INCH-POUND
MIL-T-21868C(SA)
5 DECEMBER 1989
SUPERCEDING
MIL-T-21868B(SA)
5 MAY 1984

MILITARY SPECIFICATION

TRUCKS, LIFT, FORK, DIESEL; SHIPBOARD GENERAL SPECIFICATION FOR

This specification is approved for use within the Naval Supply System Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for diesel powered fork lift trucks for use on board marine vessels. To meet this specialized service, trucks shall be constructed and equipped to meet all requirements specified herein.

2. APPLICABLE DOCUMENTS

2.1 Government Documents.

2.1.1 Specifications, Standards, and Handbooks. 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 036, 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.

AMSC/F4809 FSC 3930

SPECIFICATIONS

FEDERAL

QQ-P-416 Plating, Cadmium (Electrodeposited)

VV-B-680 - Brake Fluid, Automotive

ZZ-H-428 Hose, Rubber, Preformed and Straight, Hose, Preformed, Flexible, Wire Reinforced (For the Coolant Systems of Automotive and Other Liquid - Cooled Engines).

MILITARY

MIL-V-173 - Varnish, Moisture and Fungus Resistant

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

MIL-S-901 - Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment and Systems; Requirements for

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 - Meter, Time Totalizing, Non-Hermetically sealed, Electric, AC and DC.

MIL-W-5044 - Walkway, Coating and Matting, Nonslip, Aircraft.

MIL-B-11040 - Belt, V-Type, Engine Accessory Drive.

MIL-F-16884 - Fuel, Naval Distillate

MIL-H-17672 - Hydraulic Fluid, Petroleum, Inhibited.

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

MS-51336 - Lunette-Coupler, Drawbar, Ring.

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 of U.S. Military Property

MIL-STD-162 - Materials Handling Equipment: Preparation for Shipment, Storage, Cyclic Maintenance,Routine Testing and Processing.

MIL-STD-209 - Slinging and Tiedown Provisions for Lifting

MIL-STD-461 - Electromagnetic Interference Characteristics.

MIL-STD-810 - Environmental Test Methods.

MIL-STD-1474 - Noise Limits For Army Materials.

MILITARY HANDBOOK

MIL-HDBK-267 (SH)

MILITARY SPECIFICATION SHEETS

MIL-T-21868/3C(SA) - Truck, Lift, Fork, Diesel, Solid Tires, 6,000 Pound (2722 kg) Capacity, 130 inch (3300 mm) Lift, Shipboard.

MIL-T-21868/4C(SA) - Truck, Lift, Fork, Diesel, Pneumatic Tires, 6,000 Pound (2722 kg) Capacity, 130 inch (3300 mm) Lift, Shipboard.

MIL-T-21868/7C(SA) - Truck, Lift, Fork, Diesel, Pneumatic Tires, 15,000 Pound (6803 kg) Capacity, 220 inch (5590 mm) Lift, Shipboard.

MIL-T-21868/8C(SA) - Truck, Lift, Fork, Diesel, Pneumatic Tires, 20,000 Pound (9070 kg) Capacity, 220 inch (5590 mm) Lift, Shipboard.

MIL-T-21868/9B(SA) - Truck, Lift, Fork, Diesel, Solid Tires, 6,000 Pound (2722 kg) Capacity, 92 inch (2335 mm), Shipboard, Low Silhouette

(Copies of specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer or 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 J180	Electrical Charging Systems for Construction and Industrial Machinery
SAE J185	Access Systems for Off-road Machines
SAE J514	Hydraulic Tube Fittings
SAE J516	Hydraulic Hose Fittings (SAE 100R5)
SAE J517	Hydraulic Hose
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 J553	Circuit Breakers
SAE J833	USA Human Physical Dimensions
SAE J899	Operator's Seat Dimensions for Off-road Self-Propelled Work Machines
SAE J925	Minimum Access Dimensions for Construction and Industrial Machinery
SAE J1127	Battery Cable

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pennsylvania 15086).

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).

European Tyre & Rim Technical Organisation

Tyre and Rim Data Book

(Application for copies should be addressed to the European Tyre and Rim Technical Organisation, 32, Avenue, Brugmann, Brussels, Belgium)

American Society of Mechanical Engineers (ASME)

ASME/ANSI B56.1 - Safety Standard for Low Lift and High Lift Trucks.

