1.5.5	Lead	X	X	X	X	X	X	X			X
3.5.2	4.8.2	Dimensions and Weight	X	X	X	X		X	X			X
3.5.3	4.8.3	Fuel and Lubrication	X	X	X	X	X	X	X	X	X	X
3.5.3.1	4.8.3.1	Centralized Lubrication System	X	X	X	X	X	X	X	X	X	X
3.5.3.2	4.8.3.2	Oil Drain Plugs	X	X	X	X	X	X	X	X	X	X
3.6	4.9	Performance	X	X	X	X		X	X			X
3.6.1	4.9.1	Forward Speed	X	X	X	X		X	X			X
3.6.2	4.9.2	Mobility Rating Speed	X	X	X	X		X	X			X
3.6.3	4.9.3	Mission Profile	X	X	X	X		X	X			X
3.6.4	4.9.4	Gradeabilty and Speeds	X	X	X	X			X			X
3.6.5	4.9.5	Side Slope Operation	X	X	X	X			X			X
3.6.6	4.9.6	Climate Conditions	X	X	X	X			X			X
3.6.7	4.9.7	Vehicle-Machine/Equipment Interopersbility	X	X	X	X			X			X
3.6.7.1	4.9.7.1	Dump Loading	X	X	X	X			X			X
3.6.7.2	4.9.7.2	LUET Type II Companion Trailer	X	X	X	X			X			X
3.6.8	4.9.8	Fording	X	X	X	X			X			X
3.6.9	4.9.9	Ride Quality	X	X	X	X			X			X
3.7	4.10	Chassis and Components	X	X	X	X	X	X	X	X	X	X
3.7.1	4.10.1	Power Train	X	X	X	X	X	X	X	X	X	X
3.7.1.2	4.10.1.1	Engine	X	X	X	X	X	X	X	X	X	X
3.7.1.3	4.10.1.2	Fan Clutch	X	X	X	X	X	X	X	X	X	X
3.7.1.4	4.10.1.3	Retarder	X	X	X	X	X	X	X	X	X	X
3.7.1.5	4.10.1.4	Data Storage and Retrievel	X	X	X	X	X	X	X	X	X	X
3.7.1.6	4.10.1.5	Self Priming Pump	X	X	X	X	X	X	X	X	X	X
3.7.1.7	4.10.1.6	Automatic Starting Aid	X	X	X	X	X	X	X	X	X	X
3.7.1.9	4.10.1.7	Reusable Oil Filter	X	X	X	X	X	X	X	X	X	X
3.7.1.10	4.10.1.8	Belt Tensioner	X	X	X	X	X	X	X	X	X	X
3.7.1.11	4.10.1.9	Oil Pan and Radiator Bottom Protection	X	X	X	X	X	X	X	X	X	X
3.7.2	4.10.2	Fuel/Water Separator	X	X	X	X	X	X	X	X	X	X
3.7.3	4.10.3	Fuel Tanks	X	X	X	X	X	X	X	X	X	X
3.7.3.1	4.10.3.1	Fuel Tank Protection	X	X	X	X	X	X	X	X	X	X
3.7.4	4.10.4	Engine Air Induction System and Filtration System	X	X	X	X	X	X	X	X	X	X
3.7.5	4.10.5	Cooling System	X	X	X	X	X	X	X	X	X	X
3.7.5.1	4.10.5.1	Coolant Filter with Inhibitor	X	X	X	X	X	X	X	X	X	X
3.7.5.2	4.10.5.2	Draining	X	X	X	X	X	X	X	X	X	X

3.7.6	4.10.6	Exhaust System	X	X	X	X	X	X	X	X	X	X
3.7.7	4.10.7	Automatic Electronic Transmission	X	X	X	X	X	X	X	X	X	X
3.7.7.1	4.10.7.1	Inhibitor System.	X	X	X	X	X	X	X	X	X	X
3.7.7.2	4.10.7.2	Transmission Filter	X	X	X	X	X	X	X	X	X	X
3.7.7.3	4.10.7.3	Transmission Control System	X	X	X	X	X	X	X	X	X	X
3.7.7.4	4.10.7.4	Cruise Control	X	X	X	X	X	X	X	X	X	X
3.7.9	4.10.9	Transfer Case	X	X	X	X	X	X	X	X	X	X
3.7.10	4.10.10	Suspension and Axle	X	X	X	X	X	X	X	X	X	X
3.7.10.1	4.10.10.1	Front Suspension	X	X	X	X	X	X	X	X	X	X
3.7.10.2	4.10.10.2	Rear Drive Axle and Suspension	X	X	X	X	X	X	X	X	X	X
3.7.10.2.1	4.10.10.2.1	Differential (s)	X	X	X	X	X	X	X	X	X	X
3.7.10.3	4.10.10.3	Hubs	X	X	X	X	X	X	X	X	X	X
3.7.11	4.10.11	Permanent Lube Driveline	X	X	X	X	X	X	X	X	X	X
3.7.12	4.10.12	Wheels, Rims and Tires	X	X	X	X	X	X	X	X	X	X
3.7.12.1	4.10.12.1	Tires	X	X	X	X	X	X	X	X	X	X
3.7.12.2	4.10.12.2	Spare Tire/Wheel Assembly, Carrier and Hoist	X	X	X	X	X	X	X	X	X	X
3.7.12.3	4.10.12.3	Tire Changing Equipment	X	X	X	X		X	X	X	X	X
3.7.12.4	4.10.12.4	On Vehicle Air Supply	X	X	X	X	X	X	X	X	X	X
3.7.13.	4.10.13	Electrical System	X	X	X	X	X	X	X	X	X	X
3.7.13.1	4.10.13.1	Vehicle Power and Reserve Power	X	X	X	X	X	X	X	X	X	X
3.7.13.2	4.10.13.2	Engine Starting System	X	X	X	X	X	X	X	X	X	X
3.7.13.3	4.10.13.3	Batteries	X	X	X	X	X	X	X	X	X	X
3.7.13.3.1	4.10.13.3.1	Battery Charging System	X	X	X	X	X	X	X	X	X	X
3.7.13.3.2	4.10.13.3.2	Battery Shut-Off Switch	X	X	X	X	X	X	X	X	X	X
3.7.13.4	4.10.13.4	NATO Slave Receptacle and Cable	X	X	X	X	X	X	X	X	X	X
3.7.13.5	4.10.13.5	Electronic Strobe Warning Light	X	X	X	X	X	X	X	X	X	X
3.7.13.6	4.10.13.6	Work Lamps and Utility Outlets	X	X	X	X	X	X	X	X	X	X
3.7.13.6.1	4.10.13.6.1	Work Lamps	X	X	X	X	X	X	X	X	X	X
3.7.13.6.2	4.10.13.6.2	Utility Outlets	X	X	X	X	X	X	X	X	X	X
3.7.13.6.3	4.10.13.6.3	Convenience Outlets	X	X	X	X	X	X	X	X	X	X
3.7.13.7	4.10.13.7	Secure Lighting	X	X	X	X	X	X	X	X	X	X
3.7.13.7.1	4.10.13.7.1	Lock Out	X	X	X	X	X	X	X	X	X	X
3.7.13.8	4.10.13.8	Electromagnetic Emission Interference	X	X	X	X			X	X		X
3.7.13.8.1	4.10.13.8.1	Electromagnetic Environmental Effects (E3).	X	X	X	X			X	X		X
3.7.13.9	4.10.13.9	Day Time Running Lights	X	X	X	X	X	X	X	X	X	X
3.7.13.9.1	4.10.13.9.1	LED Lighting	X	X	X	X	X	X	X	X	X	X

3.7.13.10	4.10.13.10	Horn	X	X	X	X	X	X	X	X	X	X
3.7.14	4.10.14	ABS Brakes	X	X	X	X	X	X	X	X	X	X
3.7.14.1	4.10.14.1	Air Dryer System	X	X	X	X	X	X	X	X	X	X
3.7.14.2	4.10.14.2	Air Connectors (Front of Vehicle)	X	X	X	X	X	X	X	X	X	X
3.7.14.3	4.10.14.3	Brakes for Pintle/Lunette Towed Trailers	X	X	X	X	X	X	X	X	X	X
3.7.14.4	4.10.14.4	Brake Shields	X	X	X	X	X	X	X	X	X	X
3.7.14.5	4.10.14.5	Air Reservoir	X	X	X	X	X	X	X	X	X	X
3.7.15	4.10.15	Cab	X	X	X	X	X	X	X	X	X	X
3.7.15.1	4.10.15.1	Cab Rear Window	X	X	X	X	X	X	X	X	X	X
3.7.15.2	4.10.15.2	Cab Seats	X	X	X	X	X	X	X	X	X	X
3.7.15.3	4.10.15.3	Occupant Crash Protection	X	X	X	X	X	X	X	X	X	X
3.7.15.4	4.10.15.4	CAB Accessories and Equipment	X	X	X	X	X	X	X	X	X	X
3.7.15.5	4.10.15.5	Cab Climate Control	X	X	X	X	X	X	X	X	X	X
3.7.15.6	4.10.15.6	Air Conditioning	X	X	X	X	X	X	X	X	X	X
3.7.15.7	4.10.15.7	Windshield Wipers and Washers	X	X	X	X	X	X	X	X	X	X
3.7.15.8	4.10.15.8	Cab Visibility	X	X	X	X	X	X	X	X	X	X
3.7.15.9	4.10.15.9	Rearview Mirrors	X	X	X	X	X	X	X	X	X	X
3.7.15.10	4.10.15.10	Spotter Mirror	X	X	X	X	X	X	X	X	X	X
3.7.16	4.10.16	Steering	X	X	X	X	X	X	X	X	X	X
3.7.17	4.10.17	Front Bumper	X	X	X	X	X	X	X	X	X	X
3.7.18	4.10.18	Stowage	X	X	X	X		X	X	X	X	X
3.7.18.1	4.10.18.1	Equipment Storage	X	X	X	X		X	X	X	X	X
3.7.18.2	4.10.18.2	Individual Equipment Stowage	X	X	X	X		X	X	X	X	X
3.7.19	4.10.19	Basic Issue Items	X	X	X	X		X	X	X	X	X
3.7.20	4.10.20	Rear Fenders	X	X	X	X	X	X	X	X	X	X
3.7.21	4.10.21	Mud Flaps	X	X	X	X	X	X	X	X	X	X
3.7.22	4.10.22	Pintle	X	X	X	X	X	X	X	X	X	X
3.8		Dump Body Design	X	X	X	X	X	X	X	X	X	X
3.8.1	4.1.11	Corrosion Control	X	X	X	X	X	X	X	X	X	X
3.8.2	4.11.1	Dump Body Capacity	X	X	X	X	X	X	X	X	X	X
3.8.2.1	4.11.2.1	Over Load Sensor (OLS) System	X	X	X	X	X	X	X	X	X	X
3.8.3	4.11.3	Floor	X	X	X	X			X	X		X
3.8.3.1	4.11.3.1	Heated Dump floor	X	X	X	X			X	X		X
3.8.4	4.11.4	Head Sheet	X	X	X	X	X	X	X	X	X	X
3.8.5	4.11.5	Sides	X	X	X	X			X	X		X

