

INCH-POUND
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SUPERSEDING
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MILITARY SPECIFICATION

TRUCKS, STRADDLE-CARRY, DIESEL, 30,000 POUNDS (13,605 kg) CAPACITY,
PNEUMATIC RUBBER TIRES,

GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers industrial duty, diesel powered, pneumatic rubber tires straddle-carry trucks.

1.2 Classification. Straddle trucks shall be classified by the following parameters and as specified for each truck (see 6.2):

- (a) Truck minimum inside frame width (inches) (mm).
- (b) Truck maximum overall height without rated load (inches) (mm).
- (c) Truck maximum length without shoes (inches) (mm).
- (d) Truck maximum outside width (inches) (mm).
- (e) Truck maximum outside turning radius (feet) (M).
- (f) Truck shoe length (feet) (mm) - plus or minus 1/4 inch (mm)).
- (g) Truck minimum shoe width (inches) (mm).
- (h) Pallet load width (inches - plus or minus 1/4 inch (7 mm)).
- (i) Pallet load height when on ground (inches - plus or minus 1/4 inch (7mm)).

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following specifications, standards, and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Navy Ships Parts Control Center, Post Office Box 2020, Attention: Code 0361, Mechanicsburg, Pennsylvania 17055-0788 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

ASMC A6775

FSC 3930

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MIL-T-16101E

SPECIFICATIONS

FEDERAL

GG-P-455 Plates and Foils, Photographic (Photosensitive Anodized Aluminum)

QQ-P-416 Plating, Cadmium (Electrodeposited)

MILITARY

MIL-V-173 Varnish, Moisture and Fungus Resistant

MIL-P-514 Plates, Identification, Instruction and Marking, Blank.

MIL-L-2104 Lubricating Oil, Internal Combustion Engine, Heavy-duty.

MIL-G-3859 Grease guns, Hand, High Pressure, Lever Operated, Cartridge and Bulk Loading

MIL-M-3971 Meters, Time Totalizing, Non-Hermetically Sealed, Electric, AC and DC

MIL-W-5044 Walkway Compound, Nonslip Walkway Matting, Nonslip

MIL-F-16884 Fuel, Naval Distillate

MIL-H-17672 Hydraulic Fluid, Petroleum, Inhibited

MIL-E-52649 Engine Cold Starting Aid, Ether Fuel Primers

MS-35844 Plug, Machine Thread, Magnetic, (Drain)

MS-49006 Plug, Pipe, Magnetic-headless, Aluminum, Iron Or Steel

STANDARDS

FEDERAL

FED-STD-H28 Screw Threads Standards for Federal Services

FED-STD-595 Color

MILITARY

MIL-STD-129 Marking for Shipment and Storage

MIL-STD-130 Identification Marking for U.S. Military Property

MIL-STD-162 Material Handling Equipment, Preparation for Shipment, Storage, Cyclic Maintenance, Routine Testing and Process

MIL-STD-209 Slings and Tiedown Provisions for Lifting

MIL-T-16101E

MIL-STD-1474 Noise Limit For Army Material

(Unless otherwise indicated, copies of federal and military specifications, standards and handbooks are available from the Naval Publications and Forms Center, Attn: NPODS, 5801 Tabor Avenue, Philadelphia, Pa. 19120-5099)

2.2 Non-Government Publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents which are cited in the solicitation (see 6.2).

Underwriters Laboratories (UL)

Standard for Safety UL 558, "Internal Combustion Engine-Powered Industrial Trucks

(Applications for copies should be addressed to: Underwriter's Laboratories Inc., 333 Pfingsten Road, Northbrook, Illinois 60062)

Society of Automotive Engineers (SAE)SAE Handbook

SAE J20	Coolant System Hoses
SAE J96	Flashing Warning Lamp for Industrial Equipment
SAE J154	Operator Enclosures Human Factor Design Considerations
SAE J180	Electrical Charging Systems for Construction and Industrial Machinery
SAE J185	Access Systems for Off-road Machines
SAE J198	Windshield Wiper Systems - Trucks, Buses, and Multipurpose Vehicles
SAE J209	Instrument Face Design and Location for Construction and Industrial Equipment
SAE J297	Operator Controls on Industrial Equipment
SAE J492	Rivets & Riveting
SAE J514	Hydraulic Tube Fittings
SAE J516	Hydraulic Hose Fittings (SAE 100R5)
SAE J517	Hydraulic Hose

MIL-T-16101E

SAE J518	Hydraulic Flanged Tube, Pipe, and Hose Connections, 4-Bolt Split Flange Type
SAE J524	Seamless Low Carbon Steel Tubing Annealed for Bending and Flaring
SAE J525	Welded and Cold Drawn Low Carbon Steel Tubing Annealed for Bending and Flaring
SAE J534	Lubrication Fittings
SAE J536	Hose Clamps
SAE J537	Storage Batteries
SAE J541	Voltage Drop for Starting Motor Circuits
SAE J551	Performance Levels and Methods of Measurement of Electromagnetic Radiation from Vehicles and Devices (20-1000 MHz)
SAE J553	Circuit Breakers
SAE J636	V-belts and Pulleys
SAE J760	Dimensional Specifications for General Service Sealed Lighting Units
SAE J833	USA Human Physical Dimensions
SAE J845	360 Degree Emergency Warning Lamp
SAE J898	Control Locations for Off-Road Work Machines
SAE J899	Operator's Seat Dimensions for Off-road Self-Propelled Work Machines
SAE J917	Marine Push-Pull Control Cables
SAE J925	Minimum Access Dimensions for Construction and Industrial Machinery
SAE J994	Alarm, Backup, Electric, Performance, Test and Application
SAE J1105	Horn, Forward Warning, Electrical, Performance, Test, and Application
SAE J1127	Battery Cable
SAE J1362	Symbols for Controls, Indicators and Tell-tales for Off-Road, Self-Propelled Work Machines

MIL-T-16101E

SAE J1383	Performance Requirements for Motor Vehicle Headlamps
SAE J1395	Turn Signal Lamps for Use on Motor Vehicles 2032 mm or More Width
SAE J1398	Stop Lamps for Use on Motor Vehicles 2032 mm or More Width
SAE J1944	Truck & Bus Multipurpose Vehicle Windshield Washer System

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pennsylvania 15096-0001).

Tire and Rim Association

YEAR BOOK
The Tire and Rim Association, Inc.

(Application for copies should be addressed to the Tire and Rim Association, Inc., 3200 West Market Street, Akron, Ohio 44313).

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM B633 - Electrodeposited Coatings of Zinc on Iron and Steel

(Application for copies should be addressed to the American Society for Testing and Materials, 1961 Race Street, Philadelphia, Pennsylvania 19103).

DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

29 CFR, Chapter XVII, Part 1910.
Occupational Safety and Health Standards

(Application for copies should be addressed to the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402).

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)

Z 26.1 - -Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways

(Applications for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10017.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however,

MIL-T-16101E

shall supercede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First Article. When specified (see 6.2), a sample (first produced) shall be subjected to first article inspection (see 6.2) in accordance with 4.3.

3.2 Design. Straddle truck shall be designed for the lifting and transporting the rated load when travelling at the speed specified herein. No adjustments or deration to the rated load will be permitted due to lift height, travel speed, tire load ratings, wheel suspension or truck weight. Design of trucks covered by this specification and all components specified herein shall insure safe operation around warehouses and terminals over rough paved road surfaces and railroad crossings. Truck shall be designed to permit selection and operation of travel, lift, and steering separately, simultaneously or combinations thereof.

3.3 Environmental Requirements.

3.3.1 Ambient operating Temperature. The engine shall start within 5 minutes and the truck shall operate as specified herein within 15 minutes after engine start in any ambient temperature from 0° F (minus 14° C) to plus 115° F (43° C).

3.3.2 Rain. The truck shall start within 5 minutes and operate as specified herein when subjected to a rainfall of not less than 4 inches (100 mm) per hour for a period of one hour without malfunction of any electrical component, gage or instrument; without leakage of water in the air-intake filter; and without leakage of water into the torque converter oil chamber, engine crankcase sump, transmission, instruments, gages, or fuel tank.

3.3.3 Saline spray and atmosphere. The truck shall be protected from ocean spray and atmosphere to prevent corrosion and loss of performance as specified herein.

3.4 Safety. The truck shall conform to the requirements of UL558 Type "D" and OSHA Standards. All exposed parts subject to high operating temperatures or energized electrically shall be located, insulated, enclosed, or guarded so as to prevent hazards to operating personnel. All moving parts which are of such nature or so located as to be a hazard to operating and maintenance personnel shall be enclosed or guarded. There shall be no exposed bolts, clamps, gages, fittings, lifting attachments, or appendages that can be caught or hooked while the truck is in operation. Protective devices shall not impair operating functions.

3.5 Human Factors Engineering. The characteristics of the truck shall provide for operation by personnel ranging from the small man (5%), clothed, through the large man (95%), clothed, in accordance with SAE J833.

3.6 Lubrication. All surfaces requiring lubrication shall be provided with a means for replenishing or replacing the lubricant.

3.6.1 Lubrication Fittings. Lubrication fittings shall conform to SAE J534. Fittings shall be located in a protected position and shall be accessible to a

MIL-T-16101E

hand-operated grease gun conforming to MIL-G-3859 with a 10-inch flexible extension. Accessibility to fittings shall be provided without requiring the removal or adjustment of accessories or parts.

3.7 Maintainability. Provisions and clearances shall be made for lubrication, adjustment, servicing, or replacement of all truck components subject to wear or maintenance. Clearances for removing and replacing all truck filters shall be provided. Truck engine cowl, hood, and side plates may be opened to facilitate filter replacement. The truck shall not require scheduled maintenance at intervals of less than eight hours. Reservoir fluid level checks will not be considered scheduled maintenance.

3.7.1 Access openings. When hand-access openings are used on the exterior of the truck, the edge of the opening shall be smooth and shall be provided with a removable or hinged cover, whenever it is required. Dimensions of access openings shall be in accordance with SAE J925 for a bare or normal clothed hand.

3.7.2 Drainage. Coolant and lubricants from the hydraulic system reservoir, service brake system, steering system, transmission housing or reservoir, and engine shall be capable of drainage into a container located on the ground without spillage on any part of the truck. Draincock(s) shall be furnished for complete drainage of the cooling system. When drains are located over other parts of the truck, integral tubes, pipes, troughs, or other means shall be used to convey the coolant or lubricant from the drain to the container. Drains shall be accessible without the removal or adjustment of accessories or parts other than opening covers. Drainholes with removable drainplugs or covers shall provide for complete drainage of all reservoirs and driveline housings without disconnecting hose(s). Each enclosure shall be equipped for draining. The drain outlet shall be fitted with a magnetic drain plug having either tapered pipe threads or shoulder and gasket, and size shall conform to MS35844 or MS49006. In lieu of a magnetic drain plug, a separate magnetic device shall be fastened inside the enclosure at or near the bottom and shall be removable for cleaning without removal of other parts or components. Each drain plug or valve shall be located so that removal of the plug or valve will result in complete drainage of the fluid from the enclosure (except torque converter).

3.7.3 Replenishment. Each enclosure shall be equipped for filling. The hydraulic system reservoir, steering system, service brake system, transmission housing or reservoir, and engine shall be equipped with not less than a 3/4 inch (75 mm) diameter fill port and with dipsticks or visible level indicators to determine fluid level. As a minimum, dipsticks or visible level indicators shall be graduated with two marks indicating full and add levels. Dipsticks shall be accessible without the use of hand tools.

3.8 Screw Threads. Screw threads shall be in accordance with FED-STD-H28.

3.9 Plating. All threaded fasteners, washers and cotter pins required to fabricate the truck, except those in contact with oils in reservoirs and those inside corrosion resistant components shall be zinc plated, cadmium plated or made of corrosion resisting material. Zinc plating shall be in accordance with ASTM B633, type II, SC 3 and cadmium plating shall be in accordance with QQ-P-416, type II, class 2.

MIL-T-16101E

3.10 Bearings. Rotating parts shall be mounted on ball, needle, roller or tapered bearings to the extent normally provided in standard commercial practice. Bearing load capacity, including applicable safety and life factors, as recommended by the bearing manufacturer, shall be equal to or greater than maximum bearing loading required by the performance requirements specified herein.

3.11 Fungus and moisture resistance. The truck electric circuitry, including all components and connections, shall be protected from the effects of saline moisture and fungus growth by an overall treatment with a varnish conforming to MIL-V-173 with the following exceptions that: (a) Components or circuit elements that are inherently fungus and moisture resistant or which are hermetically sealed need not be treated; (b) Components or circuit elements whose functions will be adversely affected by the varnish coating shall not be treated. When used, the varnish shall be applied by spray, brush, or a combination of both to give a minimum dry-film thickness of .001 inch (.03 mm) to component or element surfaces previously cleaned and prepared so that the surfaces are free from all foreign matter which would interfere with the adherence or function of the varnish.

3.12 Engine. The engine shall be diesel, two or four cycle, water cooled, industrial type capable of operating on fuel conforming to Naval Distillate Fuel (F-76) conforming to MIL-F-16884. The power and speed rating of the engine shall be such that operation of the truck, under any of the operational requirements and conditions specified herein, will not require horsepower in excess of the intermittent horsepower rating of the engine for the applicable governed speed as established by the engine manufacturer. All other requirements including electromagnetic interference suppression, cooling system, fuel system, starting system and accessories shall be as specified herein. The engine shall be provided with a 12-volt starting and charging system.

3.12.1 Alternator. An alternator to charge the battery and in accordance with SAE J180 (except EMI paragraphs 4.4 shall be disregarded) shall be provided. It shall have output capacity sufficient to meet the electrical load required by the engine and to support the complete truck electrical system and accessories furnished with the vehicle plus a 25 percent reserve capacity. The alternator shall not utilize externally mounted selenium rectifiers. The alternator shall be driven by single or multiple V-belts in accordance with SAE J636 to provide full alternator output at all engine speeds without belt slippage. A protective device shall be provided and matched electrically to the alternator so that the vehicle's electrical system including alternator is protected from damage when incorrect polarity is applied or arc welding maintenance repairs are performed anywhere on the equipment. Fuses are not acceptable. In lieu of a protective device to protect truck electrical system from arc welding repairs, a master manual electrical system switch may be provided.

3.12.1.1 Alternator regulator. An alternator regulator shall be supplied if required by the alternator and electrical system design. Provision shall be made within the electrical system for alternator voltage regulation, current limiting to protect alternator enclosed diodes or the alternator, disconnection of circuit to the alternator rotor when the starting switch is off, actuation of ammeter or charge indicator lamps and field current relay switch to prevent rotor current from passing through the ignition switch where applicable.