ASME/ANSI MH11.3 - Load Handling Symbols for Powered Industrial Trucks.

ASME/ANSI MH11.4 - Hook-Type Forks and Fork Carriers for Powered Industrial Trucks

(Applications for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017)

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM B633 - Electrodeposited Coatings of Zinc on Iron and Steel

ASTM D3951 - Standard Practice for Commerical Packaging

(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).

I.B.I. International Interchange

I.B.I. GUIDE
BEARINGS

I.D.B.I. GUIDE
DRIVE BELTS

(Application for copies should be addressed to Interchange Inc. P.O. Box 16012, St. Louis, Mn 55416).

Industrial Truck Association

Recommended Practices Manual

(Application for copies should be addressed to Industrial Truck Association, Suite 210, 1750 K Street NW, Washington, DC 20006).

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

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 First Article. When specified in the contract or purchase order, a preproduction sample shall be subjected to first article inspection (see 4.3, 6.2.

3.3 Design. These trucks shall be designed for the lifting capacity (rated load) at the specified load center measured from the vertical face of the forks and to the specified full lift height. No adjustments or deration to the lifting capacity will be permitted for lift height, side shifters or any other factor specified herein. Design of trucks covered by the specification and all components therein shall insure safe operation under marine service conditions. Truck shall be designed to permit selection and operation of travel, lift, steering, tilt, and side shift separately, simultaneously or combinations thereof.

3.4 Environmental Requirements.

3.4.1 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 to plus 115°F.

3.4.2 Rain. The truck shall start within 5 minutes and operate as specified herein when subjected to a rainfall of not less than 4 inches 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.

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

3.5 Safety. The truck shall conform to the requirements of ASME/ANSI B56.1, UL558 Type DS, 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.

3.6 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.

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

3.7.1 Lubricants. The truck shall operate as specified herein when lubricated with standard military lubricants and hydraulic fluids listed in MIL-HDBK-267 (SH). No other lubricants are permitted.

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

3.8 Maintainability. Provisions shall be made for lubrication, adjustment, servicing, or replacement of all truck components subject to wear or maintenance. 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. Coolant and lubricants from the hydraulic system reservoir, service brake system, transmission housing or reservoir, and engine shall be drained into a container located on the ground without spillage on any part of the truck. 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). The hydraulic system reservoir, service brake system, transmission housing or reservoir, and engine shall be equipped with not less than a 3/4 inch diameter fill port and with dipsticks or visible level indicators to determine fluid level. As a minimum, dipsticks shall be graduated with two marks indicating full and add levels. Dipsticks shall be accessible without the use of handtools. The truck shall not require scheduled maintenance at intervals of less than 100 hours operation. Reservoir level checks by the operator on a daily basis will not be considered scheduled maintenance.

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

3.10 Plating. All threaded fasteners, washers and cotter pins required to fabricate the truck, except those in contact with oils in reserviors 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.

3.11 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. All bearings used in the truck or it's components shall be listed in the I.B.I Guide.

3.12 Drive belts. All drive belts used on the truck or its components shall conform to MIL-B-11040 and shall be listed in the I.D.B.I. Guide.

3.13 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 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.

3.14 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, Aviation Turbine Fuel (JP-5) and lubricants listed in MIL-HDBK-267 (SH). 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.

3.14.1 Engine accessories. The engine shall be provided with a 12-volt starting and charging system. All wires and cables shall be adequately supported to minimize chafing and abrasion and located such as to provide adequate clearance from moving parts, hot engine parts, exhaust and fuel systems. Cables and wires shall not be supported on oil or grease retaining surfaces or be exposed to dripping diesel fuel, oil, or grease. Cables and wiring shall be protected from vibration by flexible tubing or suitable harness. Grommets shall be provided whenever wiring passes through bulkheads, partitions, or structural members.

3.14.1.1 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 sufficent 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 conforming to

MIL-B-11040 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. Alternator shall conform to UL 558, Type DS. A manual disconnect switch shall be installed in the battery and charging circuits in accordance with UL 558, Type DS.

3.14.1.2 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:

(a) Alternator voltage regulation.

(b) Current limiting to protect alternator enclosed diodes or the alternator.

(c) Disconnection of circuit to the alternator rotor when the starting switch is off.

(d) Actuation of ammeter or charge indicator lamps.

(e) Field current relay switch to prevent rotor current from passing through the ignition switch where applicable.