3.8.6	4.11.6	Dump Underbody	X	X	X	X	X	X	X	X	X	X
3.8.7	4.11.7	Cab Protector and Load Cover	X	X	X	X	X	X	X	X	X	X
3.8.8	4.11.8	Tailgate	X	X	X	X		X	X	X	X	X
3.8.8.1	4.11.8.1	Tailgate Lock	X	X	X	X		X	X	X	X	X
3.8.8.2	4.11.8.2	Hardware and Latch	X	X	X	X		X	X	X	X	X
3.8.8.3	4.11.8.3	Spill Shield Kit	X	X	X	X	X	X	X	X	X	X
3.8.9	4.11.9	Material Control System (MCS) Tailgate	X	X	X	X	X	X	X	X	X	X
3.8.10	4.11.10	Standard and Material Control System (MCS) Tailgate Interchangeability	X	X	X	X		X	X	X	X	X
3.8.11	4.11.11	Access Steps	X	X	X	X	X	X	X	X	X	X
3.8.12	4.11.12	Travel Lock	X	X	X	X	X	X	X	X	X	X
3.8.13	4.11.13	Cargo Tiedowns	X	X	X	X	X	X	X	X	X	X
3.8.14	4.11.14	Safety Props	X	X	X	X	X	X	X	X	X	X
3.8.15	4.11.15	Dump Body Switch	X	X	X	X	X	X	X	X	X	X
3.8.16	4.11.16.	Dump Body Control Lever	X	X	X	X	X	X	X	X	X	X
3.8.17	4.1117.17.1	Hydraulic System	X	X	X	X	X	X	X	X	X	X
3.8.17.2	4.11.17.2	Hydraulic Hoist	X	X	X	X	X	X	X	X	X	X
3.8.17.3	4.11.17.3	Hydraulic Pump	X	X	X	X	X	X	X	X	X	X
3.8.17.4	4.11.17.4	Hydraulic Reservoir	X	X	X	X	X	X	X	X	X	X
3.8.17.5	4.11.17.5	Hydraulic Controls	X	X	X	X	X	X	X	X	X	X
3.8.18		Accessories	X	X	X	X	X	X	X	X	X	X
3.8.18.1	4.11.18.1	Sideboards	X	X	X	X			X	X		X
3.8.18.2	4.11.18.2	Load Cover	X	X	X	X			X	X		X
3.9	4.12	HDT Armoring Concept	X	X	X	X				X		X
3.11	4.13	Workmanship	X	X	X	X		X	X	X	X	X
3.11.1	4.13.1	Welding Steels	X	X	X	X	X	X	X	X	X	X
3.11.2	4.13.2	Welding Aluminum	X	X	X	X	X	X	X	X	X	X
3.11.3	4.13.3	Welder Qualification	X	X	X	X	X	X	X	X	X	X
3.12	4.14	Servicing and Adjusting	X	X	X	X		X	X	X	X	X

Legend (Methods of Verification):
A- Analysis
D- Demonstration
E- Examination
T- Test
CERT - Certification Required
FPVI – First Production Vehicle Inspection
PVT- Production Verification Test
CAT- Conformance Acceptance Test
CT – Control Test
FPT – Follow On Production Test

4.3 Requirements.

4.3.1 First Article Test (FAT). To determine conformance to 3.1 when specified, the contractor shall furnish HDTs that shall be subjected to first article test IAW 4.1.1.

4.4 System Mission Reliability and Maintainability.

4.4.1 Mission Reliability (Chassis). The HDT shall show conformance to 3.2.1 during 10,000 mile RAM test.

4.4.2 Mission Reliability (Dump Body). The HDT shall show conformance to 3.2.2 during 10,000 mile RAM test.

4.4.3 Maintainability (Chassis). The HDT shall show conformance to 3.2.3 during 10,000 mile RAM test.

4.4.4 Maintainability (Dump Body). The HDT shall show conformance to 3.2.4 during 10,000 mile RAM test.

4.5 Standard Vehicle and/or Components, Parts and Accessories. To determine conformance to 3.3 inclusive, certification, visual inspection, contractor testing, and testing at Government test site shall be accomplished.

4.5.1 Ratings. To determine conformance to 3.3.1 performance will be verified during tests.

4.5.2 Commonality. To determine conformance to 3.3.2 performance will be verified during tests.

4.5.3 Computer Resource Support. To determine conformance to 3.3.3 performance will be verified during visual inspections, tests and LOG/DEMO.

4.5.4 Design Interface. To determine conformance to 3.3.4 performance will be verified during visual inspections, tests and LOG/DEMO.

4.5.5 Condition Based Maintenance Plus (CBM+). To determine conformance to 3.3.5 performance will be verified during visual inspections, tests and LOG/DEMO.

4.5.6 Platform Re-Generation Maximum. To determine conformance to 3.3.6 performance will be verified during visual inspections, tests and LOG/DEMO.

4.6.1 Capabilities.

4.6.1.1 Force Protection. To determine conformance to 3.4.1.1 the contractor shall certify conformance and performance shall be verified during tests and fit-up (if required).

4.6.1.2 Payload. To determine conformance to 3.4.1.3 all payload testing will be performed and verified during testing.

4.6.1.3 Vehicle Recovery. To determine conformance to 3.4.1.4, vehicle recovery testing will be performed and verified during testing.

4.6.2 Painting. To determine conformance to 3.4.2, the contractor shall certify that the vehicle has been cleaned, treated, primed and top coated IAW MIL-DTL-53072. The contractor shall also certify that the cleaning and pretreatment is IAW TT-C-490, and that top coating is IAW MIL-DTL-64159.

4.6.3 Corrosion Protection. The contractor shall certify his compliance to paragraph 3.4.3 inclusive. The contractor's corrosion prevention and control plan, the contractor's certification, the

corrosion prevention production processes involved and the attendant design will be examined and verified during First Production Vehicle inspection

4.6.4 Markings. To determine conformance to section 3.4.4 and 3.4.5 markings and data plates will be inspected for conformance and the contractor shall certify compliance to applicable standards.

4.6.5 Transportability. To determine conformance to 3.4.6, the HDT will be examined for conformance to transportability requirements.

4.6.5.1 Highway. To determine conformance to 3.4.6.1 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.6.5.2 Overall Clearances. To determine conformance to 3.4.6.2 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.6.5.3 Roll-On/Roll-Off (RORO). Compliance with RORO requirements of 3.4.6.3, and the ability to crest/toe a 15 degree ramp will be accomplished by analysis, inspection and test.

4.6.5.4 Rail Transport. To determine conformance to 3.4.6.4, the HDT shall be weighed and measured and results documented at the contractor's facility and Government test site.

4.6.5.5 Rail Impact. To determine conformance to 3.4.6.5, each requirement delineated in the referenced paragraphs shall be tested during PVT. The MIL-STD-810G rail impact test shall be used to validate the structural integrity of the HDT and the adequacy of the HDT tiedown provisions and procedures.

4.6.5.6 Water. To verify compliance with the water transportability requirements 3.4.6.6 the contractor shall certify compliance analysis, inspection and test.

4.6.5.7 Fixed-Wing Aircraft. To determine conformance to 3.4.6.7, demonstrate ability of HDT to enter and exit aircraft either by paper study (Military Surface Deployment and Distribution Command) or by actual installation.

4.6.5.8 Lifting and Tiedown Provisions. To determine conformance to 3.4.6.8, the contractor shall certify conformance and each lifting and tiedown provision shall be certified, inspected, and verified for specified yield strength during PVT.

4.6.5.9 Towing Eyes. To determine conformance to 3.4.6.9, the contractor shall certify conformance and each towing eye shall be certified, inspected, and verified for specified yield strength during PVT.

4.7.1 Mounting Kit, M13 Decontamination Apparatus. To determine conformance to 3.4.7.1 shall be verified during visual inspections and tests.

4.7.2 Arctic Heater Kit, Engine and Personnel. To determine conformance to 3.4.7.3 performance will be verified during tests.

4.7.3 Fog Lights. To determine conformance to 3.4.7.4, the contractor shall certify that the electrical connections are water tight, environmentally sealed, positive retention type. The HDT will be examined during FPVI and test to assure that wiring is secured to prevent chaffing and loose connections and the switch is securely mounted.

4.7.4 Mounting Kit, Rifle and MOPP Gear and Body Armor. To determine conformance to 3.4.7.5 installation and performance will be verified during visual inspections, tests and LOG/DEMO.

4.7.5 M22 Automatic Chemical Agent Alarm. To determine conformance to 3.4.7.7 shall be verified during visual inspections, tests and LOG/DEMO.

4.7.6 High-Altitude Electromagnetic Pulse (HEMP). To determine conformance to 3.4.8 performance shall be verified during tests.

4.7.7 Command, Control, Communications, Computer & Intelligence (C4I). To determine conformance to 3.4.9 shall be verified during visual inspections.

4.7.7.1 Communication and Situation Awareness Equipment Space and Mounting Points. To determine conformance to 3.4.9.1 shall be verified during visual inspections and measurements.

4.7.7.1.1 Identifying Friend or Foe (IFF). To determine conformance to 3.4.9.1.1 shall be verified during visual inspections and measurements.

4.7.7.1.2 Radio frequency Automatic Identification Technology (RF AIT). To determine conformance to 3.4.9.1.2 shall be verified during visual inspections and measurements.

4.7.7.1.3 Force XXI Battle Command Brigade & Below (FBCB2) Blue Force Tracking. To determine conformance to 3.4.9.1.3 shall be verified during visual inspections and measurements.

4.7.7.1.4 Auxiliary Power Connections. To determine conformance to 3.4.9.1.4, the auxiliary power connections shall be examined and verified. The contractor shall certify that connections rated voltages, amperes, circuits and locations are IAW Table 3.

4.7.7.1.5 Movement Tracking System (MTS) w/GPS. To determine conformance to 3.4.9.1.5, the cable and electrical cabling pass-throughs will be examined and verified. The contractor shall certify that the power provisions are IAW the power provision in Table 3.