MIL-T-16101E

3.12.2 Starting system. The engine starting system shall include battery or batteries, starting motor solenoid, starting motor, necessary wiring and cable, and starting motor switch. Trucks shall be provided with an interlock in the starting system which prevents energizing the starter motor except when the directional control lever is in the neutral position and when the engine is not running. Cranking torque of the starting motor shall be sufficient to start the engine with battery specified for the truck when both engine and battery are exposed to the temperature specified herein. Starting system circuit voltage drop shall not exceed the drops indicated in SAE J541.

3.12.2.1 Battery. Truck shall be furnished with 12 volt maintenance free type battery or batteries capable of meeting the cold cranking requirement of the engine when exposed to the environmental requirements specified herein and in conformance with SAE J537. The term "Maintenance Free" is defined as a battery that does not require the addition of water or electrolyte during the expected battery life.

3.12.2.2 Battery mounting. Battery mounting shall provide for complete support over the entire base of the battery and shall be in such a position that the top of the battery(ies) is visible without removing the battery from its mounting bracket or requiring the use of tools. Battery restraining clamps shall be furnished to hold the battery in a fixed position and shall not be designed for or dependent upon special battery shapes. Battery mounting shall be either under the engine hood or in an outside compartment such that the battery may be removed without interference with any other truck component. A battery mounted under the engine hood shall be located in such a manner as not to interfere with access to engine components or accessories or provision(s) shall be made to swing battery out of the way.

3.12.2.3 Battery enclosure. A battery mounted in a outside compartment shall be housed in an individual acid resistant finished metal or polyethelene plastic box . The metal or polyethelene plastic box shall be fitted with a quick release cover to provide for inspection and servicing , hold-down clamps and short circuit protection in accordance with UL Safety Standards. Metal or polyethelene plastic shall be of sufficient strength to support the weight of the battery(ies) without deflection. The polyethelene box shall be constructed of seamless, hi-density polyethelene plastic and shall be resistant to battery electrolyte. The metal box shall require provisions for drainage. The interior of the metal box shall be finished with an acid resisting material and the exterior shall be finished the same as the exterior surfaces of the truck. Either type box shall provide adequate means for ventilation to prevent the accumulation of hydrogen gas.

3.12.2.4 Battery cable. Battery cables shall conform to SAE J1127. Battery terminals on the ends of cables connected to the battery shall be clamp-type, secured with a bolt and nut to facilitate disconnection and battery removal.

3.12.3 Fuel system. The fuel system shall include a fuel transfer pump, fuel strainer, fuel filter, and a fuel injection pump with provisions for priming. Fuel lines shall provide continuous operation at full throttle, with rated load when traversing the slope specified herein. Other construction and design details shall be in accordance with Underwriters' Laboratories, Inc., Publication UL 558, Type "D".

MIL-T-16101E

3.12.3.1 Fuel tank. The tank shall be equipped with a safety filler cap assembly which shall incorporate a self-closing cap, screw-locking device, removable strainer and provide for padlocking. The cap assembly and the neck of the fuel tank shall be threaded and when installed, the cap shall not be removable without the use of hand tools. The filler-neck opening shall not be less than 2 inches in (50 mm) diameter and shall be located such that the tank can be filled from a 5 gallon (litres) can. The fuel tank shall be equipped with a stand pipe or other suitable means at the fuel line inlet to prevent foreign matter from entering the fuel line and to prevent drawing fuel from bottom of tank. The fuel tank shall be equipped with a magnetic drain plug at the lowest point of the tank. The drain plug shall be removable with hand tools without the removal of any other component and protected by position or otherwise from external damage. A shut-off valve shall be located immediately adjacent to the fuel tank.

3.12.3.2 Fuel strainer, filter and water separator. A fuel filter with replaceable element(s) and a water separator shall be provided in the fuel system. A fuel strainer shall be located between the fuel tank and the fuel pump.

3.12.4 Air filter. The engine air intake manifold shall be provided with a replaceable, dry, type air cleaner having a capacity sufficient to allow the engine to operate under all conditions specified herein. The air cleaner shall be located or designed to prevent water from entering the cleaner when the vehicle is operated as specified herein. The air cleaner shall be constructed to permit replacement of filter element(s) without the requiring the use of a tool(s).

3.12.5. Air filter restriction indicator. A dirty filter restriction indicator shall be furnished and shall be mounted for unobstructed visibility.

3.12.6 Cooling System. The engine cooling system shall be the closed-pressure type, incorporating a radiator, radiator pressure cap, hoses, thermostat, fan, and circulating pump. The cooling system shall maintain an air-to-boil temperature of greater than 110°F when tested as specified herein.

3.12.6.1 Fan. The fan shall rotate on bearings and be driven by a single or matched multiple V-belts in accordance with SAE J636 or a thermostatically controlled electric motor. Fan belts adjustment (take-up) shall be at least 3 percent of the belt circumferential length, plus an allowance for replacment of new belts without forcing.

3.12.6.2 Thermostat(s). The thermostat(s) temperature range and pressure rating shall be in accordance with the engine manufacturer's recommendations. The thermostat(s) shall be removable by the use of handtools.

3.12.6.3 Radiator. The radiator assembly shall consist of a fin and tube-type core with an expansion tank and sediment tank. Where the top of the radiator is lower than the top outlet of the engine, a surge tank shall be used. The radiator shall be mounted in a manner to prevent its being damaged due to shock and vibration experienced in the operation of the truck as specified herein. The radiator shall be protected by either position or guards to prevent damage to the radiator and radiator fins. The radiator shall include provisions to prevent reverse airflow back into the engine compartment. The

MIL-T-16101E

radiator cap shall be removeable without interference with any other truck component.

3.12.6.4 Engine Coolant Hose. All engine coolant hoses shall be in conformance with SAE J20R4. Engine cooling hoses shall clear the truck structure and other components under all operating conditions specified herein.

3.12.6.5 Water Pump. The engine water pump shall be of the centrifugal type and driven by a single or matched multiple V-belts in accordance with SAE J636 and equipped with seals which prevent coolant leakage. The pump shall be corrosion resistant when exposed to water and ethylene glycol antifreeze mixture. A permanent (sealed) lubrication system or a pressure lubrication system with lubrication fittings shall be furnished.

3.12.7 Governor. An adjustable type speed-limiting type governor shall be furnished to limit the engine speed to the engine manufacturer's recommended intermittent duty speed. Engine speed shall be sufficient to permit the truck to meet all performance requirements specified herein.

3.12.8 Exhaust System. The engine exhaust system shall be designed to prevent entry of rain into the exhaust system and to prevent accumulation of water and condensed vapors. The back pressure of the exhaust system, including muffler, shall not exceed the maximum recommended by the engine manufacturer when measured approximately 2 inches (50 mm) beyond the engine exhaust header outlet at any load up to rated net continuous load. The exhaust system shall connect to the engine exhaust header with a flanged connection. The muffler shall be independently supported around the body or muffler outlet. If the tailpipe is independent of the muffler or extends more than 12 (300 mm) inches from the muffler, it shall be supported. Exhaust gases shall be discharged vertically above the personnel cab roof or at the rear or side rear of the truck within the plan outline of the truck. The exhaust system shall be arranged by either component location or guards shall be provided to prevent burns to the operator and maintenance personnel while working or operating the truck. Exhaust system shall conform to UL 558, Type "D".

3.12.9 Oil filter. Engine shall be equipped with full flow filter(s) with emergency bypass with either replaceable element(s) or spin-on type filter(s). Oil lines to and from the filters (when required) shall be installed so as to prevent oil leakage due to vibration.

3.13 Cold weather system aids. The truck shall be equipped with cold weather system aids to meet the environmental requirements specified herein. Aids shall include battery blankets, glow plugs or fluid priming engine starting system, engine oil heater, engine coolant heater, and transmission heater. However, only the aids necessary to meet the operating temperatures specified herein (see 6.2) will be required. Heaters shall operate on 110 volt alternating, 60 cycle electrical current. When a fluid priming starting system is provided it shall conform to MIL-E-52649, Type III. The size of the primer shall be in accordance with the engine manufacturers recommendations. The primer shall be mechanically or electromechanically operated. When the primer is mechanically actuated, it shall be furnished with a total cable length not exceeding 6 feet and a "tee" handle and when electromechanically actuated, it shall be furnished with a temperature control.

MIL-T-16101E

3.14 Drive Assembly. The drive assembly shall consist of all components necessary to transmit power from the engine to the drive wheels. Each gear, shaft, and axle shall be of heat-treated alloy steel. All rotating shafts and axles shall be supported on anti-friction bearings. All gears shall operate in lubricant, and a standard pressure grease lubrication system shall be provided for all friction parts not so lubricated. Differential ring and pinion gears, when used, shall be adjustable. All levers to gear enclosures shall be provided with seals, caps, rubber boots or similar means to prevent the entry of water into the enclosure under normal operation or outside storage. When a drive shaft is provided there shall be a slip joint integrated into the drive line to facilitate the removal of the drive shaft.

3.14.1 Transmission. The truck shall be equipped a power shift type transmission of the continuous drive type within each speed range(s). Truck shall have not less than three (3) speed ranges forward and reverse. When a transmission fluid heat exchanger is required to prevent excessive fluid temperature due to operations and environmental conditions specified herein, means shall be provided to insure the recommended maximum case pressures of the transmission are not exceeded to prevent deformation, damage or fluid leakage to the transmission or the torque convertor.

3.14.1.1 Torque Converter. A torque converter shall be supplied with the power shifted transmission, either as a separate converter unit or as an integral package including both torque converter and power shifted transmission. The converter shall be of size and rated capacity to suit the engine, type of terrain, and slopes specified herein.

3.14.2 Oil filter. Transmission shall be equipped with an oil filter with replaceable element(s) or a spin-on type filter.

3.14.3 Drive system.

3.14.3.1 Drive Shaft. When the transmission and differential are not an integral unit, a double universal joint type drive shaft shall link the transmission to the differential.

3.14.3.2 Differential. The differential shall be capable of accepting and transmitting full transmission output torque in the forward and reverse directions when the truck is operated as specified herein. The pinion shall be mounted on roller bearings. The ring gear and gear assembly, when utilized, shall be mounted on roller bearings. The differential shall be mounted as a unit in a removable casing at the rear of the truck. All gears shall operate in lubricant.

3.14.3.3 Drive Axles. The drive axles, with universal joints, shall link the differential to the driving wheel heads at the rear of the vehicle.

3.14.3.4 Drive Wheel Heads and Chains. Drive wheel heads shall be mounted on the top of the vehicle frame over the rear wheel fork tubes. Drive sprockets and shafts shall be supported in each drive head housing on anti-friction bearings. Chains used to drive the rear wheels shall have a factor of safety of not less than 4.7 to 1 based on average ultimate strength. Automatic drive chain adjustment of not less than four links shall be provided.

MIL-T-16101E

3.15 Hoist Mechanism. The hoist mechanism shall be either a hydraulic actuated mechanical rack and pinion system or a hydraulic lift cylinder system and shall consist of all components necessary for grappling and hoisting the rated load to the travel position. The brake system and drive assembly shall be separate from the hoist mechanism system. In the event of failure or damage to the hydraulic system, provisions shall be provided which permit automatic lowering of the rated load to the ground at the lowering speed specified herein. Fluid in the hydraulic system shall conform to MIL-H-17672 or MIL-L-2104. The hoist mechanism hydraulic system shall have a maximum working pressure (relief valve setting) not in excess of 3000 psi (20,682 kPa). The temperature rise of the hydraulic fluid shall not exceed 115° F (43° C) above the ambient temperature when tested as specified herein. All system components shall be capable of a proof pressure that is equal to or greater than two times the maximum working pressure without external leakage, damage or pressure deformation.

3.15.1 Hydraulic actuated mechanical rack and pinion system. When a hydraulic actuated rack and pinion system is furnished the hydraulic components for the hydraulic and mechanical system shall meet the requirements for the hydraulic lift cylinder system as specified herein. Hydraulic pump(s), cylinders, relief valve, hydraulic lines, control valves and reservoir shall be furnished as specified herein for the hydraulic lift cylinder system.

3.15.1.1 Hydraulic motor reduction gear. A hydraulic motor reduction gear which will transfer power from the hydraulic system to the mechanical system drive shafts shall be furnished. The reduction gears shall be totally enclosed in a casing located at the rear of the truck. Gears shall be constantly lubricated with oil whenever gears are in operation.

3.15.1.2 Drive shafts. Drive shafts with universal joints or couplings which connect the hydraulic motor reduction gear to the front or rear hoist and lower worm gear boxes shall be furnished.

3.15.1.3 Side shafts. Side shafts which transmit power between the rear and front hoist and lower worm gear boxes shall be furnished.

3.15.1.4 Hoist and lower worm gear boxes. Front and rear hoist and lower worm gear boxes which raise and lower the load shoes shall be furnished. Hoist and lower worm gear boxes shall be totally enclosed in a casing. Gears shall be constantly lubricated with oil whenever gears are in operation.

3.15.1.5 Shoe lift rods. Shoe lift rods or shoe guides which are pivoted or otherwise arranged to permit lift shoes to elevate and lower and to grapple (swing in and out) shall be furnished. Power shall be transmitted from hoist and lower worm gear boxes to the load shoes by means of rack and pinion gearing. The grappling (swing) mechanism shall be actuated by a hydraulic cylinder or cylinders.

3.15.2 Hydraulic lift cylinder system.

3.15.2.1 Hydraulic pump(s). Hydraulic pump(s) flow rate and output pressure shall be sufficient to operate the truck as specified herein. The hydraulic pump(s) shall be direct driven by the engine or transmission. The hydraulic pump(s) shall withstand a minimum proof pressure of 1-1/2 times the maximum

MIL-T-16101E

system working pressure without external leakage, deformation or loss of performance.

3.15.2.2 Hydraulic fluid reservoir. The reservoir shall be of metal construction with a fluid capacity of not less than 110 percent of the fluid required to operate the truck as specified herein. The reservoir shall also have sufficient capacity to prevent air from entering the system with all hydraulic pistons fully extended and sufficient free air capacity to prevent oil from being discharged through the reservoir air vent when maximum return flow of oil is surged into the reservoir from the system. A removable strainer or a replaceable filter element shall be installed in either the hydraulic reservoir or the suction line to protect the hydraulic pump(s). When a strainer is provided for pump protection a filter shall also be installed in the hydraulic system after the pump discharge. A two way breather filter is required except for pressurized type reservoirs. Reservoir shall have an access opening not less than 2-1/2 inches (64 mm) in diameter or the reservoir shall be removable to permit servicing the strainer and allow for cleaning. The reservoir filler cap and tube shall be located to provide for filling from a standard 5-gallon (19 liters) container.

3.15.2.3 Filter. A full flow hydraulic filter with replaceable element(s) or spin-on filter(s) with a 25 micron minimum filter rating shall be furnished. Filter shall include the following:

- (a) An emergency by-pass which may open for system oil at a temperature less than 70 degrees F. (21 degrees C.).
- (b) Prevent contaminant trapped by the filter from being released into the system when the emergency by-pass opens or when the filter is removed for servicing.