3.14.2 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 or other means to prevent energizing the starter motor except when the directional control lever is in the neutral position and when the engine is 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 thoroughly cold soaked to the temperature specified herein. Starting system circuit voltage drop shall not exceed the drops indicated in SAE J541.

3.14.2.1 Battery. Truck shall be furnished with 12 volt maintenance free type battery(ies) capable of meeting the cold cranking capacity of the engine when cold soaked to the operating temperature 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 during the expected battery life.

3.14.2.2 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. A battery mounted in a outside compartment shall be housed in an individual acid resistant finished metal box

incorporating provisions for drainage and protection against short circuiting. The box shall be fitted with a quick release cover to provide for inspection and servicing.

3.14.2.3 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.

3.14.3 Fuel system. The capacity of the fuel tank shall insure not less than 8 hours continuous operation during the reliability test specified herein. The tank shall be designed to eliminate fuel surging. The tank shall be equipped with a safety filler cap assembly painted with green or red enamel which shall incorporate a self-closing cap, screw-locking device for cap, removable strainer, and provision 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 tools. The fuel fill cap must be recessed into the tank outside the engine compartment and away from the exhaust system. The cap shall not be vented thereby precluding the possibility of fuel leakage from the filler if the truck should overturn. The filler-neck opening shall not be less than 2 inches in diameter and shall be located such that the tank can be filled from a 5 gallon can. There shall be no obstruction above the filler-neck to prohibit access to the filler pipe with a straight nozzle filler hose. A standpipe or other suitable means at the fuel line inlet shall be provided to prevent foreign matter from entering the fuel line and to prevent drawing fuel from bottom of tank. The fuel tank shall be equpped with a 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. The fuel tank shall be protected by position or otherwise from external damage. A shut-off valve shall be accessibly located immediately adjacent to the fuel tank. Fuel lines capacity shall be sufficient to insure continuous operation at full throttle with rated loads when ascending the slope ascension specified herein. Fuel system shall conform to UL 558, Type DS.

3.14.3.1 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 or filter shall be located between the fuel supply and the fuel pump and shall be readily accessible by raising the hood cover or opening the sideplates. Clearance shall be provided for removing and replacing the filter element(s), draining the water separator and cleaning the strainer.

3.14.4 Air-induction system. 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 during inclement weather. The air cleaner shall be constructed so as to permit disassembly without tools for replacement of the filter element(s). It shall be bracket or throat-mounted, connected to the intake manifold, and accessible for servicing. The engine cowl, hood, or access plate may be opened for servicing the air cleaner. A dirty filter restriction indicator shall be furnished and shall be mounted for unobstructed visability.

3.14.5 Cooling System. The engine cooling system shall be of 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. Draincock(s) shall be furnished for complete drainage of the cooling system.

3.14.5.1 Fan. The fan shall rotate on antifriction bearings and be driven by a single or matched multiple V-belts conforming to MIL-B-11040. Fan belts take-up shall be at least 3 percent of the belt circumferential length, plus an allowance for replacment of new belts without forcing. The belts shall be clear of all other components within the adjustment range.

3.14.5.2 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.

3.14.5.3 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 normal operation of the truck. The radiator shall be protected by either position or guards to prevent damage to the radiator fins. Hoses shall clear the truck structure and other components under all operating conditions specified herein. The radiator shall include provisions to prevent reverse airflow back into the engine compartment. The radiator cap shall be removeable without interference with any other engine component.

3.14.5.4 Engine Coolant Hose. All engine coolant hoses shall be in conformance with ZZ-H-428 or SAE J20R4.

3.14.6 Governor. A speed-limiting type governor shall be furnished. The engine speed shall not exceed the engine manufacturer's recommended intermittent duty speed.

3.14.7 Exhaust System. The engine exhaust system shall be protected against entry of rain and shall include drainage provisions to prevent accumulation of water and condensed vapors. The back pressure of the exhaust system, including muffler, shall in no case exceed the maximum recommended by the engine manufacturer when measured approximately 2 inches beyond the flanged header outlet at any load up to rated net continuous load. The exhaust header outlet shall be provided with a flanged connection for attachment to exhaust system. 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 inches from the muffler, it shall be supported. Exhaust gases shall be discharged vertically above the operator's head 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 to prevent burns to the operator and maintenance personnel while working or operating the truck. Exhaust system shall conform to UL 558, Type DS.