4.7.7.1.6 Vehicle Computing System (VCS). To determine conformance to 3.4.9.1.6, the contractor shall certify that the data bus conforms to ISO 9141, SAE J1962 and shall be verified during visual inspections, measurements and tests.

4.7.7.1.7 Test Measurement and Diagnostic Equipment (TMDE).). To determine conformance to 3.4.9.1.7, the contractor shall certify that data bus architecture is compliant with and interoperable between recognized protocals SAE J1939, J1708/J1587, J1850 and shall be verified during analysis, drawings, visual inspections, and tests.

4.7.7.1.8 SINCGARS Radio Set. To determine conformance to 3.4.9.1.8 shall be verified by drawings, visual inspections and measurements.

4.7.8 HDT Central Tire Inflation System (CTIS). To determine conformance to 3.4.10 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.1 Tire Pressure Control. To determine conformance to 3.4.10.1 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test will be accomplished.

4.7.8.2 Installation. To determine conformance to 3.4.10.2 the contractor shall provide certification of compliance and drawings, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.3 Provision and Storage of Air. To determine conformance to 3.4.10.3 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.4 Manual Tire Inflation/Deflation System. To determine conformance to 3.4.10.4 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.5 Air-Priority System. To determine conformance to 3.4.10.5 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.6 Speed/Pressure Control and Warning. To determine conformance to 3.4.10.6 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.6.1 Speed Detection/Driver Alert. To determine conformance to 3.4.10.6.1 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.7 Maintenance of Tire Pressure. To determine conformance to 3.4.10.7 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.8 Operating Environment. To determine conformance to 3.4.10.8 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.7.8.9 Time to Inflation/Deflation. To determine conformance to 3.4.10.9 the contractor shall provide certification of compliance, visual inspections, contractor testing, and testing at Government test site will be accomplished.

4.8.1.1 Safety and Design. To determine conformance to 3.5.1.1, the contractor shall certify that the vehicle complies with all Federal Motor Vehicle Safety Standards and Federal Motor Carrier Safety Regulations applicable to the type of vehicle furnished and in effect on the date of manufacture except as specified in this document. The contractor shall also certify that the vehicle and furnished accessories comply with MIL-STD-1180B Safety Standards for Military Ground Vehicles. To confirm conformance 3.5.1.1 the vehicle will be inspected and tested.

4.8.1.1.1 User Interface. To determine conformance to 3.5.1.1.1, the HDT will be tested at a Government test site to determine operation by a fifth percentile female through a ninety-fifth percentile male Soldiers wearing PPE, and a combination of PPE and environmentally protective clothing or MOPP IV clothing. The Contractor shall certify that the vehicle's design utilized MIL-STD-1472F.

4.8.1.1.2 Back Up Alarm To determine conformance to 3.5.1.1.2 the contractor shall provide certification of compliance with SAE J994 type C, inspections, contractor testing, and testing at Government test site will be accomplished.

4.8.1.1.3 Collision Warning System (CWS). To determine conformance to 3.5.1.1.3 the contractor shall provide certification of compliance, inspections, contractor testing, and testing at Government test site will be accomplished.

4.8.1.1.4 Ball Inclinometers (Slope Indicator, Tilt Meter). To determine conformance to 3.5.1.1.4 the contractor shall provide certification of compliance, inspections, contractor testing, and testing at Government test site will be accomplished.

4.8.1.1.5 Heads Up Display Drivers Vision Enhancer (DVE). To determine conformance to 3.5.1.1.5, the cable and electrical cabling pass-throughs shall be examined and verified. The contractor shall certify that the power provisions are IAW the power provision in Table 3.

4.8.1.2 Human Factors. To determine conformance to 3.5.1.2, the HDT will be tested at a Government test site to determine operation and maintenance can be performed by a fifth percentile female through a ninety-fifth percentile male Soldiers wearing PPE, and a combination of PPE and environmentally protective clothing or MOPP IV clothing.

4.8.1.2.1 Operators and Maintainers. To determine conformance to 3.5.1.2, the HDT will be tested at a Government test site.

4.8.1.2.2 Preventive Maintenance Checks and Services (PMCS). To determine conformance to 3.5.1.2.2, the HDT will be tested at a Government test site.

4.8.1.3.1 Air Quality. To determine conformance to 3.5.1.3.1, the contractor shall certify that the vehicle complies with the Environmental Protection Agency regulations governing Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines in effect on the date of vehicle manufacture. To confirm conformance 3.5.1.3.1 the vehicle will be inspected and tested at a Government test site.

4.8.1.3.2 Noise Standard. To determine conformance to 3.5.1.3.2, the contractor shall certify that the vehicle complies with the Interstate Motor Carrier Noise Emission Standards of the Environmental Protection Agency when tested IAW Department of Transportation Regulations, Part 325 and applicable Army Surgeon General requirements for operator personnel without hearing protection and the steady state noise level at the HDT crew positions shall not exceed 85 dBA IAW SAE J336. To confirm conformance 3.5.1.3.2 the vehicle will be inspected and tested at a Government test site.

4.8.1.4 Toxic Gas Exposure. To determine conformance to 3.5.1.4, the contractor shall certify that the vehicle complies with threshold limit values for Chemical Substances in work air by the American Conference of Government Industrial Hygienists. To confirm conformance 3.5.1.4 the vehicle will be inspected and tested at a Government test site.

4.8.1.5 Material. To determine conformance to 3.5.1.5 the contractor shall have certifications on all material and components identifying the items and materials are as specified.

4.8.1.5.1 Ozone depleting substance. To determine conformance to 3.5.1.5.1, the contractor shall certify that no Class 1 and Class 2 ozone depleting substance have been used in the design, manufacture, test, operation or maintenance of the HDT vehicle system.

4.8.1.5.2 Radioactive material. To determine conformance to 3.5.1.5.2, the contractor shall certify that No radioactive material has be used in any part of the HDT vehicles.

4.8.1.5.3 Hazardous Materials (HAZMAT) Management. To determine conformance to 3.5.1.5.3 the contractor shall provide certification that the prohibited materials specified are not used in the manufacture, assembly, operation, maintenance or sustainment of the system unless approval has been granted by the government, in which case the contractor shall provide copies of the government approval(s).

4.8.1.5.4 Dissimilar metals. To determine conformance to 3.5.1.5.4 the contractor shall certify conformance and performance will be verified during tests.

4.8.1.5.5 Lead. To determine conformance to 3.5.1.5.5 the contractor shall certify conformance and performance will be verified during tests.

4.8.2 Dimensions and Weight. To determine conformance to 3.5.2 the contractor shall certify conformance and measurements and weights will be verified during tests.

4.8.3 Fuel and Lubrication. To determine conformance to 3.5.3, the contractor shall certify conformance to the performance requirements using JP-8 (STANAG 1135, F-34), standard diesel fuel and lubricants (A-A-52557, MIL-PRF-2104, MIL-PRF-2105, MIL-PRF-10924 and MIL-PRF-46167) and

certify that grease fittings conform to SAE J534 and verify that pressure relief fittings are used where needed. The HDT will be examined for accessibility of grease fittings and for proper lubrication, including taking one wheel hub apart and examining the amount of grease in the wheel hub, which shall be 100% of hub cavity.

4.8.3.1 Centralized Lubrication System. To determine conformance to 3.5.3.1 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.8.3.2 Oil Drain Plugs. To determine conformance to 3.5.3.2 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.9 Performance. To determine conformance to 3.6 the contractor shall provide certification of compliance and will be verified during Government testing..

4.9.1 Forward Speed. To determine conformance to 3.6.1 the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.2 Mobility Rating Speed (MRS). To determine conformance to 3.6.2 the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.3 Mission Profile. To determine conformance to 3.6.3 the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.4 Gradeability and Speeds. To determine conformance to 3.6.4 the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.5 Side Slope Operation. To determine conformance to 3.6.5 the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.6 Climatic Conditions. To determine conformance to 3.6.6 the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.7 Vehicle-Machine/Equipment Interoperability. To determine conformance to 3.6.7 the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.7.1 Dump Loading. To determine conformance to 3.6.7.1 the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.7.2 LEUT Type II Companion Trailer. To determine conformance to 3.6.7.2, the contractor shall provide certification of compliance and will be verified during Government testing.

4.9.8 Fording. To determine conformance to paragraph 3.6.8, the HDT without special equipment fully loaded and without load, shall be operated without preparation at the depth and for the length of time specified. After fording tests and during durability testing, the HDTs will be examined for component failure or degradation due to fording contamination.

4.9.9 Ride Quality. To determine conformance to 3.6.9, the contractor shall provide certification of compliance and will be verified during Government testing.

4.10.1 Power Train. To determine conformance to 3.7.1 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.1.1 Engine. To determine conformance to 3.7.1.2, the contractor shall certify that the vehicle complies with 40 CFR, Sections 85.1703, 89.908, 1068.225 and labeled IAW EPA regulations. Performance will be verified during test.

4.10.1.2 Fan Clutch. To determine conformance to 3.7.1.3 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.1.3 Retarder. To determine conformance to 3.7.1.4 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.1.4 Data Storage and Retrieval To determine conformance to 3.7.1.5 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.1.5 Self-Priming Pump. To determine conformance to 3.7.1.6 the contractor shall certify conformance, and will be verified by visual inspections and during tests. .

4.10.1.6 Automatic Starting Aid. To determine conformance to 3.7.1.7 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.1.7 Reusable Oil Filter. To determine conformance to 3.7.1.9 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.1.8 Belt Tensioner System. To determine conformance to 3.7.1.10 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.1.9 Oil Pan and Radiator Bottom Protection. To determine conformance to 3.7.1.11 the contractor shall certify conformance, and will be verified by visual inspections and during tests. .

4.10.2 Fuel/Water Separator. To determine conformance to 3.7.2 the contractor shall certify conformance, and will be verified by visual inspections and during tests. .

4.10.3 Fuel Tanks. To determine conformance to 3.7.3 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.3.1 Fuel Tank Protection. To determine conformance to 3.7.3.1 the contractor shall certify conformance, and will be verified by visual inspections and during tests. .

4.10.4 Engine Air Induction and Filtration System. To determine conformance to 3.7.4 the contractor shall certify conformance and shall meet the requirements of MIL-PRF-62048, performance will be verified during Government tests.

4.10.5 Cooling System. To determine conformance to 3.7.5 the contractor shall certify and the cooling system shall be operated to meet cooling system performance requirements and IAW SAE J1436, paragraph 5.3. Performance will be verified during testing.