3.15.2.4 Hydraulic system contamination indicator. The hydraulic system shall include a signal mechanism or contamination indicator to indicate when filter maintenance or replacement is required.

3.15.2.5 Relief Valve. A hydraulic-system relief valve to protect the hydraulic system from pressures in excess of that specified herein shall be furnished.

3.15.2.6 Hoist system control valve(s). The hoist system shall be furnished with separate control valves or operating sections for the hoist and the grappling (swing) mechanisms. Valves shall be double acting, self-centering control valves type such that all hydraulic fluid flow is rerouted to the hydraulic return system when the control valve lever is released by the operator to the neutral position. These valves or operating sections shall be equipped with adjustable pressure relief valves. Mounting of the valve(s) shall be sufficient to prevent vibration which may cause instability of the controls. All control valve or operating section spools shall be spring centered with sufficient force to return the levers to the center position and positively retain them there throughout all operations. Controls shall operated by either the right or left hand within reach of the seated operator.

3.15.2.7 Cylinders. The hoist and grappling (swing) mechanisms shall be actuated by not less than two fully equalized, double acting, hydraulic

MIL-T-16101E

cylinders, so that each lift shoe remains parallel to the axis of the truck and to each other throughout their lifting range. All hydraulic cylinders shall be pin, socket, or gimbal mounted. Cylinders shall be fabricated from either seamless steel tubing, or welded and redrawn tubing. All welding and brazing to the cylinder within the zone of the piston operation shall be done prior to final machine honing or rolling of the cylinder. Cylinders shall be so located to provide for ease of maintenance, and replacement. All internal cylinder ports shall be located beyond the area of piston travel. Cylinders shall be equipped with exclusion devices which prevent foreign material and fluids from entering the cylinder and damaging seals and other cylinder components. Hydraulic cylinder piston rods shall be provided with a hard chrome plate finish capable of resisting the effects of corrosion as a result of the environmental requirements specified herein. Plating shall be electro-deposited hard chromium finish, having uniform thickness of not less than 0.0005 of an inch (.013 mm). After plating, maximum rod surface roughness shall not exceed 32 microinches.

3.15.2.8 Hydraulic fittings. Valves, cylinders, tubing and pressure hose fittings shall have a minimum burst pressure that is equal to or greater than 4 times the maximum system working pressure. Hydraulic fittings sizes shall be limited to those listed in the SAE Handbook.

3.15.2.8.1 Valves and cylinders. Hydraulic fittings used on valves and cylinders shall be the "O" ring straight thread or pipe thread type in accordance with SAE J514 Section III and IV or 4-bolt split flange type in accordance with SAE J518 standard pressure series.

3.15.2.8.2 Tubing. Hydraulic fittings used on tubing shall conform to SAE J514 Section I and II 37 degree, flare and flareless.

3.15.2.8.3 Hoses. Hydraulic return or suction hose fittings shall be clamp type connectors in accordance with SAE J536 where hydraulic pressure does not exceed 100 psi (689400 Pa). Pressure hose fitting shall be female 37 degree flared type, field attachable, screw style in accordance with SAE J516.

3.15.2.9 Hydraulic hoses and tubing. Hydraulic hoses and tubing shall have a minimum burst pressure that is equal to or greater than 4 times the maximum system working pressure. Hydraulic hoses and tubing will be located or shielded so that in the event of a rupture there will be no danger of hydraulic fluid contacting the engine or engine exhaust system. Hydraulic hose and tube sizes shall be limited to those listed in the SAE Handbook.

3.15.2.9.1 Hoses. Hydraulic return or suction hoses shall be in accordance with SAE J517 100R3. All other hydraulic hoses shall be in accordance with SAE J517 100R2.

3.15.2.9.2 Tubing. Pressure tubing shall be in accordance with SAE J524 or SAE J525 and shall meet the requirements specified herein. Tubing shall be clamped by cushioned, threaded fasteners spaced at intervals of not more than 24 inches (610 mm). All bends shall be smooth without flattening, kinking, or wrinkling of the tube. The term "without flattening" is defined as follows: Throughout the bend, the tube maximum diameter shall be equal to or greater than the tube nominal diameter, and the tube maximum diameter minus the tube minimum diameter shall be not greater than 15 percent of the tube nominal

MIL-T-16101E

diameter.

3.15.2.10 Shoe Lift Rods. Shoe lift rods or shoe guides shall be provided which are pivoted or otherwise arranged to permit lift shoes to elevate and lower, as well as swing in and out. Power shall be transmitted to the load shoes by means of hydraulic cylinders.

3.15.3 Hoist mechanism limit stop. An automatic limit stop shall be furnished for either the hydraulic rack and pinion or the hydraulic lift cylinder systems which shall halt movement of the hoist and lower mechanism automatically at the limit of travel in either direction, disengage the hoist, and return the hoist lever to a neutral position. The lower limit of travel of the hoist mechanism shall be easily adjusted for varying ground clearance.

3.15.4 Hoist load Shoes. Truck shall be furnished with a load shoe that extends longitudinally along each side of the truck and shall be located within the truck inside frame width as specified herein (see 6.2). They shall be made of steel and shall connect to the hoist mechanism. Load shoes shall be not less than 8 feet (2440 mm) long and of sufficient width or as specified herein (see 6.2) to support the load securely.

3.16 Chassis and frame. The truck chassis, frame members, bracings, and all their joints shall provide a rigid unit structure. The frame and related structure shall be fabricated from metal or castings. The frame and related structure shall have sufficient depth to afford protection for working parts and shall be capable of withstanding, without permanent deformation, stresses induced by capacity loads and tests specified herein.

3.16.1 Wheels. There shall be a minimum of two front steer wheels and two rear steer-drive wheels. Each wheel shall be mounted on an alloy steel spindle and tapered roller bearings. All wheels shall track true in accordance with automotive practice, as determined by their respective radii. The rear wheel hubs shall provide for mounting removable drive sprockets. Wheels shall have demountable type rims which can be removed from the hubs without deflating tires. Each wheel shall be mounted on wheel studs or capscrews with self-centering tapered ends or on tapered boltholes which shall provide a positive method of locating the wheel on the hub. Wheel sizes shall be selected from those listed in the Year Book of the Tire and Rim Association.

3.16.2 Wheel Mounting. Wheel mountings and axles shall be arranged to permit the truck to negotiate the obstacle course specified herein. Means shall be provided to prevent wheels or tires from contacting any part of the truck structure, irrespective of obstacle specified herein.

3.16.3 Wheel guards. Metal wheel guards shall be provided to prevent foreign objects from being discharged in the direction of the operator and pedestrians or otherwise creating a hazardous situation. The wheel guards may have minimum contact with the load shoes to permit the truck to obtain required turning radius. The contact shall not permanently dent/damage the guard, nor in any way restrict truck operation. Wheel guards dimensions shall be included in determining overall truck width.

3.16.4 Wheel suspension. The truck shall be mounted on coil springs providing individual suspension for each wheel. Springs shall be fully enclosed in fork

MIL-T-16101E

tubes or in separate housings. Suspension springs shall be of sufficient strength to prevent bottoming out of the truck frame to the wheel housing when tested as specified herein.

3.16.5 Wheel Forks and Tubes. Wheel forks shall be designed to permit required wheel angularity, steering radii, and tire accessibility. Fork tubes shall be of sufficient strength and rigidity to withstand, without permanent deformation, stresses induced by a load equal to 200 percent of rated capacity in the transport position. Forks shall be readily detachable from the fork tubes. The minimum interchangeability of forks and tubes shall be from side to side in the front and from side to side in the rear. Wheel forks interchangeable right front to left rear and left front to right rear is also acceptable.

3.16.6 Tires. Tires shall be industrial type, bias or radial ply arrangement, pneumatic (high pressure), tube or tubeless type with tread design as required to permit operation within areas as specified herein. Tires shall be new and shall be selected from sizes listed in the Yearbook of the Tire and Rim Association. The maximum tire pressure permitted is 125 psi (861750 Pa).

3.16.7 Tubes. Tubes, if required, shall be industrial type and the size required to fit the tires furnished. Valve stems shall be arranged to permit inflation of mounted tires from the side of the truck. Physical protection of the valve stems shall be provided by either guards or valve location.

3.17 Body. The truck body shall be constructed of metal sheet or plate.

3.17.1 Access Openings. All access openings in the truck body shall be provided with access covers. Access covers which must bear the weight of an operator shall be constructed of steel equal to the construction of the truck body. Access covers shall be furnished with a device capable of holding the cover in the open position in a safe manner by utilizing counterweights, springs or latch mechanisms which cannot be inadvertently released while servicing the truck.

3.17.2 Hand Holds. Suitable hand holds and steps conforming to SAE J185 shall be provided to assist the operator in mounting the truck from two sides.

3.17.3 Engine and transmission enclosure. The engine and transmission shall be completely enclosed with metal cowl or hood cover and side plates. Either the hood cover or side plates shall be quick-opening. Hood cover, if lift-up type, shall be held in the open position in a safe manner by counterweight, gas operated cylinders or spring and linkage mechanism or latch which requires no brace or support and cannot be inadvertently released while servicing the vehicle. Hood cover shall be capable of being opened or removed by one man. Hand tools shall not be required for release of hood or side plates. All engine components (accessories) shall be accessible, without requiring the removal of any additional truck structure, when hood cover and side plates are opened. The hood shall be of such a design that when closed it shall prevent the entry of water. Side ventilation openings, if required, shall be located away from the fuel fill area.

3.18 Slings and Tiedown Attachments. Vehicles shall be equipped with slings and tiedown attachments conforming to MIL-STD-209, Class 1, 2 or 3 for

MIL-T-16101E

Type II or III equipment, excluding air transportation requirements.

3.19 Steering. Power steering shall be furnished and shall provide for four wheel steering. The hoist hydraulic system may be utilized to furnish power steering force. An automotive type steering wheel mounted on the steering column, shall turn the steer wheels. There shall be a minimum of 7 inches (180 mm) measured vertically between the lowest point on the steering wheel rim and a line parallel to the floor and passing through the highest point of the unoccupied seat cushion. There shall be a minimum of 3 inches (75 mm) between the rim of the steering wheel and the directional control lever(s) for all positions of the lever(s). Wheels shall steer true in accordance with the Ackermann steering principal. Clockwise rotation of the steering wheel shall provide for right-hand turning of the truck while in forward motion. Provisions shall be made for adjustment for wear and alignment of all major steering components and for lubrication of all friction points by accessible grease fittings or permanent lubrication, or a lubricant reservoir. Means shall be provided to prevent wheels or tires or steering linkage from contacting any part of truck structure, other than stops, irrespective of obstacle magnitude or cramped steer angle.

3.20 Brake System.

3.20.1. Service Brake System. The truck shall be equipped with either a hydraulic, air or combination air over hydraulic service four wheel brake system with either expanding disc or drum brakes. The service brake hydraulic system shall be separate from the hoist mechanism and steering hydraulic systems. Brake system shall be equipped with two independent master cylinders or one master cylinder with two independently operating sections and a dual (separate) hydraulic circuit for the front and rear wheels. The service brake system shall include driver's pedal or treadle, actuator mechanisms, wheel brake assemblies; and all other components required for a complete, matched brake system. Brake system shall be capable of safely stopping, holding, and controlling the movement of the truck with the rated load under the operating conditions and environments specified herein. The wheel brake assembly rated torque capacity, heat rejection characteristics, and installation shall be in accordance with the recommendations of the brake assembly manufacturer. Brake lining for shoes or pads shall be intended for industrial service and shall be securely bonded or fastened to the brake components. Brake lining shall have at least 80 percent of the total lining rubbing surface in contact with the wearing surface during the service life of the lining. Automatic or mechanical brake adjustment shall be provided. Automatic adjustment shall maintain correct lining to drum or disc adjustment without looseness or lockup. The automatic adjusters shall be of the guarded or enclosed type. The necessary provisions to permit manual brake adjustment shall be provided. When the hydraulic master cylinder is located under a floorboard(s) an access hole of not less than 2-1/2 inches (64 mm) in diameter shall be provided above the master cylinder unless a remote reservoir is provided for filling master cylinder.

3.20.2 Mechanical Parking Brake. The truck shall be equipped with a parking brake which shall be an independent mechanical friction brake mounted on the transmission output shaft or the differential input shaft. In lieu of a independent parking brake, a separate mechanical linkage or cable which actuates the service brake system can be furnished. Either type of parking

MIL-T-16101E

brake shall be operated by a hand lever equipped with a locking device located within reach of a seated operator. Adjustment of parking brake cable, shoes or bands shall be accomplished without the removal of any major assembly. In lieu of a mechanical system to activate the parking brake, an electrical activation system is permitted. A warning light shall indicate when the parking brake has been activated.

3.21 Personnel Cab. The truck shall be equipped with an insulated, weathertight personnel cab. The cab clearances shall be in accordance with SAE J154. The cab shall inherently resist torsional strain and withstand all operational shock and vibration under the conditions specified herein. The cab shall be constructed of metal. The cab shall be equipped with a minimum of one fully opening or removeable door. The door shall have a safety latch, opening stop and hold-open catch. All hardware shall be of the industrial type, resistant to corrosion.

3.21.1 Glazing. The cab shall provide the operator with all around visability to permit the operator an unobstructed view of the road in all directions and to provide load visability to permit the operator to properly staddle and engage the load with the load shoes. The total glazed area shall be not less than 3500 square inches (22,580 square mm) of tinted windows consisting of windshield, sliding or roll-down door windows, rear window, and other windows required by cab design. All glazing shall conform to ANSI Z26.1, type AS1 in the windshield and type AS1 or AS2 in other windows. Fixed glazing shall be sealed in waterproof stress-absorbent molding, and moveable windows shall be sealed on piled lined channels. Plastic glazing is not permitted.

3.21.2 Interior. The interior of the cab shall be fitted with insulation, retarding both heat loss and noise intrusion. The insulation and cab framing shall be covered with an interior skin and headliner, providing a smooth, cleanable protective cover. The floor boards shall be removable within ten (10) minutes with common handtools without the requirement to remove the cab. The requirement for removeable floor boards can be deleted whenever the personnel cab is not located above equipment which requires maintenance and repairs or to retard heat and sound transmission entering the cab from auxilary equipment. All penetrations of the cab shall be sealed by rubber boots or covers.

3.21.3 Seat. A weather resistant cushion seat and a cushion backrest, adjustable forward and reverse, shall be provided for the operator when operating the truck. The seat shall have a minimum horizontal adjustment of 4 inches (100 mm) which shall be adjustable by the operator from the operating position without the use of tools. Seat shall be in accordance with SAE J899 except armrests are not required.