3.14.8 Oil filter. Engine shall be equipped with full flow heavy duty filter(s) with emergency bypass with either replaceable element(s) or spin-on type filter(s). The oil filter shall be mounted in an accessible location for replacement of elements without interference with any other engine component. Oil lines (if applicable) to and from the filters shall be installed to minimize fatigue from vibration.

3.15 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 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 may 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.

3.16 Oil Sampling Valves. Oil sampling valves shall be provided on the engine and transmission and shall have the capability of closing automatically when released. Valves shall be made of material resistant to corrosion such that it will not contaminate the sample. The valves shall be located in such a way as to insure operator safety when taking oil samples with the engine running.

3.17 Drive assembly. The drive assembly shall consist of all components necessary to transmit power from the engine to the wheels. All rotating shafts and axles shall be supported on bearings. All gears shall operate in lubricant, and a standard pressure grease lubrication system shall be provided for all friction parts not so lubricated. All levers to gear enclosures shall be provided with seals, caps, rubber boots, or similar means to prevent the entry of water into enclosures or casings 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.

3.17.1 Power shifted transmission. A power shifted transmission shall be furnished and shall be of the continuous drive type within each speed range(s). Trucks shall be equipped with either a hydrodynamic or a hydrostatic transmission. Transmission in forward and reverse shall be capable of providing either variable speed or single speed range for trucks up to and including 6000 pound (2722 kg) capacity and two speed range for trucks greater than 6000 pound (2722 kg) capacity. Transmissions shall provide for positive inching control of truck (throughout the entire range of engine speed) in the forward and reverse directions. The inching control shall permit tilting and full lifting speeds with rated load independently of and simultaneously with truck motion while in inching travel. When a transmission fluid heat exchanger is required to prevent excessive fluid temperatures, means shall be provided to insure recommended case pressures of the transmission are not exceeded during all environmental conditions specified herein including cold weather start-up. The transmission shall withstand all operations specified herein without permanent deformation, damage, or leakage.

3.17.1.1 Hydrodynamic transmission. The transmission shall be connected to the engine through a torque convertor and shall provide controlled application of the clutches to provide smooth shifting and limit slippage which would damage the clutches. All transmission gears shall be constant mesh. Oil pressure for actuation of the transmission clutches, for torque convertor supply, and for transmission lubrication shall be supplied by a mechanically driven pump.

3.17.1.2 Hydrostatic transmission. The hydrostatic transmission shall be a closed loop type with a reversible variable displacement pump and a reversible variable or reversible fixed displacement motor. A charge pump shall be provided and shall be gear or shaft driven by the engine and shall provide sufficent oil under pressure to prevent cavitation of the pump and motor and to maintain a constant, smooth control lever response independent of operating conditions performed at full throttle engine speeds. With an oil temperature of 120 degrees F. (47 degrees C.) plus or minus 5 degrees F. (2 degrees C.) and new filter, the vacuum at the charge pump inlet port shall not exceed 5 inches Hg (16930 Pa). A shuttle valve or equivalent means shall be provided to automatically prevent loss of high pressure oil from the closed loop pump/motor circuit during the transition of rapid change of direction of the truck. When necessary, a set of reduction gears with two speed ranges capable of being shifted on the move under full engine torque may be used in conjunction with the hydrostatic transmission. When a gear range selector is provided it shall be acessible to the operator in the normal operating position and shall be labeled to indicate high and low speed ranges. Oil temperatures in the transmission shall not exceed 100 degrees F. (38 degrees C.) above ambient when measured at the pump case drain and motor case drain under any operating conditions specified herein.

3.17.2 Oil filter. The transmission shall be equipped with an oil filter with replaceable element(s) or spin-on type filter(s) which is located without interference with any other truck component to permit filter replacement.