4.10.5.1 Coolant Filter with Inhibitor. To determine conformance to 3.7.5.1 the contractor shall certify conformance, and will be verified by visual inspections and during tests. .

4.10.5.2 Draining. To determine conformance to 3.7.5.2 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.6 Exhaust System. To determine conformance to 3.7.6 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.7 Automatic Electronic Transmission. To determine conformance to 3.7.7 the contractor shall certify and operate the automatic electronic transmission to meet transmission performance requirements and the performance specification as stated herein and with all applicable federal safety standards at the time of vehicle manufacture. Performance will be verified during testing.

4.10.7.1 Inhibitor System. To determine conformance to 3.7.7.1 the contractor shall certify conformance and will be verified by during test.

4.10.7.2 Transmission Filter. To determine conformance to 3.7.7.2 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.7.3 Transmission Control System. To determine conformance to 3.7.7.3 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.7.4 Cruise Control. To determine conformance to 3.7.7.4 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.9 Transfer Case. To determine conformance to 3.7.9 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.10 Suspension and Axles. To determine conformance to 3.7.10, the contractor shall provide material certification for rated capacity of suspensions and axles.

4.10.10.1 Front. To determine conformance to 3.7.10.1 the contractor shall certify conformance to 49CFR393.207 and rated capacity. Clearances, axle loading, and articulation will be verified during testing.

4.10.10.2 Rear Drive Axles and Suspension. To determine conformance to 3.7.10.2 the contractor shall certify conformance to 49CFR393.207 and rated capacity. Clearances, axle loading, and articulation will be verified during testing.

4.10.10.2.1 Differential(s). To determine conformance to 3.7.10.2.1 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.10.3 Hubs. To determine conformance to 3.7.10.3 the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.11 Permanent Lube Driveline. To determine conformance to 3.7.11the contractor shall certify conformance, and will be verified by visual inspections and during tests.

4.10.12 Wheels, Rims, and Tires. To determine conformance to 3.7.12, the contractor shall provide certification of compliance. The contractor shall certify that the Tires and Wheels conform to FMVSS 49CFR571.119 and 49CFR571.120. The contractor shall also certify that the rims conform to Tire and Rim Association recommendations for the type and size of tires furnished. The trailer shall be inspected to confirm that tires and rims are the same size for all wheels on the vehicle. The contractor shall also certify that wheel assemblies have been balanced.

4.10.12.1 Tires. To determine conformance to 3.7.12.1, the tires will be examined for type, size, manufacturer, design, ply rating and date of manufacture. Tires will be tested during RAM testing to confirm a tread life of 12,000 miles per SAE J2014, section A7. During RAM testing the wheel assembly will be inspected for retention of wheel balancing weights. The tire shall be certified that it has a 5 year storage life IAW paragraph 4.4.13 of the "TACOM Administrator's Manual (AM) for use with SAE J2014 Pneumatic Tires for Military Tactical Wheeled Vehicles". The trailer shall be examined to confirm that the valve caps are provided and all tires are equipped with valve extensions and so mounted as to permit checking tire pressure and inflation using only on-vehicle equipment, and for the presence of the required tire pressure stencils.

4.10.12.2 Spare Tire/Wheel Assembly, Carrier and Hoist. To determine conformance to 3.7.12.2, the HDT will be examined for presence of spare wheel and tire assembly, and that the spare wheel and tire assembly is identical to the other wheel and tire assemblies on the vehicle. The spare tire carrier and hoist will be operated to verify functionality and safety of the spare tire carrier and hoist.

4.10.12.3 Tire Changing Equipment. To determine conformance to 3.7.12.3, the HDT will be examined for required tools.

4.10.12.4 On Vehicle Air Supply. To determine conformance to 3.7.12.4, the contractor shall provide certification of compliance. The contractor shall certify that the On Vehicle Air Supply conform to FMVSS 121, visual inspection, contractor test and Government test.

4.10.13 Electrical System. To determine conformance to 3.7.13, the contractor shall certify that electrical system is a 12/24 system that shall be stepped down to 12 volts from a primary 24 volt power source, the lighting meets the requirements of FMVSS 108 and that backup lights are IAW SAE J593,Confirmation will be accomplished via visual inspection, contractor test and Government test.

4.10.13.1 Vehicle Power and Reserve Power. To determine conformance to 3.7.13.1, the contractor shall certify that the power source (i.e., batteries, alternator, generator and/or fuel cell, etc.) supports the individual vehicle electrical requirements. The Government will verify performance during inspections and test.

4.10.13.2 Engine Starting System. To determine conformance to 3.7.13.2, the contractor shall certify that the vehicle engine starting system is an all battery 24-volt engine starting system or a commercially available Capacitor Starting System which will be verified by visual inspection and during test.

4.10.13.3 Batteries. To determine conformance to 3.7.13.3, the contractor shall certify that the batteries conform to the type (Army 6TAGM Hawker Armasafe Plus Valve Relief Lead Acid (VRLA) maintenance-free) batteries and physical/ functional requirements cited in STANAG 4015, ATPD 2206R6 where applicable, and MIL-PER-32143. During inspection the batteries, battery box, and cables will be checked for location, condition, proper installation and operation.

4.10.13.3.1 Battery Charging System. To determine conformance to 3.7.13.3.1, the contractor shall certify that the battery charging system include load sensing and temperature-compensated voltage regulation with battery compartment sensing for proper charging of 6TAGM (Hawker) batteries and is capable of providing battery temperature monitoring, temperature compensation and modified charge curves. During inspection charging system operation will be verified.

4.10.13.3.2 Battery Shut-Off Switch. To determine conformance to 3.7.13.3.2, the contractor shall certify the battery shut-off switch is properly located and the on/off positions are clearly marked. Location and markings will be verified during inspection.

4.10.13.4 NATO Slave Receptacle and Cable. To determine conformance to 3.7.13.4, the contractor shall certify the NATO slave receptacle and cable is IAW STANAG 4074 (Type 1 receptacle) and IAW STANAG 4074 with Type 1 plugs, with electrical capability to jump-start vehicles with 24 volt starting systems and properly located. Location and operation will be verified during inspect and test.

4.10.13.5 Electronic Strobe Warning Light. To determine conformance to 3.7.13.5, the contractor shall certify the electronic strobe warning light is (NSN 6220-01-495-2851) and located in the BII box. Installation and operational verification shall be during inspection and test.

4.10.13.6 Work Lamps and Utility Outlets. To determine conformance to 3.7.13.6, the contractor shall certify that the HDT is equipped with the correct total and type of work lamps and outlets. Verification will be by inspections and drawings.

4.10.13.6.1 Work Lamps. To determine conformance to 3.7.13.6.1, the contractor shall certify that the lamps and mounting are IAW with SAE J598 and properly located in the stowage box with a 25 foot cord. Verification will be by inspections and drawing

4.10.13.6.2 Utility Outlets. To determine conformance to 3.7.13.6.2, the contractor shall certify that the HDT is equipped with no less than two 12-volt outlets and one 24-volt outlet with protective covers and on/off switches are properly located outside the HDT cab, are 30 amp fused , protected and clearly marked. Verification will be by inspection, drawings and test.

4.10.13.6.3 Convenience Outlets. To determine conformance to 3.7.13.6.3, the contractor shall certify that the HDT is equipped with no less than two fuse protected convenience outlets, one 12-volt outlet and one 24-volt outlet, 15 amps including on/off switches are properly located inside the HDT cab, and clearly marked. Verification will be by inspection, drawings and test.

4.10.13.7 Secure Lighting. To determine conformance to 3.7.13.7 the contractor shall certify that the HDT is equipped with LED blackout lighting that is IAW MIL-STD-1179. The blackout lighting will be operated and tested to verify conformance.

4.10.13.7.1 Lock Out. To determine conformance to 3.7.13.7.1 the contractor shall certify that the secure light automatically locks out all regular service lights, electronic horn and back up alarm. The secure lighting will be operated and tested to verify conformance.

4.10.13.8 Electromagnetic Emission Interference (EMI). To determine conformance to 3.7.13.8 the contractor shall certify that The HDT complies with applicable EMI and electromagnetic emission susceptibility requirements of MIL-STD-461 and MIL-STD-464. Verification will be by Government test.

4.10.13.8.1 Electromagnetic Environmental Effects (E3). To determine conformance to 3.7.13.8.1 the contractor shall certify that the HDT is hardened to the maximum extent practical to reduce the effects of all expected E3, e.g. Electromagnetic Radiation (EMR), Electronic Counter Countermeasures (ECCM), Hazard of Electromagnetic Radiation to Personnel (HERP), IAW MIL-STD-464C and MIL-STD-461F. Verification will be material certifications and Government test.

4.10.13.9 Day-Time Running Lights. To determine conformance to 3.7.13.9 the contractor shall certify the HDT is furnished with day-time running lights which shall be disabled when the vehicle is switched to the blackout mode. Verification will be inspections, contractor tests and Government tests.

4.10.13.9.1 LED Lighting. To determine conformance to 3.7.13.9.1 the contractor shall certify the HDT vehicle is equipped with LED headlights, marker, clearance and tail lights that are IAW MIL-STD-1179 and FMVSS 108. Verification will be material certifications and Government test.

4.10.13.10 Horn. To determine conformance to 3.7.13.10 the contractor shall certify that Standard air horn(s) and standard electrical city horn(s) for this class of vehicle are furnished. Verification will be material certifications and Government test.

4.10.14 ABS Brakes. To determine conformance to 3.7.14, the Contractor shall provide required certifications and data. Function will be verified by inspection, contactor tests and Government tests.

4.10.14.1 Air Dryer System. To determine conformance to 3.7.14.1 the contractor shall certify that the HDT is furnished with an air dryer system with an automatic drain valve to minimize condensation from forming in the air reservoir when a 30^{o}F drop in the system air temperature occurs and an electrical heating element is provided in the air dryer to permit functioning below 32^{o}F. Function will be verified by inspection, contactor tests and Government tests.

4.10.14.2 Air Connectors (Front of Vehicle). To determine conformance to 3.7.14.2 the contractor shall certify compliance and the glad hands will be examined and tested for conformance to SAE J318 and SAE J702.

4.10.14.3 Brakes for Pintle/Lunette Towed Trailers. To determine conformance to 3.7.14.3 the contractor shall certify that the air brake hose couplers (glad hands) with cover assemblies and cover securing chains are provided at the rear of the HDT vehicle and are IAW SAE J849. This will be verified by inspection, contactor tests and Government tests.

4.10.14.4 Brake Shields. To determine conformance to 3.7.14 the contractor shall certify that shields for the front and rear brakes shall be provided to minimize the amount debris entering the brake drums. Will be verified by inspection.