3.21.4. Window Wipers and Washer. The cab shall be equipped with powered wiper assemblies to clear the windshield and the rear window.. Windshield wiper shall be in accordance with the requirements of SAE J198. Self-parking features shall be provided. The wiper arms shall provide pressure on the glazed surface of at least 1-ounce for each inch of wiper arm length. Air motors shall be plumbed to exhaust air outside of the cab. The operator controls shall be located for convenient operation by the operator from the normal operating position. The windshield shall be provided with a washing system in accordance with SAE J1944.

MIL-T-16101E

3.21.5 Personnel Cab Heater and Defroster. A hot water, air type heater and windshield defroster that operates on engine coolant shall be furnished. Heater shall be of sufficient capacity to maintain a temperature of 60° F (16° C). at cab floor level in the ambient temperature specified herein (see 3.3.1). Use of thermal insulation in the cab area to insure adequate capacity is acceptable. Heater shall be equipped with a removeable safety guard. When specified (see 6.2), the heater and defroster shall be omitted.

3.21.6 Air Conditioner. When specified (see 6.2), a recirculating-air type air conditioner shall be furnished. The air conditioner shall have a minimum rating of 17,000 Btu/hour (5.0 kw/hr).

3.21.7 Ventilation fans. The cab shall be equipped with not less than two ventilation fans not less than 6 inches (150 mm) in diameter. Fans shall be directionally adjustable to direct air flow toward all glazing.

3.22 Instrument and control panel. The instrument and control panel shall be visible to the seated operator and shall conform to SAE J209. On this panel shall be mounted the electrical system monitors, pressure monitors, temperature monitors, fuel gauge, indicator lights, hour meter, speedometer, electrical switch, light switches, starter button or switch and any other instruments and controls when required. Starter button or switch may be located on the steering column in lieu of instrument panel.

3.23 Instruments. Truck shall be furnished with the following instruments which shall be flush-mounted on the instrument panel and shall be capable of being read by the operator while in his normal sitting operating position. Gauges, indicator lights and meters shall be constructed to be moisture and weather resistant. Gauges shall be internally lighted. Whenever indicator light type instruments are furnished, means shall be provided to check operation of the light.

3.23.1 Electrical system monitor. A remote indicating ammeter indicator light (amber or red) or voltmeter shall be furnished. The ammeter or voltmeter shall have sufficient capacity to indicate variations in current supply or demand experienced by the truck, exclusive of starter requirements. The alternator light shall light when the alternator is not charging and the ignition switch is "on".

3.23.2 Engine oil pressure monitor. A remote indicating engine oil pressure gauge or a low-pressure amber or red indicator light shall be furnished. The light shall come "on" whenever engine oil pressure is below the pressure required by the engine manufacturer.

3.23.3 Engine coolant temperature monitor. A remote indicating engine coolant temperature gauge or a high temperature amber or red indicator light shall be furnished. The light shall come "on" when the engine coolant temperature exceeds the temperature specified by the engine manufacturer.

3.23.4 Transmission fluid temperature monitor. A remote indicating transmission fluid temperature gauge or a high temperature amber or red indicator light shall be furnished. The light shall come "on" when the transmission fluid temperature exceeds the temperature specified by the transmission manufacturer.

MIL-T-16101E

3.23.5 Hour meter. An electrically operated hour meter, which registers the number of engine operating hours only, shall be provided. The hour meter shall be in accordance with MIL-M-3971, Type I, except mounting may be at the supplier's option. The hour meter shall be accessible for reading without removal of any component of the truck. The hour meter shall register up to 9999 hours of operation.

3.23.6 Fuel gauge. An electric, thermally stabilized, remote indicating fuel gauge shall be provided.

3.23.7 Speedometer. A automotive type speedometer shall be provided which shall indicate speed of the truck in miles per hour and kilometers per hour.

3.24 Controls. All switch and lever type controls shall be provided with position marking diagram on a plate or embossed or depressed into the control (decals are not acceptable) at the control, or in the case of the directional speed controls, on a diagram visible to the seated operator. The distance from the near edge of one knob to the near edge of an adjacent knob or other surface shall be a minimum of 1-1/2 inches (40 mm). When mechanical push-pull remote controls are furnished they shall be of the waterproof antifriction type, complying with the requirements for marine cables as specified in SAE J917. Forces necessary to actuate controls shall be 10 pounds (44 N) maximum at the handgrip and shall have sufficient strength to withstand without permanent deformation or damage all vibration forces generated during any operation specified herein. The travel of the controls shall not exceed 6 inches (150 mm) from the center position when measured at the end of the grip. Controls shall be labeled with universal symbols in accordance with SAE J1362. Controls shall be located in accordance with SAE J297 and SAE J898. Foot operated control pedals shall be equipped with replaceable rubber cap.

3.24.1 Head lights switch. An "on-off" switch for simultaneous operation of the head lights shall be furnished and located on the instrument panel.

3.24.2 Load Light Switch. A load light switch shall be provided and located on the instrument panel.

3.24.3 Electrical switch. The electrical switch shall require a key and shall be located on the instrument panel. It shall have not fewer than 2 positions, an "on" and an "off". A second "on" position, for operation of electrical accessories is permitted. All trucks under each contract shall be keyed identically. Two keys shall be supplied with each truck.

3.24.4 Starting motor switch. The starting motor shall be energized through a solenoid plunger type switch connecting the starting motor to the battery. Solenoid shall be operated by depressing a button or turning a spring-loaded switch to a "start" position. If a push button is used, the starter shall be inoperable when the electrical switch is in the "off" position.

3.24.5 Interlocking Light Switch. A directional switch interlocked with directional gear shift control shall be provided. The switch shall permit the front headlights and rear tail lamps to operate when the vehicle is in neutral and forward gear. When vehicle is in reverse gear, the rear headlights and front tail lamps shall be permitted to operate.

MIL-T-16101E

3.24.6 Parking brake control. The manual control shall be either hand or foot operated. The hand control shall be located within reach of a seated operator. A foot operated control shall be installed for left foot operation.

3.24.7 Accelerator control. The accelerator control shall be installed for right-foot operation. It shall be located to the right of the brake pedal at a distance of not less than 1-1/2 inches (40 mm).

3.24.8 Transmission controls. Selective forward and reverse (and speed range when applicable) speed controls shall be positioned for either left or right hand operation when in the seated position. Movement of the control lever in the forward or upward direction shall cause forward motion of the truck.

3.24.9 Hoist and Grappling Controls. The hoist mechanism shall be actuated by a hand lever. A second lever or device that automatically controls operation of load shoe grappling (swing) control shall be provided to actuate the grappling (shoe swing) mechanism. Control(s) shall be conveniently located for right hand or left hand operation. Rearward or upward motion of hoist and load swing control lever(s) shall grapple and raise the load.

3.24.10 Service brake control. The brake pedal shall be conveniently located for right foot operation with a clearance of at least 1-1/2 inches (38 mm) on each side. Brake pedal width shall be at least 2-1/2 inches (64 mm).

3.28.11 Window wipers and washer control. Each window wiper shall be controlled by one on-off switch. The windshield washer control shall be located adjacent to the windshield wiper switch.

3.24.12 Headlight control. Headlight high and low beam shall be controlled with a dimmer switch placed for left foot operation.

3.24.13 Direction Indicators control. The direction indicator control lever shall be activated by a lever mounted on the steering column.

3.24.14 Horn control. The horn shall be controlled with push button mounted in the center of the steering wheel.

3.24.15 Heater and defroster control. The heater and defroster controls shall be located within reach of the seated operator and shall provide for temperature control and variable selection of blower speeds.

3.24.16 Air conditioner controls. The air conditioner controls shall be located within reach of a seated operator and shall provide for variable selection of blower speeds, "on-off" switch and temperature control.

3.24.17 Ventilation fans. Fan(s) shall have "on-off" switch(es) located within reach of a seated operator.

3.25 Electrical system. The truck shall have a 12 volt electrical system. Multiple conductor routing shall be protected by flexible tubing or electrical insulation tape. Grommets shall be provided whenever wiring passes thru bulkheads, partitions, structural members and the wiring shall be fastened to prevent chafing or abrasion. All wiring shall be color coded. Each electrical circuit shall be protected from electrical overload with circuit breakers in accordance with SAE J553. Fuses are not permitted. System shall conform to UL

MIL-T-16101E

558, Type "D". Electrical system shall be constructed to be moisture and weather resistant.

3.25.1 Headlights. The truck shall be equipped with two front and two rear headlights, of not less than 25 watts. Lights shall be multiple beam, automotive sealed beam type in accordance with SAE J760 and SAE J1383. Directional focus of these lights shall be vertically and horizontally adjustable. Protection of the lights against damage shall be provided by either position or guards.

3.25.2 Stoplights and tail lamps. The truck shall be equipped with two front and two rear automotive red reflector type, combination stoplights and tail lamps, of not less than 15 candle power respectively in accordance with SAE J1398. Stoplights shall operate automatically only upon actuation of the service brake pedal and shall not operate when ignition switch is in an "off" position. Combination stoplights and tail lamps shall be mounted below or adjacent to the headlights and be protected against damage by either position or guards.

3.25.2.1 Wiring and Switching. Wiring and switching shall be such that operation of headlights on one end of the truck shall operate stoplights on the opposite end.

3.25.3 Direction Indicators. Electric automotive type turn indicators shall be mounted on both sides of the front and rear of the straddle truck readily visible from road level in accordance with SAE J1395 to indicate turning direction.

3.25.4 Load Lights. The truck shall be equipped with two load lights, of not less than 15 candle power each in accordance with SAE J760. Lights shall be mounted on the underside of the vehicle frame, to the left and to the right of the operator, and shall illuminate the load being straddled or hoisted.

3.25.5 Horn. The truck shall be equipped with one electric horn. The horn button assembly and electrical wiring shall be constructed to be weather and moisture resistant when operated or stored outdoors in ambient conditions specified herein (see 3.3).

3.26 Dual Rearview Mirrors. The truck(s) shall be equipped with a rearview mirror mounted on the left and right hand sides of the personnel cab within the seated operators field of view.

3.27 Safety Features. Each truck shall be equipped with following safety features:

3.27.1 Drive Unit Safety Guards. The truck shall be equipped with full length sheet steel safety guards covering drive wheel chains and sprockets. The guards shall provide protection down to 10 inches (254 mm) above the ground and shall provide sufficient clearance to allow the tires to rotate freely under all operating conditions. Also, rotating shafts, gears, pulleys and all moving parts shall be covered with adequate guards to protect personnel from injury.

3.27.2 Platforms. The truck shall be equipped with open grate safety platform on both sides of the engine and personnel cab to provide access to the truck

MIL-T-16101E

components and to cover all openings on the upper deck of the truck. The platform shall conform to SAE J185. The individual grate openings shall be such that they do not interfere with the operators visibility for loading and unloading operations. A platform made of open grated steel shall completely cover all openings on the upper deck of the truck and shall not interfere with the removal of doors or any other component. All openings greater than three by 3 inches (75 mm) shall be covered. However, a support bar or angle iron may be used for 3 by 3 inches (75 by 75 mm) or smaller openings but there shall be no more than 1 inch (25 mm) unprotected gap surrounding the support.

3.27.3 Guardrails. The truck shall be equipped with suitable guardrails located on the upper deck of the truck. Guardrails shall encircle the truck perimeter except at ladder locations and they shall conform to SAE J185. Guardrails shall be designed such that they do not interfere with the operator's visibility.

3.27.4 Sounding Device. The truck shall be equipped with a minimum of two sounding devices, one for forward and one for rearward motions and shall conform to SAE J994 and SAE J1105. The two sounding devices shall be interlocked with the direction shift lever so that first forward gear provides for operation of the sounding device, and first reverse gear the rear sounding device. The sounding device shall operate continuously when the truck is in motion in the first gear only and emit a maximum 87 db audible alarm. The audible warning shall be distinguishable from the normal operational noise of the truck.

3.27.5 Warning lights. Flashing warning amber lights or an amber strobe visible from all directions, which operate continuously when the truck is in operation. The lights shall conform to SAE J96 or SAE J845. A minimum of four lights shall be provided, one on each corner of the truck. The lights shall be mounted between 3 to 5 feet (915 to 1525 mm) above ground level and shall not interfere with truck operations or exposed to damage from loading and unloading operations.

3.27.6 Mirrors. Wide angle convex or rectangular mirrors shall be mounted on the right front and left front of each truck to permit operator visibility as specified herein. The mirrors shall be a minimum of 15⁴ square inches (994 square centimeters) in size or total glass area and shall provide visibility in front of the truck and along the right side of the truck for left mounted cabs, the opposite shall be provided for right mounted cabs. The mirrors shall be mounted in such a manner as not to interfere with normal truck operations or maintenance procedures. Additional mirrors shall be provided if required to obtain the desired visibility based on truck design.

3.28 Workmanship. All workmanship on the truck shall be in accordance with the engineering and production standards of the material handling industry. The truck shall withstand any operation during normal work without permanent deformation, breakage of connections, malfunction, or component interference caused by incorrect workmanship. All parts of the truck before and after painting shall be clean and free from sand, rust, dirt, fins, pits, sprues, scale, flux, and othe harmful extraneous material. Edges and surfaces exposed to operating and maintenance personnel shall be smooth and rounded to the extent that a hazardous surface does not exist.

MIL-T-16101E

3.28.1 Steel and Other Metal Fabrication. Metals used in the fabrication of the truck shall provide original quality surface finish and shall be free from kinks and sharp bends. Metals having eroded or pitted surfaces are not acceptable. The straightening of materials shall be done by methods that will not cause weakening or injury to the material. Burrs and sharp edges in holes and on sheets, plates, and members shall be removed sufficiently to assure correct fits and to prevent loosening of fasteners and damage to components. Flame cutting, using a tip suitable for the thickness of metal, may be employed instead of shearing or sawing. Splatter shall be removed from exposed cuts and from re-entrant cuts. Heated metals shall be allowed to cool slowly except during heat treatment, and over-heating shall be avoided in accordance with the recommendations of the metal manufacturer. All modular assembly fabrication shall provide for interchangeability of components.

3.28.2 Rivet Connections. Rivet holes, in the sizes recommended by standard practice, shall be accurately punched or drilled and shall have burrs removed. Rivets shall be driven with power tools. Rivet heads shall be full, neatly made, concentric with rivet holes, in full contact with the surface of the member, and in accordance with SAE J492. Excessive upsetting of rivets to fill holes will not be acceptable.

3.28.3 Bolted Connection. Bolt holes shall be accurately formed. Washers or lockwashers or a combination of the two shall be provided on all bolts, studs, and capscrews having straight thread. Self-locking nuts are acceptable in lieu of standard nuts and lockwashers. All nuts shall have full thread engagement, and all other threaded fasteners shall have tightening and thread engagement in accordance with SAE J475.

3.28.4 Welds. Welded joints shall be sound, smooth, and free from pits, holes, fissures, rough projecting edges, and slag. Each weld shall be thoroughly fused with the base metal.