3.18 Hydraulic system. The hydraulic system shall consist of all hydraulic components necessary for the lifting operations of the forklift truck including the steering system. The brake system and drive assembly shall not be a part of the main hydraulic system. The system shall provide for lowering of the rated load in the event of failure or damage to components utilized within the hydraulic system. Hydraulic flow and pressure used for hydraulic functions shall be furnished by a hydraulic pump(s) driven by the engine or transmission. Hydraulic components shall provide protection against contamination of hydraulic fluid by direct impingement or seepage of other fluids. Fluid in the hydraulic system shall conform to MIL-H-17672 or MIL-L-2104. All hydraulic component materials shall be compatible with these oils. The hydraulic system shall be designed and constructed so the hydraulic oil will not be lost from any part of the system in the event of a truck overturn. A pipe tap shall be provided in either the pressure inlet side of each valve or in a tee between the pump and the valve to check pressure in each hydraulic circuit. Hydraulic hoses shall be properly restrained to protect them from unnecessary flexing, pressure surges, or contact with other moving mechanical components. The system shall have a maximum working pressure (relief valve setting) not in excess of 3000 psi. The temperature rise of the hydraulic fluid shall not exceed 115°F above ambient when tested as specified herein. All system components shall be capable of a proof pressure that is equal to or greater than 2 times the maximum working pressure without external leakage, damage or pressure deformation.

3.18.1 Reservior. Hydraulic reservoir and system shall be capable of being drained without spillage. The reservoir shall be of metal construction, free of metal particle or other foreign material, with a fluid capacity of not less than 110 percent of the fluid required for the hydraulic system operation. 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 pump. When a strainer is provided for pump protection a removable filter must also be installed in the hydraulic system after the pump discharge. A two way breather filter is required except for pressurized type reserviors. Reservior shall have an access opening not less than 2-1/2 inches (64 mm) in diameter or the reservior shall be removable to permit servicing the strainer and allow for cleaning.

3.18.2 Filter. A full flow hydraulic filter with replaceable element(s) or spin-on filter(s) 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.

(c) Include a signal mechanism or contamination indicator to indicate when filter maintenance or replacement is required.

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

3.18.4 Hydraulic Control Valves. Control valves shall be self-centering type such that all hydraulic fluid flow is terminated when the control valve lever is released by the operator. Mounting of the valves shall be rigid and shall permit no vibration which may cause instability of the controls. All control-valve spools shall be spring centered with sufficient force to return the levers to the center position and positively retain them there throughout all operations.

3.18.5 Cylinders. All hydraulic system and steering 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 have an exclusion devices which prevent foreign material and fluids from entering the cylinder and damaging seals and other cylinder components. Lift cylinders, if single-acting type, shall provide a bleeder line to reservoir or an internal valve to return oil that bypasses the piston. 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 rougness shall not exceed 32 microinches.

3.18.6 Hose Reels. Hydraulic hose reels are required on the mast to maintain hose tension during mast extension. Sheave wheels, guide rollers, guide blocks, or other means shall be provided to prevent the hose from becoming

entangled around and riding over the reels or reel flanges. Guide blocks, reel divider, or other devices shall not abrade hose and cause premature failure.

3.18.7 Hydraulic fittings. Valves, cylinders, tubing and pressure hose fittings shall have a miniumum 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.

3.18.7.1 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.

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

3.18.7.3 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. Pressure hose fitting shall be female 37 degree flared type, field attachable, screw style in accordance with SAE J516.

3.18.8 Hydraulic hoses and tubing. Hydraulic hoses and tubing shall have a miniumum 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.

3.18.8.1 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. Hose in accordance with SAE J517 100R7 or 100R8 is not permitted due to ship damage control safety requirements.

3.18.8.2 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 diameter.

3.18.9 Steering. Power steering shall be furnished. Power steering shall be effective at engine idling speed. An automotive type steering wheel mounted on the steering column shall steer the wheels in accordance with the Ackermann steering principle. Clockwise rotation of the steering wheel shall provide for right-hand turning of the truck while in forward motion. Provisions shall be made for precision adjustment for wear and alignment of all major steering components and for lubrication of all friction points by accessible grease fittings or lubricant reservoirs. Lubricant reservoirs shall be accessible for filling and checking of lubricant level. Means shall be provided to prevent wheels or tires or steering linkage from contacting any part of truck structure, other than steering stops, irrespective of obstacle magnitude or steer angle.