4.10.14.5 Air Reservoir. To determine conformance to 3.7.14.5 the contractor shall certify that the air reservoir is equipped with an automatic drain valve. Verification will be by inspection.

4.10.15 Cab. To determine conformance to 3.7.15 the contractor shall certify that the furnished cab meets the requirements identified in the ATPD. Verification will be by drawings, measurements, material certifications, inspections and testing.

4.10.15.1 Cab Rear Window. To determine conformance to 3.7.15.1 the contractor shall certify that the rear window with an outside guard is provided. The guard allows for ease of cleaning outside of window and the windows size will allow the driver to have a full vision of vehicle rear area.

4.10.15.2 Cab Seats. To determine conformance to 3.7.15.2 the contractor shall certify that the driver and passenger seats are of the air ride type, individually adjustable and ergonomically designed to provide appropriate leg, back, shoulder, and head support; the height, fore and aft seat position, back angle, and seat cushion tilt are adjustable. The seats are upholstered and the driver and passenger seats are individually adjustable andthat the seat and restraint systems do accommodate a 5th percentile female to 95th percentile male soldier wearing full combat gear (to include LBV, personal body armor, and protective mask) and individual MOPP IV protective gear, without interfering with vehicle or crew operations. Verification will be operation, inspections and testing.

4.10.15.3 Occupant Crash Protection. To determine conformance to 3.7.15.3 the contractor shall certify that the HDT vehicle has occupant crash protection, seat belts and shoulder restraints (minimum three point restraints) conforming to FMVSS 208, 209 and 210 are provided for each seated crewmember. The contractor shall also certify that the seat belt anchors and retarders conform to FMVSS 208, 209 and 210. The vehicle is equipped with self-actuating air bag systems that provide protection for both operator and passenger that can be turned on and off by the operators. Verification willl be operation, inspections and testing.

4.10.15.4 Cab Accessories and Equipment. To determine conformance to 3.7.15.4 the contractor shall certify that the accessories and equipment are furnished and shall be verified by visual inspection.

4.10.15.5 Cab Climate Control. To determine conformance to 3.7.15.5 the contractor shall certify that the HDT cab has a high performance HVAC system that meets the requirements of the ATPD and the windshield is capable of being defrosted with and without B-kit installed IAW SAE J382. Verification shall be by visual inspection and operational testing.

4.10.15.6 Air Conditioning. To determine conformance to 3.7.15.6 the contractor shall certify that the cooling system for the cab is installed and has the capability of achieving a 90 degree F average crew compartment corrected effective temperature when operated in a 120 degree F. ambient temperature environment within 60 minutes and will be verified by visual inspection and operational testing.

4.10.15.7 Windshield Wipers and Washers. To determine conformance to 3.7.15.7 the contractor shall certify conformance, and will be verified by visual inspections and operational testing.

4.10.15.8 Cab Visibility. To determine conformance to 3.7.15.8 the contractor shall certify conformance and will be verified by visual inspections and operational testing.

4.10.15.9 Rearview Mirrors. To determine conformance to 3.7.15.9 the contractor shall certify conformance that the vehicle is equipped with remote controlled, heated rearview mirrors that provide the driver a clear view of along the sides of dump body from ground to top of payloads to rear of vehicle, including towed lunette trailer and the mirror comply with FMVSS 111 and have both a flat and convex surface (minimum 6-inch diameter) enclosed in separate housing and will be verified by visual inspections and operational testing.

4.10.15.10 Spotter Mirror. To determine conformance to 3.7.15.10 the contractor shall certify conformance and will be verified by visual inspection and testing.

4.10.16 Steering. To determine conformance to 3.7.16 the contractor shall certify conformance and will be verified by visual inspection, operation and testing.

4.10.17 Front Bumper. To determine conformance to 3.7.17 the contractor shall certify conformance and will be verified by visual inspection and testing.

4.10.18 Stowage. To determine conformance to 3.7.18 the contractor shall certify conformance and will be verified by drawings, visual inspection and testing.

4.10.18.1 Equipment Storage. To determine conformance to 3.7.18.1 the contractor shall certify conformance and will be verified by drawings, visual inspection and testing.

4.10.18.2 Individual Equipment Storage. To determine conformance to 3.7.18.2 the contractor shall certify conformance and will be verified by drawings, visual inspection and testing.

4.10.19 Basic Issue Items (BII) (On-Vehicle Tools). To determine conformance to 3.7.19 the Government will inspect that the tool box assemblies exist, have provisions to hold lids open, have locking commercial key padlock, and is of sufficient size to contain all BII components. The HDT will be inspected for presence of all required BII.

4.10.20 Rear Fenders. To determine conformance to 3.7.20 the contractor shall certify conformance and will be verified by drawings, visual inspection and testing.

4.10.21 Mud Flaps. To determine conformance to 3.7.21 the contractor shall certify conformance and will be examined to verify the mud flaps are fixed anti-sail type and installation conforms to SAE J682.

4.10.22 Pintle. To determine conformance to 3.7.22 the contractor shall certify conformance and are IAW SAE J849 verification will be by visual inspection and testing.

4.11 Dump Body Design

4.11.1 Corrosion Control. The contractor shall certify his compliance to paragraph 3.8.1, inclusive. The contractor's corrosion prevention and control plan, the contractor's certification, the corrosion prevention production processes involved and the attendant design will be examined and verified during First Production Vehicle inspection.

4.11.2 Dump Body Capacity. To determine conformance to 3.8.2 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.2.1 Over Load Sensor (OLS) System. To determine conformance to 3.8.2.1 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.3 Floor. To determine conformance to 3.8.3 inclusive, certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.3.1 Heated Dump floor. To determine conformance to 3.8.3.1 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.4 Head Sheet. To determine conformance to 3.8.4 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.5 Sides. To determine conformance to 3.8.5 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.6 Dump Underbody. To determine conformance to 3.8.6 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.7 Cab Protector and Load Cover To determine conformance to 3.8.7 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.8 Tailgate. To determine conformance to 3.8.8 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.8.1 Tailgate Lock. To determine conformance to 3.8.8.1 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.8.2 Hardware and Latch. To determine conformance to 3.8.8.2 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.8.3 Spill Shield Kit. To determine conformance to 3.8.8.3 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.9 Material Control System (MCS) Tailgate. To determine conformance to 3.8.9 inclusive, certification, material certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.10 Standard and Material Control System (MCS) Tailgate Interchangeability To determine conformance to 3.8.10 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.11 Access Steps. To determine conformance to 3.8.11 the contractor shall certify conformance that the two non-skid steps are installed IAW J185. Verification will be by inspection and testing.

4.11.12 Travel Lock. To determine conformance to 3.8.12 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.13 Cargo Tiedowns. To determine conformance to 3.8.13 inclusive, certification, visual inspection, measurements, contractor testing, and testing at Government test site shall be accomplished.

4.11.14 Safety Props. To determine conformance to 3.8.14 inclusive, certification, material certification, visual inspection, measurements, contractor testing, and testing at Government test site will be accomplished.

4.11.15 Dump Body Switch. To determine conformance to 3.8.15 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.16 Dump Body Control Lever. To determine conformance to 3.8.16 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.17 Hydraulic System.

4.11.7.17.1 Hydraulic System. To determine conformance to 3.8.17.1 the contractor shall certify that the hydraulic system is compatible with the vehicle power take-off, the pump and valves are manufacturers standard, have a pressure relief device to prevent build-up of pressures exceeding the rating of any component and conform to SAE J517, J516 and SAE J931. Verification will be by visual inspection, contractor testing, and testing at Government test site shall be accomplished.

4.11.17.2 Hydraulic Hoist. The contractor determine conformance to 3.8.17.2 and shall certify the hydraulic hoist conforms to the National Truck Equipment Association 50 degree dump angle and complies with SAE J1333, SAE J1334, SAE J1335, and SAE J1336. Verification will be by visual inspection, contractor testing, and testing at Government test site shall be accomplished.

4.11.17.3 Hydraulic Pump. To determine conformance to 3.8.17.3 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.17.4 Hydraulic Reservoir. To determine conformance to 3.8.17.4 inclusive, certification, visual inspection, contractor testing, and testing at Government test site shall be accomplished.

4.11.17.5 Hydraulic Controls. To determine conformance to 3.8.17.5 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.18 Accessories.

4.11.18.1 Sideboards. To determine conformance to 3.8.18.1 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.11.18.2 Load Cover. To determine conformance to 3.8.18.2 inclusive, certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.12 HDT Armoring Concept. To determine conformance to 3.9 inclusive, certification, material certification, visual inspection, contractor testing, and testing at Government test site will be accomplished.

4.13 Workmanship. To determine conformance to 3.11, the HDT will be examined to ensure that its components are free of defects that compromise, limit or reduce the capability of the HDT to perform in accordance with its intended use. Each vehicle shall have no evidence of cracks, dents, scratches, burrs, sharp edges, chaffing, loose parts, foreign matter, or any other evidence of poor workmanship. Each vehicle shall be checked to insure that normal vehicle operation does not cause chafing, binding or other damage to any harness, hose, control cable, lanyard, tube or line, that shall render the vehicle unsuitable/unsafe for the purpose intended.

4.13.1 Welding Steels. To determine conformance to 3.11.1 all welds will be visually inspected to AWS D1.1 for steel.

4.13.2 Welding Aluminum. To determine conformance to 3.11.2 all welds will be visually inspected to AWS D1.2 for aluminum.

4.13.3 Welder Qualification. To determine conformance to 3.11.3 the contractor shall certify that the qualification of all arc welders and automated welders are IAW AWS D1.1 and AWS D1.2 and will be verified by training records and individual welding certifications.

4.14 Servicing and Adjusting. To determine conformance to 3.12 the contractor shall certify that the items list in section 3.12 have been serviced and adjusted IAW the manufacture's standard and will be verified by visual inspection and Government testing.

5. PREPARATION FOR DELIVERY.

5.1 Vehicle Processing. The vehicle shall be processed for shipment, from the manufacturer's plant to the initial receiving activity, in accordance with the contract or delivery orders.

6. NOTES.

6.1 Intended Use HDT. The intended use of the Heavy Dump Truck is to support construction projects by loading, transporting and dumping payloads of sand and gravel aggregates, crushed rock, hot asphalt mixes, earth, clay, rubble, large boulders and other materials up to the HDT's gross vehicle weight rating (GVWR) to job sites under worldwide climatic conditions

6.2 Ordering Data. As specified in the contract or delivery order.

6.3 Production Verification Vehicle. Unless otherwise specified in the contract or delivery order, a production verification vehicle is one of the first ten (10) vehicles of the type produced under manufacturing methods to be used in normal production (see 3.1).