3.28.5 Machine Work. All parts shall be manufactured for accurate assembly through the use of correct jigs, fixtures, or tape controlled machines or any desired combination of these. Like parts shall be interchangeable.

3.29 Identification Plates. The truck shall be equipped with identification plates conforming to MIL-P-514 as specified herein. All plates shall be securely attached to the truck with screws, bolts, or rivets, and shall be furnished and mounted by the contractor.

3.29.1 Identification marking plate. Each truck shall be identified with an identification plate conforming to MIL-P-514, Type I, Style 1, Composition C, (GG-P-455, Type I, Grade A, Class 1), which shall be mounted in a visible and safe location on the instrument panel or fire wall of the truck. The identifying data to be applied to the identification plates shall be as indicated herein and as defined in MIL-STD-130. Identification data shall include the truck hoisting capacity, name of manufacturer, model number, serial number, contract number, gross vehicle weight, USN registration number, delivery date, technical manual stock number, shipping weight, cube dimension, and name or stamp of government inspector.

3.29.2 Instruction, warning, and caution plates. Each truck shall be equipped with instruction, warning, and caution plates conforming to MIL-P-514, Type

MIL-T-16101E

III, Composition C, (GG-P-455, Type I, Grade A, Class 1), prominently located and describing any warnings, cautions and procedures to be followed in operating, lifting, and servicing of the truck or its components.

3.29.3 Shipping data plate. Each truck shall be equipped with a shipping data plate shall conforming to MIL-P-514, Type III, Composition C, (GG-P-455, Type I, Grade A, Class 1), which shall indicate the the silhouette of the straddle truck in transport position showing the center of gravity and the location and capacity of the lifting and tiedown attachments. Wheel loading information in 3.31.4 may be included on shipping data plate.

3.29.4 Wheel loading plate. Each truck shall be equipped with a wheel loading plate conforming to MIL-P-514, Type III, Composition C, (GG-P-455, Type I, Grade A, Class 1). As a minimum the plate shall have the following information:

<u>Wheel loading (no load on hoist)</u>	
Front wheels (each wheel)	pounds (kg)
Rear wheels (each)	pounds (kg)
<u>Wheel load (rated load on hoist)</u>	
Front wheels (each wheel at maximum sideshift)	pounds (kg)
Rear wheels (each)	pounds (kg)

3.29.5 Carrying capacity data plate. Each truck shall be equipped with a carrying capacity data plate conforming to MIL-P-514, Type III, Composition C (GG-P-455, Type I, Grade A, Class 1), and shall be located in a visable location to the seated operator. The actual carrying capacity of each truck at 5, 10, 15, 20 and 25 mph (8, 16, 24, 32 and 40 Km/hr) forward and 7, 10 and 15 mph (11, 16 and 24 Km/hr) reverse directions shall be identified.

3.29.6 Speed warning plate. Each truck shall be equipped with a speed warning plate conforming to MIL-P-514, Type III, Composition C (GG-P-455, Type I, Grade A, Class 1), if the truck is capable of exceeding 17 mph (27 Km/hr) when travelling in the reverse direction a metal warning plate shall be provided for each truck in plain view of seated operator stating the following: "CAUTION - WHEN IN REVERSE DO NOT OPERATE THIS VEHICLE MORE THAT 17 MPH (27 Km/hr)".

3.30 Vehicle marking. Each truck shall be marked as specified herein. All markings shall be painted in black enamel block letters and numbers. Color number shall be 17038 in accordance with FED-STD-595.

3.30.1 Truck capacity. Capacity of the truck shall be three inches (75 mm) high located on each side of truck.

3.30.2 Registration number. Assigned USN registration number for each truck shall be three inches (75 mm) high located on each side and on each side of the engine cowl or hood.

3.30.3 Tire pressure. For pneumatic tired trucks the tire pressures for each tire shall be one inch high (25 mm) located on each side of the truck above the applicable tire.

MIL-T-16101E

3.30.4 Slinging and tiedowns. Slinging and tiedown markings shall be in accordance with MIL-STD-209.

3.30.5 Safety warning. Safety warning "no rider" shall be two inches (50 mm) high located on each side of truck.

3.30.6 Fuel type. Fuel type shall be one inch (25 mm) high located near fuel tank filler.

3.30.7 Painting. The words "Painted with lead/chromate free paint by manufacturer (name), month and year" located on each side of truck.

3.31 Treating and Painting. Truck shall be painted in accordance with contractor's commercial practice except neither lead or chromate primer or finish coat paint is permitted. The finish coat color shall be 13538 in accordance with FED-STD-595. All exterior surfaces of the truck shall be thoroughly cleaned and shall be dry and free from mill scale, oil, grease, dirt and rust. The finish coat when dry shall be a smooth even surface, free from runs, sags, peels, chips, blisters, and areas of no film. Surfaces of components and assemblies of the truck, not normally painted with a finish coat, shall be cleaned and painted in accordance with good commercial practices. Hoist chains, sprockets, rollers, plastics, hoses (except hydraulic hoses) and drive belts shall not be painted except that slight overspray will be accepted provided there is no interference with the proper functioning of the component. Paint must be kept off working surfaces where interference with working parts would result. Engine accessories, such as radiator, drive belts, instruments, chrome plating and lift chains shall not be painted by the contractor and shall be adequately protected or masked from overspray.

3.31.1 Walkway coating. Floor plates and step surfaces shall be coated or matted coating conforming to MIL-W-5044, type II or III, color black (color number 17038 of FED-STD-595).

3.32 Performance.

3.32.1 Lifting Speed. The time for swinging the load shoes together, grappling and lifting the rated load from the ground to 12 inches (305 mm) above the ground shall be 15 seconds maximum.

3.32.2 Lowering Speed. The time for lowering and ungrappling the unloaded shoes from 12 inches (305 mm) above the ground to ground level and swinging the load shoes out to their maximum spread shall be 15 seconds maximum.

3.32.3 Outside turning radius. Truck outside turning radius shall not exceed the dimension indicated (see 6.2) with the rated load and the specified shoe length (see 6.2).

3.32.4 Steering. The truck wheels, with rated load positioned on the load shoes, shall be capable of being turned from extreme right to extreme left, or vice versa, in not more than 3 complete turns of the hand steering wheels; and the force required to operate shall not exceed 20 pounds (90 N) force when the truck is stationary. The steering wheel free play shall not exceed 3 inches (75 mm).

MIL-T-16101E

3.32.5 Speed. Truck shall be capable of attaining the following speeds when traveling on a level paved surface:

<u>With load</u>				
<u>Minimum Speed</u>	<u>MPH (Km/hr)</u>	<u>Direction</u>	<u>Minimum Load</u>	<u>Pounds (kg)</u>
15	(24)	Forward	30,000	(13,605)
25	(40)	Forward	8,000	(3,565)
7	(11)	Reverse	30,000	(13,605)
15	(24)	Reverse	30,000	(13,605)
<u>Without load</u>				
30	(48)	Forward	N/A	
17	(27)	Reverse	N/A	

3.32.6 Acceleration. Trucks, when carrying rated load on a level surface, shall be capable of accelerating from a standing start at an average rate of not less than 2.0 feet (610 mm) per second in the first 100 feet (3048 cm). Trucks, when unloaded, shall be capable of accelerating from a standing start at an average rate of not less than 4.3 feet (1310 mm) per second in the first 100 feet (3048 cm).

3.32.7 Slope Ascension, First Speed. Trucks, with and without rated load (30,000 lbs), shall be capable of ascending a 10 percent slope and to be able to accelerate from a dead stop on this grade when carrying rated load.

3.32.8 Underclearance. The truck shall have sufficient underclearance to permit operation from one horizontal plane to another when traversing up or down a 10 percent slope, and to negotiate the obstacle course specified herein. When carrying rated load at maximum elevation, the truck shall have a minimum underclearance of not less than 5 inches (127 mm).

3.32.9 Service Brakes. Truck stopping distance at truck's maximum speed, with rated load, shall not exceed 70 feet (21,336 mm) when a brake pedal pressure of 50 pounds (222 N) minimum and 100 pounds (444 N) maximum is applied. The brake system shall be capable of withstanding brake pedal pressure of 250 pounds (114 kg) without failure of any component.

3.32.10 Parking brake. The parking brake shall be capable of retaining the truck with rated load on a 10 percent grade.

3.32.11 Truck frame, wheel forks, tubes, and hoist mechanism overload. The truck shall be capable of supporting a load of 60,000 pounds (27,210 Kg) in the transport position for ten minutes (minimum) with no permanent deformation or failure. The hoist hydraulic system shall show no leaks or rupture with the pressure relief valve inoperative. This requirement does not include the hydraulic pump, hydraulic system relief valve and tires.

3.32.12 Lateral Stability. Lateral stability of the unloaded truck shall be such that no wheel will lose contact with the ground when the load shoes are at maximum height and either side of the truck is raised to a 4 percent slope.

MIL-T-16101E

3.32.13 Truck dimensions. Truck dimensions shall be as specified for each truck (see 6.2). Truck maximum overall height, without rated load, shall include the distance to the top of the personnel cab or the vertical exhaust outlet. The height of the air conditioner, when required (see 6.2), shall not be included with the specified height (see 6.2). Truck specified maximum width (see 6.2) shall include drive wheel chain guards, hand holes and slinging and tiedown attachments.

3.32.14 Load Shoe Travel. The load shoe travel measured from the ground level to the load shoe carrying surface, with rated load, shall not be less than 12 inches (305 mm).

3.32.15 Electromagnetic Interference Characteristics. The truck shall not exceed the limits of electromagnetic interference characteristics specified in SAE J551.

3.32.16 Noise Limits. The noise level of the straddle carry truck (excluding horns) shall not exceed 85 db(A) when tested under the following conditions:

(a) At the operator's station with doors and windows in the closed position.

(b) At 24.5 feet (7470 mm) from the side of the straddle truck.

3.32.17 Performance. The truck shall successfully complete 1440 laps of the test course without failure. The capacity of the fuel tank shall insure not less than 8 hours continuous operation during the performance test specified herein.

3.32.18 Drift. The hoist mechanism shall be capable of holding the rated load at maximum height not less than 10 minutes with not more than 1-1/2 inches (40 mm) of vertical drift in either shoe.

3.32.19 Visibility. The operator with the use of mirrors shall be capable of seeing the area directly in front of the truck to the point where operator's unobstructed visibility within the enclosed cab begins. Also, the operator shall be capable of seeing along both the truck's right and left side from the area beside the truck to where operator's unobstructed visibility begins and the same with the rear of the truck. Finally, the operator shall have visibility capability within the enclosed cab to verify load position and engagement.

3.32.20 Tires. The tire manufacturer's published tire load rating or the tire load ratings listed in the Year Book of the Tire and Rim Association shall be sufficient to permit truck to transport the rated loads at the speeds specified herein. Truck deration due to any requirement specified herein because of insufficient tire load rating is not permitted.

3.32.21 Slinging and tiedown attachments. Each lifting and tiedown provision shall be capable of withstanding the loads indicated in MIL-STD-209.

3.32.22 Maintainability. The following maintenance operations shall be accomplished by one man, except as noted, in not more than the time specified using common tools and special tools (if any) furnished with the truck:

MIL-T-16101E

- | | | |
|-----|---|-----------------|
| (a) | Remove, replace, and adjust all engine driven belts
Exclude engine timing belt(s). | 3/4 hour. |
| (b) | Remove and replace alternator | 1/2 hour. |
| (c) | Remove and replace alternator regulator | 1/2 hour. |
| (d) | Remove and replace all filters, screens, and strainers
in hydraulic systems. | 1/2 hour. |
| (e) | Drain engine coolant, Remove and replace engine coolant
system hoses and thermostat and refill system. | 1 hour. |
| (f) | Drain engine lubricating oil, remove and replace oil
filter elements, and refill crankcase. | 1/2 hour. |
| (g) | Remove and clean fuel strainer, replace fuel filter
elements and drain water separator. | 1/4 hour. |
| (h) | Disconnect battery cables, remove and replace battery(ies)
and reconnect battery cables. | 1/2 hour. |
| (i) | Drain torque converter oil and transmission oil, remove
and replace all filter elements and strainers, and refill
converter and transmission. | 1/2 hour. |
| (j) | Remove and replace starter | 1 hour. |
| (k) | Bleed and adjust brakes and refill master cylinder
(two men). | 3/4 hour. |
| (l) | Remove, read, and replace fluid level dipstick or
or conduct a visual inspection. | 2 minutes each |
| (m) | Disassemble and service air induction system including
replacement of air filter. | 1/2 hour. |
| (n) | Reset circuit breaker | 2 minutes each. |

Note: The time required to ascend the ladder and the opening of covers and hoods to perform the maintenance specified herein shall be excluded.

3.32.23 Starter disconnect. Starter disconnect shall prevent re-energizing the starter motor when the engine is running and when the transmission control lever is in any position other than neutral.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The

MIL-T-16101E

Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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

4.2 Classification of inspections. The inspections requirements specified herein are classified as follows:

- (a) First article inspection (see 4.3).
- (b) Post test inspection (see 4.4).
- (c) Quality conformance inspection (see 4.6).
- (d) Inspection of preparation for delivery (see 5.3).

4.3 First article (first produced) inspection. When a first article inspection is required (see 6.2), the contractor shall furnish one or more trucks which shall be the first production item(s). Prior to examination and test of the truck the contractor shall:

- (a) Furnish a schedule of maintenance to be followed during all testing of the first produced truck. A list of special tools, if required, to perform this maintenance shall be provided.
- (b) Service the truck with oils and greases suitable for use in the ambient temperature at which the tests will be conducted.
- (c) Perform truck brake-in period when required.

4.3.1 Examinations

4.3.1.1 Examinations. Prior to testing according to 4.3.2, the first produced trucks shall be examined for the defects marked "X" in Column 1 of Table I. Nonconformance with the requirements specified in Section 3 shall constitute failure of first article inspection.

4.3.2 Tests. Upon successful completion of the examinations specified in 4.3.1.1, the truck shall be subjected to the tests marked "X" in Column 1 of Table II. Test conditions and schedule shall be as follows:

- (a) Unless otherwise specified in the contract, tests shall be conducted at the ambient temperature and climatic conditions existing at the place of test. Only that maintenance established by the contractor and submitted as a maintenance schedule prior to commencement of tests shall be performed during these tests.

MIL-T-16101E

- (b) Tests may be conducted in any order desired except the performance test shall be the last test conducted. An "X" in the applicable column indicates the tests that shall be conducted.
- (c) Rated load is defined as 30,000 pounds (13,605 Kg) plus or minus one percent positioned on a pallet or pallets, adequately strapped, and uniformly distributed. The center of gravity of the load shall be on the centerline of the wheelbase and the centerline of the truck. The vertical center of gravity shall be no higher than the vertical center of the inside frame height.
- (d) Maximum pallet height and width shall be as specified herein (see 6.2 for the designated First Article Truck).