3.19 Upright and carriage assembly. Upright (mast) shall be of the telescopic roller type with sufficient strength and rigidity to withstand, without permanent deformation,stresses induced by capacity loads specified herein. Rollers shall be of the permanently lubricated type. The upright shall have two lift cylinders, each located near or within the upright channels, instead of one lift cylinder located in the middle of the mast except one free lift cylinder which is no higher than the top of the carriage is permitted. Any hydraulic hoses or chains located within this open area shall be located away from the center of the upright. Chains, when used in the lifting mechanism, shall be a listed ANSI Standard and shall have a factor of safety of not less than 4.7 to 1 based on ultimate strength. Cross members of the mast structure, with the forks in the travelling position, shall not interfere with the operator's horizontal or downward line of sight directly to the front of the vehicle. The lift shall be hydraulically actuated,with the upper portion automatically lifting as the load is raised above the "free lift" position. Adequate means shall be provided in the uprights to compensate by replacement or adjustment for wear which may develop between sliding surfaces or lateral rolling contacts. Positive means shall be provided to prevent overtravel of the carriage or channel in both upper and lower position. Carriages shall be supplied with adjustable thrust bearings or canted roller bearings to resist thrust introduced by sideshifter off-center loading except when rollers are contoured to inner surfaces of mast sections to take both radial and thrust loading.

3.19.1 Forks. Fork dimensions and spacing shall be as specified on the applicable military specification sheet. Fork spacing dimensions shall be measured from the outer edges of the forks. Fork spacing on trucks up to but not including 10,000 pounds (4535 kg) capacity shall be adjustable laterally without the use of hand tools and shall be attached to the fork carriage in accordance with ASME/ANSI MH 11.4. Trucks of 10,000 pound (4535 kg) capacity and above shall be attached to the fork carriage in accordance with Industrial Truck Association Recommended Practices. Fork thickness shall not exceed 1/2 inch (15 mm) at the tips and the end taper shall be not less than 14 inches (355 mm) long. Taper shall be on the underside of the forks. Top and bottom of fork tips shall be rounded to eliminate the sharp edges. On trucks of 6000 pound (2722 kg) capacity folding forks shall be furnished. The forks shall be hinged or pivoted near the heels and shall be capable of being folded back manually against fork upright and backrest. A manually operated locking device shall hold the forks in the upright position. The locking device shall not interfere with the operation of the trucks when forks are in the down position.

3.19.2 Fork Positioner. Trucks of 10,000 pound (4535 kg) capacity and above shall be provided with simultaneously adjustable hydraulic forks positioners.

3.19.3 Fork Sideshift. Trucks shall be equipped with a hydraulically operated side shift attachment.

3.19.4 Load backrest. A metal backrest, removable without disturbing any other component, shall be provided. Load backrest shall be flush with the forward vertical surface of the forks. In conjunction with fork and hanger design it shall provide a vertical rear guard at least 48 inches (1220 mm) high measured from the load carrying surface of the forks and at least equal to the width of the carriage. It shall not obstruct operator's visibility. The spacing of vertical members shall be no more than 6 inches (150 mm) between members. A positive means or stops shall be provided to prevent the fork tines

from slipping off the fork carriage when the backrest is removed. The removable backrest may be eliminated if fork and carriage assembly will provide protection equal to the above.

3.20 Wheels and tires. Number of tires and tire type shall be as specified on the applicable specification sheets. Wheels and tires shall be new and unused and shall be selected from sizes and load rating listed in the Year Book of the Tire and Rim Association or the Tyre and Rim Data Book of the European Tyre & Rim Technical Organisation. Wheels and tires shall clear any part of the truck structure and mast structure by at least 1/4 inch (8 mm) under all conditions of operation over the test course specified herein. Spacings between rims of dual tired trucks shall prevent contact between tires when truck is on level surface with rated load.

3.20.1 Wheels for solid or cushion tires. The truck shall be mounted on steel, malleable iron, or cast iron wheels mounted on tapered roller bearings.

3.20.2 Solid or cushion tires. The tires shall be of the industrial, natural or synthetic rubber, solid core, pressed or molded onto a steel band. Drive and steer tires shall have non-directional lug type tread. Smooth type tread is not acceptable. The tread design shall provide for gripping cleats across the entire width of the tire. The lug shall be a minimum of 3-1/2 times wider than the groove. The gripping cleats shall be such that the center line and point of all cleats starting from one edge shall meet the dividing line between a set of cleats starting from the opposite edge. Drive and steer tires shall be siped. There shall be two sipes on each lug of the drive tire and one sipe on each lug for the steer tire.

3.20.3 Wheels for pneumatic tires. The truck shall be mounted on steel, malleable iron, or cast iron wheels, mounted on tapered roller bearings. Each wheel shall be mounted on wheel studs or cap screws with self-centering tapered ends or on tapered bolt holes which shall provide a positive method of locating the wheel on the hub. Split rims (wheels) are not permitted.