6.4 Definition.

6.4.1 Standard Commercial Chassis. A standard commercial chassis or dump truck is a model as depicted in the manufacturer's current standard truck data book and which is comprised entirely of commercially proven components certified by the component manufacturer and the vehicle manufacturer as being properly matched and currently published rated to meet this specification.

6.4.2 Commercially Proven Components. Commercially proven components means components of the latest model/series which have been manufactured, marketed and "sold in substantial quantities" at the required rated capacity to the commercial heavy truck transport industry or components currently incorporated for use in current HDT, for at least one year preceding the issuance of the request for technical proposals.

6.4.2.1 Definition of "sold in substantial quantities" Criteria. Commercially proven components meet this criterion when the facts or circumstance support a reasonable conclusion that the quantities regularly sold are sufficient to constitute a real commercial market for the supplies or services. Nominal quantities, such as models, specimens, samples, and prototype or experimental units, cannot be considered as meeting this requirement.

6.4.3 Optional Commercial. Components, parts or accessories which are existing commercial products available as standard or special options of the truck chassis manufacturer.

6.4.4 Oil and Water Leaks. The following shall be used with the classification of defects:

a) Weep: Any evidence of fluid beyond the seal
b) Seep: Any evidence of fluid beyond the seal not resulting in the formation of a droplet.
c) Droplet: Any evidence of fluid beyond the seal that results in the formation of a droplet.
d) Drip: Any evidence of fluid beyond the seal where a droplet forms and falls.

6.4.4.1 Any drip constitutes a major defect when the vehicle has been standing idle and components are at ambient temperatures. Any leak that occurs at static fit, metal-to-metal or gasket shall constitute a major defect.

6.4.5 Contractor, Manufacturer. The term "contractor", as used in this specification, is defined as the organization having a direct contract with one Government activity. The term "manufacturer" is defined as the organization actually performing the operations covered by this specification. The contractor may or may not be the manufacturer.

6.4.6 Primary Roads. Two or more lanes, all-weather, maintained, hard surface (paved) roads with good driving visibility used for heavy and high density traffic. These roads have lanes with a minimum width of nine feet, and the legal maximum Gross Vehicle Weight (GVW)/Gross Combined Vehicle Weight (GCVW) for the country or state as is assured for all bridges.

6.4.7 Secondary Roads. Two lane, all-weather, occasionally maintained, hard or loose surface (e.g., large rock, paved, crushed rock, gravel). These roads are intended for medium-weight, low-density traffic. These roads have lanes with minimum width of eight feet and no guarantee that the legal maximum GVW/GCVW for the country or state is assured for all bridges.

6.4.8 Trails. One lane, dry weather, unimproved, seldom maintained, loose surface roads intended for low density traffic. Trails have a minimum lane width of eight feet, no large obstacles (boulders, logs, stumps) and no bridging.

6.4.9 Off-Road. Terrain not subject to repeated traffic and where no roads, routes, well-worn trails, or man-made improvements exist. (This definition does not apply to vehicle test courses which are used to simulate cross-country terrain).

6.4.10 Survivability. Survivability attributes are those that contribute to the survivability of a manned system. This includes attributes such as speed, maneuverability, detectability, and countermeasures that reduce a system's likelihood of being engaged by hostile fire, as well as attributes such as armor and redundancy or critical components that reduce the system's vulnerability if it is hit by hostile fire.

6.4.11 Force Protection. Force protection attributes are those that contribute to the protection of personnel by preventing or mitigating hostile actions against friendly personnel, military and civilian. This may include the same attributes as those that contribute to survivability, but the emphasis is on protecting the system operator or other personnel rather than protecting the system itself. Attributes that are offensive in nature and primarily intended to defeat enemy forces before they can engage friendly forces are not considered force protection attributes. Attributes that protect against accidents, weather, natural environmental hazards, or disease (except when related to a biological attack) are also not part of force protection.

Preparing Activity:
Army – AT

APPENDIX A

1.0. Heavy Dump Truck (HDT**)**

1.1. Operational Mode Summary Mission Profile

1.2. Concept of Employment. The HDT is a large capacity truck with a cargo area that can transport and dump material used in construction by engineer units in support of air and ground line of communication and theatre infrastructure repair and restoration operations. Construction units require extensive haul capability to move rock, crushed aggregate, hot mix asphalt, wet or dry sand, earth, and rubble (to include concrete with re-bar) to processing or construction sites. The material is often loaded by some mechanical means but may be loaded by hand. The material is often unloaded by tilting the bed or using a ram ejector mechanism to discharge the material from the cargo area. The rate of discharge is controlled by the operator and may be combined with the forward movement of the vehicle such that a uniform deposit is formed on the dumping surface. The rate of discharge may further be assisted by a multi-chute material control system. Material may also be unloaded by hand or with the assistance of a lifting device.

a. The HDT will be deployed worldwide.

b. The HDT will be employed across the full spectrum of operations.

c. The HDT will be used by Engineer Horizontal Construction Company; Engineer Asphalt Team; Engineer Quarry Platoon; and Engineer Equipment Support Platoon.

1.3 Operational Mode Summary (OMS). The loading time, dumping time, and distance traveled per dump cycle are similar between the Engineer Horizontal Construction Company, Engineer Asphalt Team, and Engineer Equipment Support Platoon. The Engineer Quarry Platoon will typically have shorter distances to travel, resulting in a higher ratio of dump cycles to miles traveled. The Asphalt Team will primarily haul hot mix asphalt and the materials necessary to mix the asphalt. The Quarry Platoon will primarily haul larger rocks from a quarry to a rock crushing plant; and from the plant to a stockpile area. The Wartime and Peacetime OMS are shown in Tables 1 and 2.

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Table 1. ANNUAL WARTIME OPERATIONAL MODE SUMMARY

	Hours per Day				Annual Hours		
Mission	OT [1]	OT+AT[2] (hours)	CT [3] (hours)	Days per Year	OT	OT+AT (hours)	CT (hours)
Horizontal Construction, Engineer Asphalt Team, and Equipment Support Platoon	17.4 325 miles 10 cycles	18.9	24	334	5812 hrs 108,550 miles 3340 cycles	6313	8760
Quarry Platoon	17 112 miles 65 cycles	18.5	24	334	5678 hrs 37408 miles 21710 cycles	6179	8760

1. Operating Time - Tasks d through j from the mission profile.
2. Alert Time - Tasks b and c from the mission profile.
3. Standby Time - Tasks a) and k) from the mission profile.

Table 2. ANNUAL PEACETIME OPERATIONAL MODE SUMMARY

	Hours per Day				Annual Hours		
Mission	OT [1]	OT+AT[2] (hours)	CT [3] (hours)	Days per Year	OT	OT+AT (hours)	CT (hours)
Horizontal Construction, Engineer Asphalt Team, and Equipment Support Platoon	8.2 hrs 145 miles 4 cycles	9.7	24	230	1886 hrs 33,350 miles 920 cycles	2231	8760
Quarry Platoon	8.6 hrs 46 miles 30 cycles	10.1	24	230	1978 10580 miles 6900 cycles	2323	8760

1. Operating Time - Tasks d through j from the mission profile.
2. Alert Time - Tasks b and c from the mission profile.
3. Standby Time - Tasks a and k from the mission profile.

1.4. Mission.

a. Engineers. Engineers are required to perform air and ground line of communication and theatre infrastructure repair and restoration operations. These operations require large amounts of rock, crushed aggregate, hot mix asphalt, wet or dry sand, earth, and rubble (to include concrete with re-bar). The aggregate is developed from natural resources in the area of operations and processed into construction material. The aggregate must be transported from the processing site to the job site. The HDT is the primary means of transporting processed aggregate to the job site. An intermediate step may be the manufacture of hot mix asphalt. The HDT would move the aggregate to the asphalt plant and then transport the asphalt to the job site. The HDT is also required to spread the aggregate at some sites by releasing a uniform amount while traveling at a slow speed. The HDT also serves as an alternate transportation asset for organizational equipment and other construction materials required for a project. Sometimes the HDT will be used to transport blast rock or native material to the processing site from a remote location.

b. Typical Wartime Mission Day. Typical wartime daily missions are shown in Tables 3 and 4. During operations PMCS and refueling is assumed to occur concurrently with other tasks.

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Table 3. Typical Daily Wartime Mission for Non-Quarry Units.

	Task	Task Time (hrs per task)	Task Miles (miles per task)	Task Frequency	Daily Time (hours)	Daily Miles		
a	Standby Time Between Missions	4.6	n/a	1	4.6	n/a		
b	Reaction Time	0.5	n/a	1	0.5	n/a		
c	Before mission PMCS	1	n/a	1	1	n/a		
d	Travel – motor pool to operations area	0.2 hrs	5 miles	1	0.2	5 miles		17.4 hours (OT)
Begin Dump Cycles								
e	Travel to Load Site	0.6 hrs	15 miles	10	6	150 miles	15.4 hours	
f	Loading, including time waiting to load (Idle)	10.2 min 0.17 hrs	n/a		1.7	n/a		
g	Travel to Dump Site	0.6 hrs	15 miles		6	150 miles		
h	Unloading, including time waiting to unload	10.2 min 0.17 hrs	n/a		1.7	n/a		
End Dump Cycles								
i	Idle Time During Mission (meals, etc)	1 hrs	n/a	1	1 hrs	n/a		
j	Travel – Dump site to motor pool	0.8 hrs	20 miles	1	0.8	20 miles		
k	After mission PMCS	0.5	n/a	1	0.5	n/a		
					24 hrs	325 miles		

*Average travel speed is assumed to be 25 mph

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Table 4. Typical Daily Wartime Mission for Quarry Units.

	Task	Task Time (hrs per task)	Task Miles (miles per task)	Task Frequency	Daily Time (hours)	Daily Miles		
a	Standby Time Between Missions	4.5	n/a	1	4.5	n/a		
b	Reaction Time	0.5	n/a	1	0.5	n/a		
c	Before mission PMCS	1	n/a	1	1	n/a		
d	Travel – motor pool to quarry	0.2 hrs	5 miles	1	0.2	5 miles		17 hours (OT)
Begin Dump Cycles								
e	Travel to Load Site	4.8 min 0.08 hrs	0.6 miles	65	6.8	51	15.6 hours	
f	Loading, including time waiting to load (Idle)	2.4 min 0.04 hrs	n/a		3.4			
g	Travel to Dump Site	4.8 min 0.08 hrs	0.6 miles		6.8	51		
h	Unloading, including time waiting to unload	2.4 min 0.04 hrs	n/a		3.4			
End Dump Cycles								
i	Idle Time During Mission (meals, etc)	1 hrs	n/a	1	1 hrs	n/a		
j	Travel – Quarry to motor pool	0.2 hrs	5 miles	1	0.2	5 miles		
k	After mission PMCS	0.5	n/a	1	0.5	n/a		
					24 hrs	112 miles		

* Average travel speed is assumed to be 25 mph to/from Motor Pool; 7.5 mph within Quarry

c. Typical Peacetime Mission Day. Typical peacetime daily missions are shown in Tables 5 and 6. During operations PMCS and refueling are assumed to occur concurrently with other tasks.