MIL-T-16101E

TABLE I. Inspection Schedule

1	2	3	4	5	6
First Produced	Quality Conformance	Requirement	Requirement Paragraph	Yes	No
X		Safety	3.4		
X		Lubrication	3.6		
X		Lubrication fittings	3.6.1		
X		Access openings	3.7.1		
X		Drainage	3.7.2		
X		Replenishment	3.7.3		
X		Plating	3.9		
X		Bearings	3.10		
X		Fungus & moisture resistance	3.11		
X		Engine	3.12		
X		Alternator	3.12.1		
X		Alternator regulator	3.12.1.1		
X		Starting system	3.12.2		
X		Battery	3.12.2.1		
X		Battery mounting	3.12.2.2		
X		Battery enclosure	3.12.2.3		
X		Battery cables	3.12.2.4		
X		Fuel tank	3.12.3.1		
X		Fuel strainer, filter & water separator	3.12.3.2		
X		Air induction system	3.12.4		
X		Air restriction indicator	3.12.5		
X		Fan	3.12.6.1		
X		Thermostat	3.12.6.2		
X		Radiator	3.12.6.3		
X		Engine coolant hose	3.12.6.4		
X		Water pump	3.12.6.5		
X		Governor	3.12.7		
X		Exhaust system	3.12.8		
X		Oil filter	3.12.9		
X		Cold weather aids	3.13		
X		Transmission	3.14.1		
X		Torque convertor	3.14.1.1		
X		Oil filter	3.14.2		
X		Drive shaft	3.14.3.1		
X		Differential	3.14.3.2		
X		Drive axles	3.14.3.3		
X		Drive wheel heads and chains	3.14.3.4		
X		Hydraulic motor reduction gear	3.15.1.1		
X		Drive shafts	3.15.1.2		
X		Side shafts	3.15.1.3		
X		Worm gear boxes	3.15.1.4		
X		Shoe lift rods	3.15.1.5		
X		Hydraulic pump(s)	3.15.2.1		
X		Reservior	3.15.2.2		

MIL-T-16101E

TABLE I. Inspection Schedule Continued

1	2	3	4	5	6
First Produced	Quality Conformance	Requirement	Requirement Paragraph	Yes	No
X		Filter	3.15.2.3		
X		Contamination Indicator	3.15.2.4		
X		Relief valve	3.15.2.5		
X		Hoist control valves	3.15.2.6		
X		Cylinders	3.15.2.7		
X		Hydraulic fittings	3.15.2.8		
X		Valves and cylinders	3.15.2.8.1		
X		Tubing	3.15.2.8.2		
X		Hoses	3.15.2.8.3		
X		Hydraulic hoses and tubing	3.15.2.9		
X		Hoses	3.15.2.9.1		
X		Tubing	3.15.2.9.2		
X		Shoe lift rods	3.15.2.10		
X		Hoist limit stop	3.15.3		
X		Hoist load shoes	3.15.4		
X		Frame	3.16		
X		Wheels	3.16.1		
X		Wheel mounting	3.16.2		
X		Wheel guards	3.16.3		
X		Wheel suspension	3.16.4		
X		Wheel forks & tubes	3.16.5		
X		Tires	3.16.6		
X		Tubes	3.16.7		
X		Body	3.17		
X		Access openings	3.17.1		
X		Hand holds	3.17.2		
X		Cowl or hood	3.17.3		
X		Slings & tiedown attachments	3.18		
X		Steering	3.19		
X		Service brake system	3.20.1		
X		Parking brake	3.20.2		
X		Personnel cab	3.21 to 3.21.4		
X	X	Heater	3.21.5 & 6.2		
X	X	Air conditioner	3.21.6 & 6.2		
X		Instrument panel	3.22		
X		Instruments	3.23		
X		Elect. system monitor	3.23.1		
X		Oil pressure monitor	3.23.2		
X		Coolant temp. monitor	3.23.3		
X		Transmission temp monitor	3.23.4		
X		Hour meter	3.23.5		
X		Fuel gauge	3.23.6		
X		Speedometer	3.23.7		
X		Controls	3.24		

MIL-T-16101E

TABLE I. Inspection Schedule Continued

1	2	3	4	5	6
First Produced	Quality Conformance	Requirement	Requirement paragraph	Yes	No
X		Head light switch	3.24.1		
X		Load light switch	3.24.2		
X		Electrical switch	3.24.3		
X		Starting motor switch	3.24.4		
X		Interlocking Light switch	3.24.5		
X		Parking brake control	3.24.6		
X		Accelerator control	3.24.7		
X		Transmission control	3.24.8		
X		Hoist & grappling control	3.24.9		
X		Service brake control	3.24.10		
X		Windshield wiper control	3.24.11		
X		Headlight control	3.24.12		
X		Direction indicators control	3.24.13		
X		Horn control	3.24.14		
X	X	Heater and defroster control	3.24.15		
X	X	Air conditioner control	3.24.16		
X		Ventilation fans control	3.24.17		
X		Electrical system	3.25		
X		Headlights	3.25.1		
		Stoplights and tail lamps	3.25.2		
		Wiring & switching	3.25.2.1		
X		Directional indicator	3.25.3		
X		Load lights	3.25.4		
X		Horn	3.25.5		
X		Dual rearview mirrors	3.26		
X		Safety guards	3.27.1		
X		Platforms	3.27.2		
X		Guardrails	3.27.3		
X		Sounding device	3.27.4		
X		Warning lights	3.27.5		
X		Mirrors	3.27.6		
X	X	Workmanship	3.28 to 3.28.5		
X	X	Identification plate	3.29.1		
X		Instruction, warning & caution plates	3.29.2		
X		Shipping data plate	3.29.3		
X		Wheel loading plate	3.29.4		
X		Carrying capacity data plate	3.29.5		
X		Speed warning plate	3.29.6		

MIL-T-16101E

TABLE I. Inspection Schedule Continued

1	2	3	4	5	6
First Produced	Quality Conformance	Requirement	Requirement paragraph	Yes	No
X		Vehicle marking	3.30		
X		Trk capacity marking	3.30.1		
X	X	Registration number marking	3.30.2		
X		Tire pressure marking	3.30.3		
X		Slinging & tiedown marking	3.30.4		
X		Safety warning marking	3.30.5		
X		Fuel type marking	3.30.6		
X		Paint marking	3.30.7		
X		Treatment & painting	3.31		
X		Walkway coating	3.31.1		

MIL-T-16101E

TABLE II. Test Schedule

1	2	3	4	5	6	7
First Produced	Quality Conformance	Post Tests	Test	Test Paragraph	Performance Paragraph	Test Method
X		X	Lifting Speed	4.3.2.1	3.33.1	1
X		X	Lowering Speed	4.3.2.1	3.33.2	1
X		X	Turning radius	4.3.2.2	3.33.3	-
X		X	Steering	4.3.2.3	3.33.4	2
X		X	Speed	4.3.2.4	3.33.5	3
X			Acceleration	4.3.2.5	3.33.6	3
X	X		Slope ascension	4.3.2.6	3.33.7	4
X			Underclearance	4.3.2.7	3.33.8	4
X	X	X	Service brakes	4.3.2.8	3.33.9	5
X	X		Parking Brake	4.3.2.9	3.33.10	4
X			Overload	4.3.2.10	3.33.11	6
X			Lateral stability	4.3.2.11	3.33.12	7
X	X		Truck dimensions	4.3.2.12	3.33.13	-
X	X	X	Load shoe travel	4.3.2.13	3.33.14	-
X			EMI	4.3.2.14	3.33.15	-
X		X	Noise limits	4.3.2.15	3.33.16	-
X			Performance	4.3.2.16	3.33.17	8
X		X	Drift	4.3.2.17	3.33.18	9
X			Visability	4.3.2.18	3.33.19	10
X			Tires	4.3.2.19	3.33.20	11
X			Slinging & tiedown	4.3.2.20	3.33.21	-
X			Maintainability	4.3.2.21	3.33.22	-
X			Starter disconnect	4.3.2.22	3.33.23	-

MIL-T-16101E

- 4.3.2.1 Lifting speed and lowering speed. Test the truck in accordance with Test Method No. 1. Nonconformance to 3.33.1 and 3.33.2 shall constitute failure of this test.
- 4.3.2.2 Outside turning radius. Test the truck to determine compliance with the requirements of 3.33.3. Truck shall negotiate a non-stop minimum turn of 360 degrees tleft turn in the forward direction. Mark the position of the truck midpoint at two 180 degree points. Measure the distance between the two points and determine the truck turning radius. Repeat the test to negotiate a right turn in the forward direction. Nonconformance to 3.33.3 shall constitute failure of this test.
- 4.3.2.3 Steering. Test the truck in accordance with Test Method No. 2. Nonconformance to 3.33.4 shall constitute failure of this test.
- 4.3.2.4 Speed. Test the truck in accordance with Test Method No. 3. Nonconformance to 3.33.5 shall constitute failure of this test.
- 4.3.2.5 Acceleration. Test the truck in accordance with Test Method No. 3. Nonconformance to 3.33.6 shall constitute failure of this test.
- 4.3.2.6 Slope ascension. Test the truck in accordance with Test Method No. 4. Nonconformance to 3.33.7 shall constitute failure of this test.
- 4.3.2.7 Underclearance. Test the truck in accordance with Test Method No. 4. Nonconformance to 3.33.8 shall constitute failure of this test.
- 4.3.2.8 Service brakes. Test the truck in accordance with Test Method No. 5. Nonconformance to 3.33.9 shall constitute failure of this test.
- 4.3.2.9 Parking Brake. Test the truck in accordance with Test Method No. 4. Nonconformance to 3.33.10 shall constitute failure of this test.
- 4.3.2.10 Overload. Test the truck in accordance with Test Method No. 6. Nonconformance to 3.33.11 shall constitute failure of this test.
- 4.3.2.11 Lateral Stability. Test the truck in accordance with Test Method No. 7. Nonconformance to 3.33.12 shall constitute failure of this test.
- 4.3.2.12 Truck dimensions. Truck dimensions (see 6.2) shall be determined and recorded. Nonconformance to 3.33.13 and measurements exceeding maximum permitted or measurements failing to meet minimum requirements shall constitute failure of this test.
- 4.3.2.13 Load Shoe Travel. Test the truck with rated load. Truck shall be placed on level paved surface and each load shoe shall be leveled with a 8 foot mason's level. Measure distance from paving to each load shoe carrying surface. Nonconformance to 3.33.14 shall constitute failure of this test.
- 4.3.2.14 Electromagnetic Interference Characteristics. The truck shall be tested to ensure compliance with 3.33.15. Emissions exceeding those permitted in SAE J551 shall constitute failure of this test.

MIL-T-16101E

4.3.2.15 Noise Level measurement

4.3.2.15.1 Operator's Station. Measure equivalent continuous noise level (Leq) in accordance with MIL-STD-1474A at the operators station during performance testing. Microphone shall be located no more than six 6 inches (150 mm) from operator's approximate ear location. Duty cycle test shall be run in lieu of the steady-state test of MIL-STD-1474A. All lifting and lowering operations shall be accomplished with the truck stationary at lifting and lowering speeds specified. Cumulative noise exposure measurement shall require a minimum of 1 hour of continuous operation on the test course. Nonconformance to 3.33.16 at the operator's station shall constitute failure of this test.

4.3.2.15.2 Exterior. Measure the maximum steady state noise level in accordance with MIL-STD-1474 for exterior noise for construction and materials handling equipment.

4.3.2.15.3 Noise Hazard. If the noise level of the truck exceeds 85db (A) at 24.5 feet when tested in accordance with 4.3.2.15.2 noise hazard signs conforming to MIL-STD-1474 shall be posted by the contractor on each side and rear of truck.

4.3.2.16 Performance. Test the truck in accordance with Test Method No. 8. The performance test shall be conducted on a continuous basis during each 8 hour day (minimum). Testing shall be conducted at the rate of 12 circuits per hour (minimum). The 1440 circuits must be completed without any failures. If failure(s) occur before completion of 1440 laps, the failure(s) must be corrected and test restarted beginning at the first circuit. Nonconformance with the requirements of 3.34.17 is defined as any malfunction which cannot be remedied by adjustment, repair, or replacement action by contractor's maintenance personnel using contractor's tools and parts within 30 minutes or the totaled time of the all malfunctions exceeds 5% of the time required to complete 1440 laps and which may cause:

- (a) Failure to commence operation, cessation of operation or degradation of performance below designated levels.
- (b) Damage to truck by continued operation.
- (c) Personnel or truck safety hazard.
- (d) Detrimental wear.

4.3.2.17 Drift. Test the truck in accordance with Test Method No. 9. Nonconformance to 3.33.18 shall constitute failure of this test.

4.3.2.18 Visability. Test the truck in accordance with Test Method No. 10. Nonconformance to 3.33.19 shall constitute failure of this test and the contractor will be required to supply additional mirror(s) in order to demonstrate compliance.

4.3.2.19 Tires. Test the truck in accordance with Test Method No. 11. Nonconformance to 3.33.20 shall constitute failure of this test.

MIL-T-16101E

4.3.2.20 Slinging and tiedown attachments. Test the slinging provisions (see 3.3.5.6) by applying the load for the time period specified in MIL-STD-209. Test the tiedown provisions by applying the ultimate load for the time period specified in MIL-STD-209. Nonconformance to 3.33.21 shall constitute failure of this test.

4.3.2.21 Maintainability. Perform and record time required to perform each maintenance operation. List any special tool required to perform any of the maintenance operations. Nonconformance to 3.33.22 shall constitute failure of this test.

4.3.2.22 Starter disconnect. Test the truck to ensure starter motor can only be energized when the transmission lever is in the neutral position and when the engine is not running. Attempt to energize the starter motor when the transmission lever is in the forward and reverse positions and when the engine is running. Any evidence of starter motor operation shall constitute nonconformance to 3.33.23 and failure of this test.

4.4 Post Tests.

4.4.1 Post Tests. After successful completion of testing specified in 4.3.2, the first produced truck shall be subjected to the test marked "x" in column 3 of Table II. Nonconformance with any of the performance requirements specified herein shall constitute failure of first article test.

4.5 First Article (first produced) inspection and test report. When specified in the contract or order, a First Article Inspection Report (4.3.1) and a First Article Test Report (4.3.2) shall be prepared (see 6.3). Each inspection, test result and report cover shall be witnessed and verified by a government representative and shall bear the government representative's stamp. First article test truck USN registration number and manufacturers serial number shall be indicated in the report.

4.6 Quality Conformance Inspection and Tests.

4.6.1 Quality Conformance Inspections. Each production truck shall be inspected for compliance marked "x" in column 2 of Table I. Nonconformance with the requirements specified herein shall be cause for rejection of truck.

4.6.2 Quality Conformance Tests. Each production truck shall be tested for compliance marked "x" in column 2 of table II. Nonconformance with the performance requirements specified herein shall be cause for rejection of truck.

4.7 Inspection Comparison. The government may select trucks at any time during the contract production period and subject the trucks to the inspections specified in Column 1 of Table I and to the tests specified in Column 1 of Table II to determine conformance to the requirements of this specification. The inspections will be performed by the Government, at a site selected by the Government, on units selected at random from those which have been accepted by the Government and will not include the previously inspected and tested truck(s). In addition to any test specified as part of the inspection comparison, the government reserves the right to conduct any and all other tests contained in this specification as part of the inspection comparison, and

MIL-T-16101E

failure of such additional tests shall have the same effect as failure of those tests specified as inspection comparison.

4.7.1 Inspection failure. Failure of an inspection comparison truck to meet any requirement specified herein during and as a result of the inspection and tests specified herein during and as a result of the inspection and tests specified in 4.2 shall be cause for rejection of the inspection comparison truck(s) and shall be cause for refusal by the Government to continue acceptance of production trucks until evidence has been provided by the supplier that corrective action has been taken to eliminate the deficiencies. Correction of such deficiencies shall be accomplished by the supplier at no cost to the Government on trucks previously accepted and produced under the contract. Any deficiencies found as a result of the inspection comparison will be considered prima facie evidence that all trucks accepted prior to the completion of inspection comparison are similarly deficient unless evidence to the contrary is furnished by the supplier and such evidence is acceptable to the contracting officer.

4.8 Preproduction sample truck(s). Any changes or deviations of production truck(s) from the approved preproduction model during production will be subject to the approval of the contracting officer. Approval of the preproduction model will not relieve the supplier of his obligation to furnish truck(s) conforming to this specification.

4.9 Incident report. When the contractor is conducting the inspections and tests specified herein, any malfunction or failure will require a written report of the incident be submitted to the contracting officer within 24 hours. As a minimum, the report shall describe components and parts affected, test and operating conditions, date of incident, hour meter reading, how detected and description of incident and corrective action taken.

5. PACKAGING

5.1 Preservation, packing, and marking. Each complete straddle carry truck shall be preserved, packed and marked in accordance with MIL-STD-162 for type I mobile or type II crated, as specified (see 6.2). The degree of preservation shall be level A, Level B, Level C or commercial, and the degree of packing shall be level A, level B, level C or commercial as specified (see 6.2 and 6.5).

5.2 Marking. Marking shall be in accordance with MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The trucks described herein are intended for moving cargo from warehouses and terminals onto piers for loading ships. Trucks are intended for operation in and around military supply facilities which contain railroad rail systems and roads within the military supply system. The trucks are intended for operation over rough paved surfaces for long distances and traversing uneven railroad crossings.

MIL-T-16101E

6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number and date of the specification.
- (b) List of non-government documents not listed in the DODISS and the date of issue (see 2.2).
- (c) List of classifications (sizes) required (see 1.2).
- (d) When preproduction sample truck is required, number and size of truck(s) to be furnished, and time frame required for submission of first article test results (see 3.1).
- (e) When cab heater and defroster are not required with personnel cab (see 3.22.5).
- (f) When cab air conditioner is required with personnel cab (see 3.22.6).
- (g) Specify type and degree of preservation, packaging and packing required (see 5.1).

6.3 Data requirements. When this specification is used in an acquisition and data (First Article Test Report) is required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase requirements. Deliverable data required by this specification are cited in the following paragraphs:

<u>Paragraph No.</u>	<u>Data Requirement Title</u>	<u>Applicable DID No.</u>
4.5 & 6.4	First Article Inspection Test Report	DI-T-4902
4.9	Incident Report	DI-T -23724

The above DID's were those cleared as of the date of this specification. The current issue of 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL, must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423).

6.4 First article. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first article(s) as specified herein. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

MIL-T-16101E

6.5 Conditions for use of level B preservation. When Level B preservation is specified (see 5.1 and 6.2), this level of protection should be limited to truck(s) which are transported over the seas onboard marine vessels and when long term storage is required.

6.6 Reassembly. The contracting officer shall include in the solicitation the requirement that the manufacturer shall provide services for on-site supervision, personnel and equipment necessary to unload, uncrate, and reassemble equipment items whose physical size prevents shipment in a fully assembled condition. Contractor shall inform the consignee in writing the truck has been shipped and upon being notified the truck has arrived at the activity the contractor will perform the reassembly operations within two weeks of notification.

6.7 Subject term (key word listing).

Straddle Truck
Diesel Engine Driven

6.8 Changes from previous issue. Marginal notes are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - ME
Navy - SA
Air Force - 99

Preparing Activity

Navy - SA

Review activities:

Army - SM, MT
Navy - MC, SH
DLA - CS
Air Force -84

User Activity

Navy -SH

MIL-T-16101E

APPENDIX

FOR

TRUCKS, STRADLE-CARRY, 30,000 POUNDS (13,605 kg) CAPACITY,
PNEUMATIC RUBBER TIRES

1.0 Scope. The Test Methods contained within this Appendix are to determine whether trucks procured under this specification conform to the requirements listed herein.

MIL-T-16101E

TEST METHOD NO. 1

LIFTING AND LOWERING SPEEDS

1. Test Course.

(a) Level, paved surface.

2. Test Apparatus.

- (a) Tape measure.
- (b) Split second timing device.
- (c) Rated load (30,000 lbs).

3. LIFTING SPEED TEST

3.1 Test shall be conducted with the truck staddling the rated load. The load shoes shall be in the swung out and fully lowered position.

3.2 Measure and mark a point of reference on thr truck which indicates when the load has been raised 12 inches (305 mm).

3.3 Record the time required to grapple the rated load and raise it to the measured mark.

3.4 The rated load shall then be lowered and the above operation repeated two (2) more times. Test result shall be the average of the three tests.

4. LOWERING SPEED TEST

4.1 This test shall be performed without the rated load on the load shoes and the load shoes positioned at the measured reference point previously marked in 3.2 in the swung-in (grappled) position.

4.2 Record the time required to lower the shoes and swing them out to the maximum swung out position.

4.3 The unloaded shoes shall be returned to the initial position and the above operation repeated two (2) more times. Test result shall be the average of the three tests.

MIL-T-16101E

TEST METHOD NO. 2

STEERING

1. Test Course.

(a) Level, paved surface.

2. Test Apparatus.

(a) Tension dynamometer (with a 0-300 pound (0-1335 N) dial) equipped with a maximum hand.

(b) Steering wheel adaptor pulley.

(c) Rated load (30,000 lbs (13,605Kg))

3. STEERING FORCE TEST

3.1 Position truck with rated load on a level paved surface.

3.2 Place steer wheels in a straight-ahead position.

3.3 Assemble an adapter pulley having a root diameter equal to the steering wheel diameter and means for attachment to the wheel spokes of the hand steering wheel.

3.4 Attach a tension dynamometer to the adapter pulley.

3.5 Grasp the dynamometer lead and apply a steady force, in a counterclockwise direction and in the wheel plane, until the steer wheels begin to turn.

3.6 Observe and record the maximum gage reading within the first half of the inner steer wheel angle.

3.7 Observe and record the maximum gage reading at extreme ends of the steer.

4. STEERING WHEEL TURNS TEST

4.1 Position the truck with rated load on a level paved surface. Record the number of turns of the hand steering wheel required to turn the four wheels from extreme right position to the extreme left.

4.2 Repeat operation from extreme left to extreme right.

5. STEERING WHEEL FREE PLAY TEST

5.1 Position the unloaded truck on a dry, level, paved surface with its rear wheels parallel to the longitudinal axis of the truck.

5.2 Attach to the steering column, immediately below the steering wheel and parallel to it, a piece of stiff fiber board of similar material which is semi-circular in shape and which has a radius at least 1 inch (25 mm) greater than the radius of the steering wheel.

MIL-T-16101E

TEST METHOD NO. 2 CONTINUED

5.3 Mark a reference point on the upper portion of the outer edge of the steering wheel; mark a corresponding point on the fiber board templet.

5.4 Turn the steering wheel counterclockwise until the rear wheels of the truck begin to turn. Mark a point on the fiber board templet corresponding to the reference point on the outer edge of the steering wheel.

5.5 Turn the steering wheel clockwise until the rear wheels of the truck begin to turn. Mark a point on the fiber board templet corresponding to the reference point on the outer edge of the steering wheel.

5.6 Remove the fiber board templet from the truck.

5.7 Place the fiber board templet on a flat surface. Measure and record the distance between the 2 points made in accordance with operations 5.3, 5.4 and 5.5 above. This distance is the free play of the steering wheel.

MIL-T-16101E

TEST METHOD NO. 3

ACCELERATION AND SPEED1. Test Course.

- (a) Test course shall be a level paved surface of sufficient length to attain maximum speed prior to entering the measured distance, plus a measured distance, plus a safe stopping distance.

2. Test Apparatus:

- (a) Tape measure.
- (b) Timing device.

3. Speed test.

- 3.1 Drive the truck forward with rated load (30,000 lbs (13,605 Kg)) a sufficient distance to attain maximum speed prior to entering the measured test course.
- 3.2 Record length of measured distance and time required to traverse measured distance. Measured distance shall be equal to or greater than 44 feet (13 m).
- 3.3 Repeat test for a total of three runs. Test result shall be the average of the three test runs.

4. SPEED TEST

- 4.1 Drive the truck forward with rated load (8,000 lbs (3630 Kg)) a sufficient distance to attain maximum speed prior to entering the measured test course.
- 4.2 Record length of measured distance and time required to traverse measured distance. Measured distance shall be equal to or greater than 44 feet (13 m).
- 4.3 Repeat test for a total of three runs. Test result shall be the average of the three test runs.

5. SPEED TEST

- 5.1 Drive the truck rearward with rated load (30,000 lbs (13,605 Kg)) a sufficient distance to attain maximum speed prior to entering the measured test course.
- 5.2 Record length of measured distance and time required to traverse measured distance. Measured distance shall be equal to or greater than 44 feet (13 m).
- 5.3 Repeat test for a total of three runs. Test result shall be the average of the three test runs.

MIL-T-16101E

TEST METHOD NO. 3 CONTINUED

ACCELERATION TEST

6.1 From a standing stop determine and record time using a timing device for truck without rated load to travel a distance of 100 feet (3048 cm).

6.2 Perform operations 6.1 a second and third time. Test result shall be the average of the three test runs.

ACCELERATION TEST

7.1 From a standing stop determine and record time using a timing device for truck with rated load to travel a distance of 100 feet (3048 cm).

7.2 Perform operations 7.1 a second and third time. Test result shall be the average of the three test runs.

MIL-T-16101E

TEST METHOD NO. 4

SLOPE ASCENSION - UNDERCLEARANCE - PARKING BRAKE

1. Test Course.

(a) 10 percent paved ramp

2. Test apparatus.

(a) Rated load (30,000 lbs (13,605 Kg))

3. Test Procedure:

3.1 Drive truck forward with rated load along horizontal approach and onto ramp of 10 percent (5.7 degrees) and bring to a complete stop (all wheels supported on the ramp).

3.2 Apply parking brake, release service brakes and observe and record whether truck remains stationary.

3.3 Reapply service brake, release parking brake and proceed up and onto a horizontal surface. Stop the truck with the front wheels on the horizontal surface and the drive wheels on the ramp. Measure and record underclearance of the lowest truck components and note each component.

3.4 Repeat operations 3.1 thru 3.3 without rated load.

MIL-T-16101E

TEST METHOD NO. 5

SERVICE BRAKES

1. Test Course.

(a) Test course shall be a paved, level surface of sufficient length to attain maximum speed prior to entering measured distance (70 feet minimum (22 m)) and sufficient safe stopping distance.

2. TEST APPARATUS.

- (a) Tape measure.
- (b) Pedal force guage
- (c) Bennett Feragen Corp. "Press-O-Meter" pressure gauge, Model PM-35 (with a 0-300 pound (0-1332 N) dial) or equivalent

3. STOPPING DISTANCE TEST.

- 3.1 Attach a pedal force gage to brake pedal in a manner which enables a force to be applied to the brake pedal.
- 3.2 Start truck and allow to warm up for 15 minutes prior to start of test.
- 3.3 With rated load (30,000 lbs (13,605 Kg)) in the carry position drive the truck a sufficient distance to attain maximum truck speed (15 mph minimum (24 Km/hr)) prior to entering the measured test course.
- 3.4 At the start of the measured test course the operator shall apply the service brakes and safely bring the truck to a complete stop.
- 3.5 A passenger shall record the minimum and maximum pedal force required to bring the truck to a complete stop.
- 3.6 Measure and record the distance from the start of the measured distance to the front of the truck shoe.
- 3.7 Perform operations 3.3, 3.4, 3.5 and 3.6 a second and third time. Test result shall be the average of the three test runs.

4. SERVICE BRAKE PRESSURE TEST.

- 4.1 Attach the pressure gage to the brake pedal by clamp to permit application of full foot pressure to one side of the pressure gage.
- 4.2 Apply pressure to the gage until it registers 250 pounds (1110 N) and hold for 1 minute.
- 4.3 Repeat operation number 4.2, 10 times.

MIL-T-16101E

TEST METHOD NO. 6

OVERLOAD

1. Test Course.

(a) Level, paved surface

2. Test Apparatus.

(a) Lifting jacks

(b) Test load (60,000 lbs (27,240 Kg))

2. Overload test.

2.1 Position truck on test course with the truck straddling the test load. Then, support truck with blocks under the frame to relieve truck weight on the tires. The hydraulic pump and system relief valve may be rendered inoperative or isolated for the purpose of this test.

2.2 The load shoes shall be at the transport height in the maximum spread position so as to permit the test load to be raised by the use of lifting jacks to the transport height.

2.3 The load shoes shall then be closed on the test load.

2.4 The test load shall then be lowered until the test load is supported totally by the load shoes.

2.5 This load shall be applied for 10 minutes. Examine and record any deformation or failure. Record any hydraulic system leaks and ruptures.

MIL-T-16101E

TEST METHOD NO. 7

LATERAL STABILITY

1. Test course.

(a) Tilt table or platform

2. Test apparatus.

(a) Clinometer

3. Lateral stability test.

3.1 Drive unloaded truck onto tilt table or platform such that truck longitudinal centerline is parallel to the tilting axis of the platform or table.

3.2 Raise unloaded load shoes to maximum lift height.

3.3 Tilt platform to 4 percent slope (2.3 degrees) as measured by the clinometer. Determine whether all tires remain in contact with platform.

3.4 Repeat operations 3.1, 3.2 and 3.4 while tilting truck to the opposite side.

MIL-T-16101E

TEST METHOD NO. 8PERFORMANCE1. Test course.

1.1 Layout of course. The test course and ramp shall be set up in accordance with the provisions of Figure 1.

1.2 Aisle or road widths. Aisle or road widths shall be 20 feet (6096 mm). The entire perimeter of the course shall be encompassed with a suitable material to form a barrier having a height of at least 12 inches (305 mm). Rubber pylons, or other suitable marking devices, shall be placed at all corners and other critical points to assist in keeping the machine under test within the course aisle.