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Table 5. Typical Daily Peacetime Mission for Non-Quarry Units.

	Task	Task Time (hrs per task)	Task Miles (miles per task)	Task Frequency	Daily Time (hours)	Daily Miles		
a	Standby Time Between Missions	13.8	n/a	1	13.8	n/a		
b	Reaction Time	0.5	n/a	1	0.5	n/a		
c	Before mission PMCS	1	n/a	1	1	n/a		
d	Travel – motor pool to operations area	0.2 hrs	5 miles	1	0.2	5 miles		8.2 hours (OT)
Begin Dump Cycles								
e	Travel to Load Site	0.6 hrs	15 miles	4	2.4	60 miles	6.2 hours	
f	Loading, including time waiting to load (Idle)	10.2 min 0.17 hrs	n/a		0.7	n/a		
g	Travel to Dump Site	0.6 hrs	15 miles		2.4	60 miles		
h	Unloading, including time waiting to unload	10.2 min 0.17 hrs	n/a		0.7	n/a		
End Dump Cycles								
i	Idle Time During Mission (meals, etc)	1 hrs	n/a	1	1 hrs	n/a		
j	Travel – Dump site to motor pool	0.8 hrs	20 miles	1	0.8	20 miles		
k	After mission PMCS	0.5	n/a	1	0.5	n/a		
					24 hrs	145 miles		

*1 Average travel speed is assumed to be 25 mph

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Table 6. Typical Daily Peacetime Mission for Quarry Units.

	Task	Task Time (hrs per task)	Task Miles (miles per task)	Task Frequency	Daily Time (hours)	Daily Miles		
a	Standby Time Between Missions	13.4	n/a	1	13.4	n/a		
b	Reaction Time	0.5	n/a	1	0.5	n/a		
c	Before mission PMCS	1	n/a	1	1	n/a		
d	Travel – motor pool to quarry	0.2 hrs	5 miles	1	0.2	5 miles		8.6 hours (OT)
Begin Dump Cycles								
e	Travel to Load Site	4.8 min 0.08 hrs	0.6 miles	30	2.4	18	7.2 hours	
f	Loading, including time waiting to load (Idle)	2.4 min 0.04 hrs	n/a		1.2			
g	Travel to Dump Site	4.8 min 0.08 hrs	0.6 miles		2.4	18		
h	Unloading, including time waiting to unload	2.4 min 0.04 hrs	n/a		1.2			
End Dump Cycles								
i	Idle Time During Mission (meals, etc)	1 hrs	n/a	1	1 hrs	n/a		
j	Travel – Quarry to motor pool	0.2 hrs	5 miles	1	0.2	5 miles		
k	After mission PMCS	0.5	n/a	1	0.5	n/a		
					24 hrs	46 miles		

* Average travel speed is assumed to be 25 mph to/from Motor Pool; 7.5 mph within Quarry

1.5. Environmental Conditions.

a. Climatic Design Type

Hot	35%
Basic	60%
Cold	5%

b. Movement Terrain, non-Quarry units

Tactical-Standard Mission Rating Speed (MRS) for the Central Europe Scenario as follows:

	Percent Use	Speed
Primary Roads	20%	65 MPH
Secondary Roads	50%	25 MPH
Trails	15%	10 MPH
Off road	15%	5 MPH

Tactical-Standard MRS for the Mid-East Scenario as follows:

	Percent Use	Speed
Primary Roads	15%	65 MPH
Secondary Roads	35%	25 MPH
Trails	35%	10 MPH
Off road	15%	5 MPH

PRYOR: this works out to be 22.75 mph

Max Payload for Primary and Secondary Roads will by 22.5 tons (Threshold)/27 tons (Objective)

Max Payload for Trails and Off Road will by 15 tons (Threshold)/20 tons (Objective)

c. Movement Terrain, Quarry units. Quarry units also operate on slopes/grades of (40)% during quarrying operations.

Primary Roads	20%	65 MPH
Secondary Roads	50%	25 MPH
Trails	15%	10 MPH
Off road	15%	5 MPH

1.7 Assumptions.

a. The wartime operations day (WOD) is 24 hours per day, 7 days per week, with 1 day every two weeks for Reset / Reconstitution, for a total of 334 days per year. Standby time (operator rest time) is a minimum of 4 hours per day.

b. The peacetime operations day (POD) is 10 hours per day, 230 days per year.

c. Troops are not hauled in the cargo area for safety reasons.

1.8. Explanation of Tasks.

a. Hauling - Transporting aggregate, hot mix asphalt, or **equipment** from one location to another. Hot mix asphalt is transported from the asphalt plant to the job site, where the mix is typically dumped into the hopper of an asphalt paver. Additionally, the HDT is used to transport organic equipment from one location to another e.g. Tool Boxes, small generators, power tools.

b. Tailgate Spreading - Distributing aggregate from the rear of the truck by partially dumping the contents while moving slowly at a uniform pace so as to cause the contents to be spread evenly behind the vehicle.

c. Scheduled Maintenance - Typical routine service of the HDT to include changing fluids and filters, inspection and lubrication of moving parts, and inspection, cleaning of wearing and contact surfaces, and replacement of major items as part of the scheduled restoration of the item.

d. Alert Time - Operationally ready and preparing to perform a given mission - includes Reaction Time, the amount of time that is needed for the unit to initiate the mission once the command to perform the mission is received.

e. Standby Time - Operationally ready but not committed to a mission.

f. Movement Time. Time the HDT is traveling under its own power to and from a mission; moving around the job site; hauling aggregate or equipment; and performing tailgate spreading.

g. All operations are performed in accordance with those specified in Combined Arms Training Strategy (CATS) task # (05-TS-4467) and (05-TS-4469).

1.9. Definition of Movement Terrain.

a. Primary Roads - Two or more lanes, all-weather, maintained, hard surface roads with good driving visibility used for heavy and high density traffic. These roads have lanes with a minimum width of 2.7 m (9 ft.) and the legal maximum GVW/gross combined weight for the country or state is assured for all bridges. Surface roughness values ranges from 0.1 inch RMS to 0.3 inch RMS.

b. Secondary Roads/Trails - Two lane, all-weather, occasionally maintained, hard or loose surface (paved, crushed rock, gravel) roads intended for medium-weight, low density traffic. These roads have lanes with a minimum width of 2.4 m (8 ft.) and no guarantee that the legal maximum GVW/gross combined weight for the country or state is assured for all bridges. Surface roughness values ranges from 0.1 inch RMS to 0.6 inch RMS.

c. Trails - One lane, dry weather, unimproved, seldom maintained, loose surface roads intended for low-density traffic. Trails have a minimum lane width of 2.4 m (8 ft.), no large obstacles (boulders, stumps, logs…) and no bridging. Surface roughness values ranges from 0.1 inch RMS to 2.8 inch RMS.

d. Off-Road - Vehicle operations over virgin terrain which has no previous traffic (Cross-Country), and over combat and pioneer trails. Surface roughness values ranges from 0.6 inch RMS to 4.5 inch RMS.

DRAFT ATPD 2375

APPENDIX B

Rail Impact Test Procedure

This procedure is intended to test materiel that will be transported by rail; to determine the effect of normal railroad car impacts that occur during rail shipment, to verify the structural integrity of the materiel, and to evaluate the adequacy of the tiedown system and the tiedown procedures. All items will be tested at their maximum gross weight (fully loaded) rating unless otherwise specified in the transportability requirements for the materiel. This procedure is not intended for the separate testing of small, individually packaged pieces of materiel that would normally be shipped (and tested) when mounted on a pallet, or as part of a larger materiel. For tests such as these, the references provide guidance on environments measured during rail impact that may be useful in separate laboratory testing of such items.

5.7 Procedure VII - Rail Impact

5.7.1 Controls. The Department of Defense (DoD) uses this test to determine the effect of normal railroad car impacts that occur during rail shipment, to verify the structural integrity of the materiel, and to evaluate the adequacy of the tiedown system and the tiedown process.

a. Test facility/equipment:

(1) Buffer railcars. Empty cars are preferred for use as the buffer or struck cars. However, loaded cars may also be used with prior approval by the Director, Military Traffic Management Command Transportation Engineering Agency (MTMCTEA), ATTN: MTTE-DPE, 720 Thimble Shoals Blvd., Suite 130, Newport News, VA 23606-2574. (MTMCTEA [SDDCTEA] is the designated DoD agent for land transportation (AR 70-44)). In either case, the total weight of the buffer cars is to be at least 250,000 lbs. The first buffer car must be a standard draft gear car. The remaining buffer cars should have standard draft gear, if possible. The following are required to perform the rail impact test:

(2) A test railcar, equipped with chain tiedowns and end-of-car cushioned draft gear, unless other railcar types are approved by MTMCTEA. Some materiel may require other types of railcars for testing to be representative of the intended shipping methods.
NOTE: Cushioned draft gear is a significant change from previous equipment requirements.

(3) One locomotive.

(4) A minimum 200 foot length of reasonably level, tangent track is required between the buffer cars and test car to allow acceleration of locomotive and test car to specified impact speeds.

(5) If the alternate procedure (paragraph 5.7.2b) is used to conduct the test, use a tangent track with a slight grade in lieu of a locomotive.

b. Preparation for test.

(1) Load and secure the test item as would be done for actual rail transport. If safety or other reasons preclude the use of a test item representative of the actual materiel, use a substitute test item that is equal in weight and general character to the materiel. Prior to using a substitute test item, obtain approval from MTMCTEA.

(2) The materiel developer is responsible for the development of transportation procedures and instructions and shall coordinate these with and obtain approval from MTMCTEA well in advance of rail impact testing. Mount the test item as would be done in actual service and in accordance with the standard loading and bracing methods shown in Section No. 6 of the Rules Governing the Loading of Department of Defense Materiel on Open Top Cars (procure copies from the Publications Department, Association of American Railroads, 50 F Street N. W., Washington, DC 20001, (202) 639-2211). Do not use more than four tiedown provisions, typically two at each end of the test item. Apply the first tiedown from each provision as near as possible to, but without exceeding 45 degrees from the horizontal (when viewed from the side). Apply additional tiedowns to the next available tiedown point on the flatcar. Apply chains to the railcar near side (do not cross chains). All tiedown procedures require approval by MTMCTEA prior to testing. Only use an arrangement of the test item and its blocking and tiedown to be tested that is identical to that proposed or approved by MTMCTEA (SDDCTEA).

(3) Unless otherwise specified in the transportability requirements for the materiel, perform the test with the test item at its maximum gross weight (fully loaded) rating.

c. Test setup.

(1) Buffer cars must have their air and hand brakes set. This provides a more conservative test. Cars must be bunched to compress all slack and cushioning in the couplings, if any. The struck end of first buffer car must have standard draft gear.

(2) Locate the test car between the buffer cars and the locomotive.

(3) Install one of the following timing devices (or equivalent) to obtain the impact speed of the test car.

(a) An electric timer capable of measuring within + 0.1 mph: Place the switch contacts on the track in accordance with manufacturer's instructions.

(b) A stop watch and torpedoes: when used, measure the torpedo locations. Place the first torpedo beyond the face of the knuckle on the first buffer car and located one foot more than the distance between the leading axle and knuckle face on the test car. Place the second torpedo 22 feet along the track from the first torpedo. The relationship of time lapse versus speed for travel of a distance of 22 feet is shown in Table 516.5-I.

(c) Radar: In order to obtain an accurate speed, position the operator of the radar in line with the direction of impact or as otherwise recommended by the radar manufacturer.

(4) Photograph the test setup including any securement items. This may be a valuable tool if there is any subsequent failure of the items of securement.

5.7.2 Procedure VII

a. General Considerations for Main Procedure.

(1) Brief the train crew on the procedure. Delegate one person to advise the appropriate member of the train crew when moves are to be made. Instruct all participants and observers to take precautions for their personal safety and observe safety practices of the carrier and/or company conducting the test. If desired, perform a test run without impacting the test item to establish accuracy of speed.

(2) Subject the test item to four impacts, the first three of which are in the same direction and at speeds of 6.4, 9.7 and 13 km/h (4, 6 and 8 mph) respectively, each speed with a tolerance of +0.8, -0.0 km/h (0.5 mph).

(3) Perform the fourth impact at 13 km/h (+0.8,-0.0 km/h) and impact the opposite end of the test car from the first three impacts. If it is not possible to turn the test car because of track layout, this may be accomplished by running the test item car to the opposite end of the buffer cars and impacting as above.

(4) If the lading or securement items loosen or fail during the test, photograph and document these items. If it appears necessary to adjust the lading or securement items to continue the test, restart the test beginning with the 4 mph impact.

(5) Pull the rail car carrying the test item a sufficient distance from the buffer cars. Next, push the test load car toward the buffer cars until the desired speed is obtained, and release it so it rolls freely into the buffer cars having knuckles positioned for coupling.

TABLE 516.5-I. IMPACT TEST TIME-SPEED

(miles per hour - based on 22'0" rail)

TIME SPEED secs. - mph	TIME SPEED secs. - mph	TIME SPEED secs. - mph	TIME SPEED secs. - mph
1.0 - 15.0	4.0 - 3.8	7.0 - 2.1	10.0 - 1.5
1.1 - 13.6	4.1 - 3.7	7.1 - 2.1	10.1 - 1.5
1.2 - 12.5	4.2 - 3.6	7.2 - 2.1	10.2 - 1.5
1.3 - 11.5	4.3 - 3.5	7.3 - 2.0	10.3 - 1.5
1.4 - 10.7	4.4 - 3.4	7.4 - 2.0	10.4 - 1.4
1.5 - 10.0	4.5 - 3.3	7.5 - 2.0	10.5 - 1.4

1.6 - 9.4	4.6 - 3.3	7.6 - 2.0	10.6 - 1.4
1.7 - 8.8	4.7 - 3.2	7.7 - 1.9	10.7 - 1.4
1.8 - 8.3	4.8 - 3.1	7.8 - 1.9	10.8 - 1.4
1.9 - 7.9	4.9 - 3.1	7.9 - 1.9	10.9 - 1.4
2.0 - 7.5	5.0 - 3.0	8.0 - 1.9	11.0 - 1.4
2.1 - 7.1	5.1 - 2.9	8.1 - 1.9	11.1 - 1.4
2.2 - 6.8	5.2 - 2.9	8.2 - 1.8	11.2 - 1.3
2.3 - 6.5	5.3 - 2.8	8.3 - 1.8	11.3 - 1.3
2.4 - 6.3	5.4 - 2.8	8.4 - 1.8	11.4 - 1.3
2.5 - 6.0	5.5 - 2.7	8.5 - 1.8	11.5 - 1.3
2.6 - 5.8	5.6 - 2.7	8.6 - 1.7	11.6 - 1.3
2.7 - 5.6	5.7 - 2.6	8.7 - 1.7	11.7 - 1.3
2.8 - 5.4	5.8 - 2.6	8.8 - 1.7	11.8 - 1.3
2.9 - 5.2	5.9 - 2.5	8.9 - 1.7	11.9 - 1.3
3.0 - 5.0	6.0 - 2.5	9.0 - 1.7	12.0 - 1.3
3.1 - 4.8	6.1 - 2.5	9.1 - 1.6	12.1 - 1.2
3.2 - 4.7	6.2 - 2.4	9.2 - 1.6	12.2 - 1.2
3.3 - 4.5	6.3 - 2.4	9.3 - 1.6	12.3 - 1.2
3.4 - 4.4	6.4 - 2.3	9.4 - 1.6	12.4 - 1.2
3.5 - 4.3	6.5 - 2.3	9.5 - 1.6	12.5 - 1.2
3.6 - 4.2	6.6 - 2.3	9.6 - 1.6	12.6 - 1.2
3.7 - 4.0	6.7 - 2.2	9.7 - 1.5	12.7 - 1.2
3.8 - 3.9	6.8 - 2.2	9.8 - 1.5	12.8 - 1.2
3.9 - 3.8	6.9 - 2.2	9.9 - 1.5	12.9 - 1.2

(6) If the materiel can be shipped in two orientations (such as lengthwise and crosswise on the rail car), repeat the four impacts for each orientation.

b. General Considerations for Alternate Procedure.

(1) A section of track can be calibrated using a test car and either radar or another speed-measuring device. Release the test car from the designated starting point and allow it to roll freely down the inclined track. For radar, a crew member riding the test car is in radio contact with the radar operator who reads off the car speed to the rider. For other than radar, follow the same concept. The rider drops markers at track-side to indicate locations at which the desired speeds are obtained. After determining the 8 mph mark, stop the test car by use of the hand brake. Ensure no other cars are present on the test track during the calibration process. Repeat the process two times to ensure the accuracy of speed locations. If it is difficult for the rider to safely drop the markers and stop the car using the hand brake, use a free rolling locomotive for the initial calibration when markers are dropped with the locomotive's brakes applied after reaching 8 mph as indicated by radar. Then release the test car from the same starting point and make adjustments in markers if needed prior to impacting.

(2) After determining speed locations, perform impacts by locating the buffer cars at the proper location for desired impact speed and releasing the test car from the designated starting point. This requires moving the buffer cars every time a different speed is required.

(3) Speeds and the direction of impacts shall be the same as outlined in 5.7.2a.

(4) In lieu of positioning of the buffer cars at various positions on the track, release the test car from calibrated positions on the inclined track that correspond to the desired speeds.

(5) If the lading or securement items loosen or fail during the test, photograph and document these items. If it appears necessary to adjust the lading or securement items to continue the test, restart the test beginning with the 4 mph impact.

NOTE: Cargo requiring extraordinary attention, e.g., nuclear, one-of-a-kind, high value, or key military equipment, may justify changes to the test procedure and criteria; these shall be identified by the developer or Program Manager, and approved by the Director, Military Traffic Management Command Transportation Engineering Agency (MTMCTEA), ATTN: MTTE-DPE, 720 Thimble Shoals Blvd., Suite 130, Newport News, VA 23606-2574 (or its European equivalent).

c. Additional requirements.

(1) The materiel developer is responsible for the development of transportation procedures and instructions and shall coordinate these with and obtain approval from MTMCTEA well in advance of rail impact testing. Mount the test item as would be done in actual service and in accordance with the standard loading and bracing methods shown in Section No. 6 of the Rules Governing the Loading of Department of Defense Materiel on Open Top Cars (procure copies from the Publications Department, Association of American Railroads, 50 F Street N. W., Washington, DC 20001, (202) 639-2211). Do not use more than four tiedown provisions, typically two at each end of the test item. Apply the first tiedown from each provision as near as possible to, but without exceeding 45 degrees from the horizontal (when viewed from the side). Apply additional tiedowns to the next available tiedown point on the flatcar. Apply chains to the railcar near side (do not cross chains). All tiedown procedures require approval by MTMCTEA prior to testing. Only use an arrangement of the test item and its blocking and tiedown to be tested that is identical to that proposed or approved by MTMCTEA.

(2) Repeat any impacts that are below the required test speeds. If any readjustment of the lading or reconditioning of the bracing or items of securement is necessary, correct, photograph and document the problem(s), correct the restraint and restart the entire test beginning with the 4 mph impact. Accept any impacts above the required test speed providing the test item satisfies the requirements of 5.7.3.

(3) If the tiedown chains or chock blocks become loose during the test, photograph and document the problem(s). The test director will notify MTMCTEA of the modifications required, and jointly decide if a retest will be required.

5.7.3 Analysis of Results. The test item fails this test if the test item or any item that is attached to it or that is included as an integral part of the test item breaks free, loosens or shows any sign of permanent deformation beyond specification tolerances. Likewise, the test item and its subassemblies must be operationally effective after the test. If tiedown securement items break or displace substantially, photograph and document the problem areas for evaluation of the procedures and materials used. The test director and MTMCTEA jointly decide if any failed securement items require reconfiguring and, if so, whether a complete retest is required. If the test item fails, the necessary required action will be determined jointly by the parties involved. For retests, use new tiedown material to eliminate additive effects and, if possible, a new test item.

ANNEX C

I. Classified Mine-Resistant, Ambush-Protected (MRAP) Capabilities Production Document (CPD) Version 1.1 (Threshold)

APPENDIX D

I. Fuel Tank Protection

APPENDIX E

I. ATPD 2352T (Transparent Glass Class 3A)