1.3 Obstacle course. The obstacle course shall be set up in accordance with the provisions of Figure 2, as a part of the test course. A guide line equal in length to two times the wheelbase of the truck under test shall be provided parallel and to the left of the center line of the course. This shall be at a distance from the course center line equal to 1/2 the distance between front wheel centers. The truck shall traverse the obstacle course in a straight line with its left front wheels tracking on the guide line. The spacing and arrangement shall allow the right front wheel tracking on the guide line. The spacing and arrangement shall allow the right front and left rear wheels to be on the crest of blocks simultaneously while the other two wheels are at ground level. Similarly, the left front and right rear wheels shall be elevated simultaneously while the other two wheels are at ground level. This rocking action shall occur while the machine is moving forward over the obstacle course.

1.4 Standard test loads. Test loads used in the performance test shall be in accordance with 4.3.2(c).

1.5 Test load areas. Skidded test loads shall be positioned in accordance with Figure 1.

1.6 Minimum lighting requirement. Headlights of the machine under test shall be on at all times during the performance test.

1.7 Course surface. The test course shall be paved or covered with hard-packed earth or gravel, with a surface permitting tire impressions not greater than 1/4 inch (6 mm) deep when the carrier is transporting the test load.

2. Performance test. Truck shall begin each lap at the test load area marked (A) on figure 1 and in a position to pick up the test load. The operator shall then sound the horn for approximately 1 second, turn each light switch on and off, elevate the test standard load to the travel position and perform the following sequence of operations to complete the test course:

2.1 Back into the transverse leg of the test course without backing into the portion of course marked area (B).

MIL-T-16101E

TEST METHOD NO. 8 CONTINUED

- 2.2 Drive forward making a 90° left hand turn and proceed along area (B).
- 2.3 At intersection, make 90° right hand turn until adjacent to area marked (C).
- 2.4 Ground the test load and back out into main aisle.
- 2.5 Return to the straddle position over the test load and elevate the test load to the travel position.
- 2.6 Back out into the aisle area (B) from which position make a 90° left hand turn and proceed along area marked (D).
- 2.7 At intersection, make a 90° left hand turn onto the ramp without backing.
- 2.8 Stop truck when arriving at position on ramp labeled "Stopping Point" and activate the parking brake.
- 2.9 Release parking brake and resume mounting ramp.
- 2.10 Proceed down grade making a right hand turn off of the ramp and left hand turn into portion of course marked (F).
- 2.11 Make left hand turn into area (G) and proceed to obstacle course area.
- 2.12 Traverse obstacle course in accordance with 1.3. This part of the test may be conducted at reduced speed with the transmission in low gear, however, the truck shall not be stopped while going over the blocks.
- 2.13 Upon completion of the obstacle course, the truck shall be driven to the initial starting area (A). The test load shall then be grounded and the start of the next circuit shall continue in accordance with 2.2 through 2.13. to complete additional circuits of the test course.
- 2.14 On alternate days, the course shall be traversed in the opposite (or clockwise) direction. On these days, the test procedure shall be reversed.
- 2.15 The "Hourly Time Record Sheet" (see figure 3) shall be filled out for each operating hour of the performance test.

MIL-T-16101E

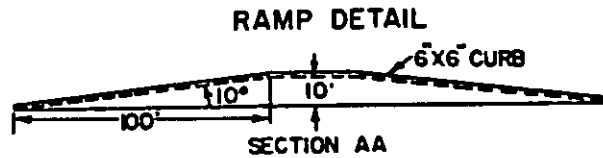
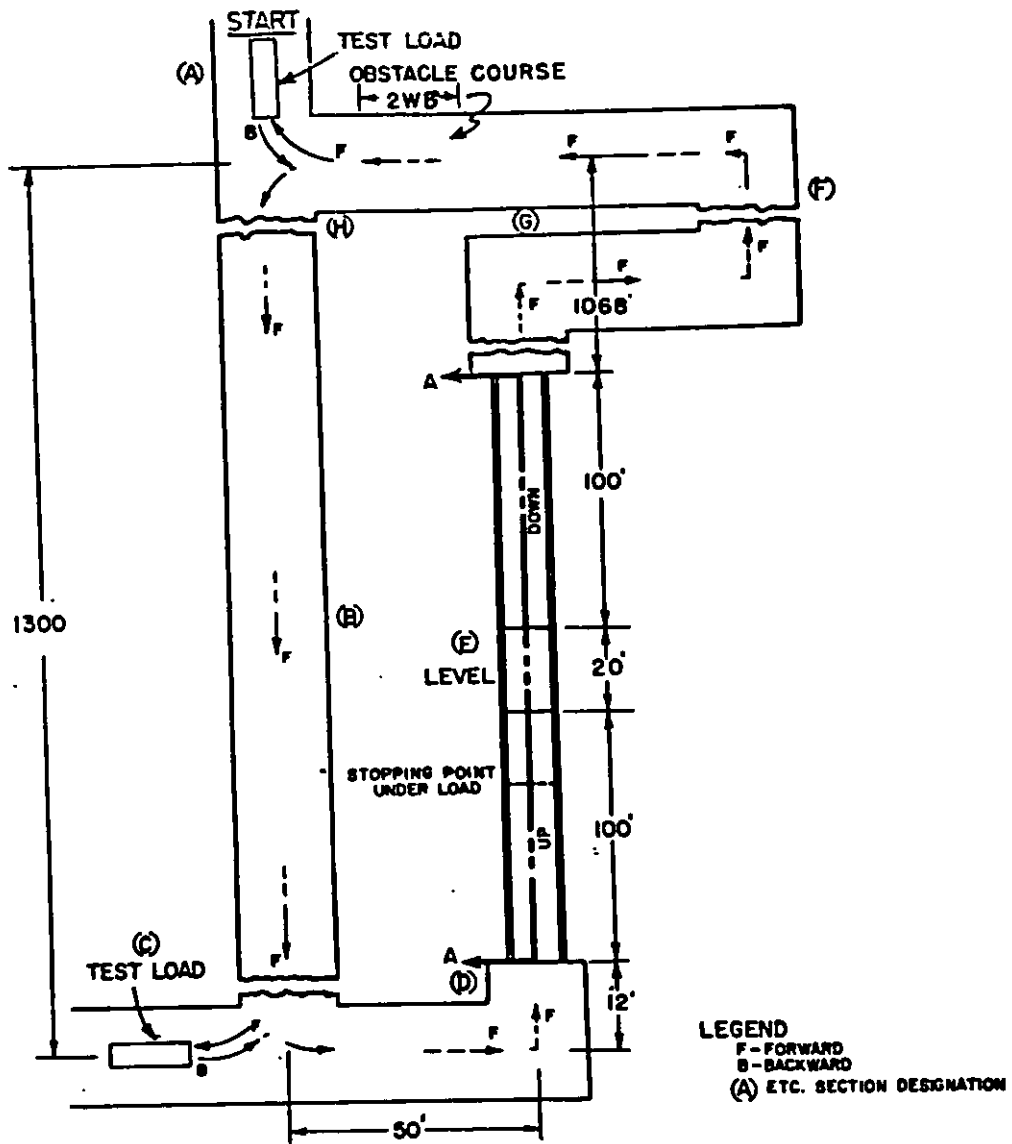
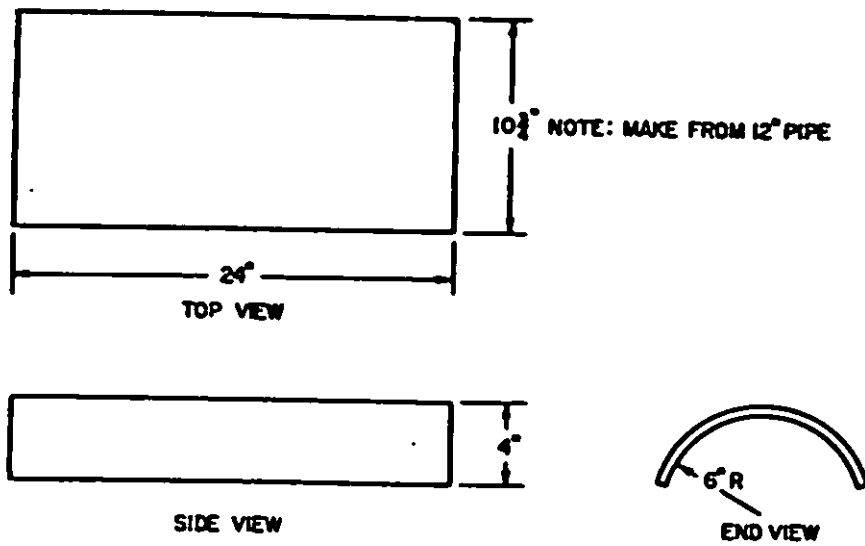
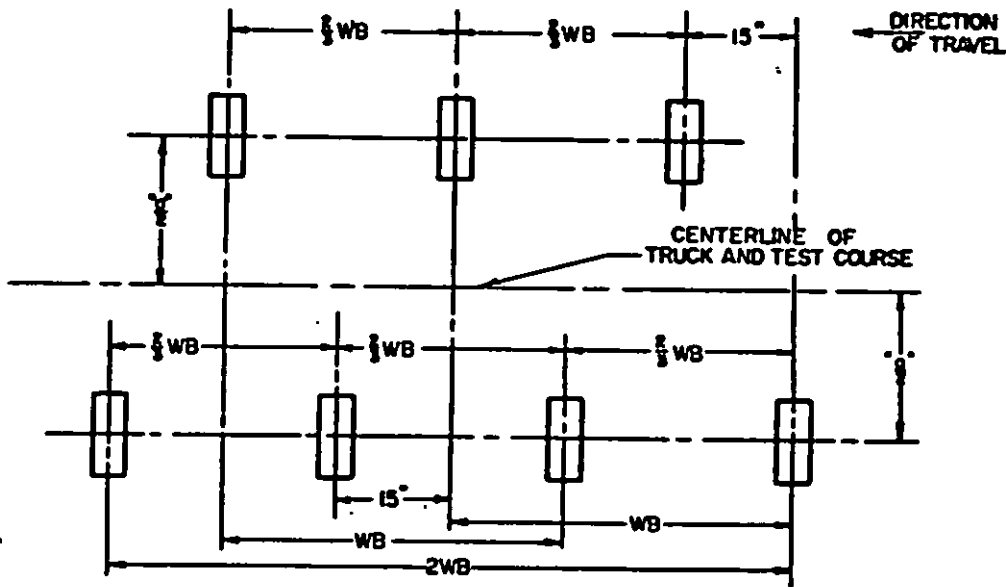


FIG. 1 - OUTDOOR TEST COURSE FOR TRUCK, STRADDLE-CARRY, GASOLINE

MIL-T-16101E



LAYOUT OF OBSTACLE COURSE



NOTE:
 15° = DISTANCE BETWEEN CENTERLINES OF DRIVING WHEELS
 WB = WHEEL BASE

AREA "B" ON TEST COURSE

FIG.2 DETAILS OF OBSTACLE CONSTRUCTION

MIL-T-16101E

HOURLY TIME RECORD SHEET

TRUCKS, STRADDLE-CARRY, DIESEL,
PNEUMATIC RUBBER TIRES

Truck Manufacturer		Model		Serial No.		Date	
Test Location		Recorded By:		Clock Readings: (start) (finish)		Required laps/hr	
Laps Number	Watch Reading	Elapsed Time	Remarks				
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
Total			Average Lap Time _____				

Instructions for Timing Performance Test

1. Start decimal minute stop watch at zero at beginning of each operating hour.
2. Record watch reading at end of each lap in "Watch Reading" space.
3. Subtract watch reading at end of preceding lap from reading at end of lap. Record differences in "Elapsed Time" space.
4. If equipment under test completes the required number of laps prior to completion of an operating hour, it shall be stopped until start of next hour, and then resume performance test.

FIGURE 3

TEST METHOD NO. 9

DRIFT

1. Test Course. Level, paved surface.

2. Test Apparatus.

- (a) Temperature thermocouples
- (b) Clinometer.
- (c) Rated load (30,000 lbs)

3. Drift test.

3.1 Install thermocouple in the hydraulic reservoir. Raise the hydraulic oil temperature to the normal operating temperature by exercising the lift and grappling functions and maintain this temperature during the duration of the test.

3.2 Raise rated load to maximum lift height with shoe lift rods in true vertical position measured with the clinometer. Measure the distance from the ground level to the load shoe carrying surface.

3.3 Record hydraulic oil temperature.

3.4 Hold for 10 minutes and record downward drift.

MIL-T-16101E

TEST METHOD NO. 10

VISABILITY

1. Test Course. Level, paved surface.
2. Test Apparatus.
 - (a) Four foot high pole with base stand
3. Visability test.
 - 3.1 Place truck on test course with operator seated in cab.
 - 3.2 Place test pole in front of truck at the truck lateral midpoint and parallel with the wheelguards. Determine if the operator can see the pole by using mirrors or by direct sight.
 - 3.3 Place the pole in front of the right front and then left front wheel and record visibility.
 - 3.4 Place pole at three separate locations along each side of the truck and at equal distances apart starting from the front of the truck and record visibility.
 - 3.5 Place the pole in front of the left rear, right rear, and then directly behind truck at truck midpoint and record visibility.
 - 3.6 Repeat the procedure in paragraph 3.2 and 3.5 moving the pole out from the truck one foot at each position described. Movement out from the tires shall be at 45 degree angle away from the truck. Repeat process until final location of pole is 40 feet away from truck.
 - 3.7 Record visibility at all locations indicated whether sight is through mirrors or direct sight.

MIL-T-16101E

TEST METHOD NO. 11

TIRES

1. Test Course. Level, paved surface.

2. Test Apparatus.

- (a) Platform scale
- (b) Rated load (30,000 lbs)

3. Tire loading test.

3.1 Determine and record the weight supported by the rear drive tires without rated load by driving the rear wheels onto a platform scale. The load on each tire shall be determined by dividing the recorded weight by the number of rear tires.

3.2 Determine and record the weight supported by the front tires without rated load by driving the front wheels onto a platform scale. The load on each tire shall be determined by dividing the recorded weight by the number of front tires.

3.3 Repeat steps 3.1 and 3.2 with rated load.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-T-16101E	2. DOCUMENT DATE (YYMMDD) 92 09 11
3. DOCUMENT TITLE TRUCKS, STRADDLE_CARRY, DIESEL, 30,000 POUNDS		
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME COMMANDER, NAVY SHIPS CONTROL CTR. ATTN: CODE 0361	b. TELEPHONE (Include Area Code) (1) Commercial (717) 790-5508	(2) AUTOVON 430-5508
c. ADDRESS (Include Zip Code) P.O. BOX 2020 MECHANICSBURG, PA 17055-0788	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	