3.20.4 Pneumatic tires. The tires shall be pneumatic, high pressure,tube or tubeless type furnished with all purpose tread. The maximum tire inflation pressure permitted is 125 psi (862 kPa).

3.20.4.1 Tubes. When tube type tires are furnished, they shall be heavy duty 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.

3.21 Service brakes. Truck shall be equipped with foot operated four wheel brake system. Brakes shall be provided on both the drive and steer axles. Brake system shall be equipped with two independent master cylinders and a dual hydraulic circuit (split hydraulic) brake system for each axle. Brake system shall be equipped with a flashing red or amber warning indicator light which shall be energized in the event of a malfunction or loss of hydraulic brake pressure in either hydraulic circuit. Brake system shall be independent of the hydraulic system and the drive assembly, and shall be either a hydraulic, air or combination air-over-hydraulic brake system with either expanding drum or disc type brakes. Brake fluid shall be in accordance with VV-B-680. When actuated at all speeds, the brake system shall provide braking, free of brake chatter and free of feed-back amounting to more than 1/4 inch (6 mm) total movement measured at the foot pedal. When ever the hydraulic master cylinder

or reservior is located under the floor plate, a access opening shall be provided thru a hole that will accommodate a 2 1/2" (65 mm) diameter filler line with its center being concentric with the center of the fill port. Wheel brake cylinders shall be located such that hydraulic lines may be bled of air without the necessity of removing the wheels or disconnecting hydraulic lines. Brake lining, when used, shall be of the woven or molded type and shall be cement-bonded or riveted to shoe. Service brake adjustment shall provide for at least 90-percent contact of brake lining with the drum throughout the service life of the brake lining. Brake adjustment mechanism shall be readily accessible and shall be adjustable using common hand tools or a star wheel brake tool. Self-adjusting brakes are acceptable.

3.21.1 Service brake holding control. The service brake system shall be equipped with a hand operated control which permits the service brakes to remain activated after the operator force has been removed from the brake pedal.

3.22 Parking brake. A parking brake shall be provided which shall actuate the drive wheel brakes utilizing a mechanical activation system and shall be equipped with a locking device. Adjustment of parking brake shall be provided. Adjustment functions shall not require the removal of any major assembly other than tires and wheels.

3.23 Deadman control. A deadman control shall be provided such that upon removal of the operator's weight from the seat, the deadman control shall apply the drive wheel brakes and also automatically return the transmission to neutral when the engine is running. On mechanically activated transmissions, the directional control lever shall be automatically returned to the neutral setting whenever the control lever is positioned at any setting other than neutral. Visual examination shall confirm the transmission control lever has been reset to neutral. On electrically activated transmissions, the control lever need not be returned to neutral but a flashing red or amber indicator light located on the instrument panel shall alert the operator the transmission is in neutral regardless of the position of the transmission control lever. A nameplate located adjacent to the flashing light shall instruct the operator he must first reset the transmission control lever to neutral prior to selecting a directional mode. In no case shall either a mechanical or electrically operated transmission return to any directional mode automatically with the return of the operator's weight to the seat.

3.24 Body. The truck body (other than counterweight), cowl or hood and access covers shall be constructed of steel sheet or plate. Trucks having a horizontal floor plate in excess of 28 inches (711 mm) above ground level shall be provided with an intermediate step approximately midway between the ground the the floor plate. The step shall be large enough to accommodate a large foot (size 11) with an overshoe and shall not extend beyond the truck profile. Handholes in accordance with SAE J185 or handrails shall be provided when steps are furnished.

3.24.1 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.

3.25 Chassis and frame. The truck chassis and frame members, bracings, and all their joints shall provide a rigid unit structure. The width, height and length of the truck shall not exceed the dimension specified on the applicable specification sheet. 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.

3.26 Cowl or hood. The engine shall be completely enclosed with a 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.

3.27 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.

3.28 Wheel guards. If drive or steer wheels, when in a straight ahead position, protrude beyond the body of the truck in excess of 1-1/2 inches (40 mm), suitable wheel guards shall be provided to prevent foreign objects from being discharged in the direction of the operator, endangering personnel, or otherwise creating a hazard. Wheel guards dimensions shall be included in determining overall truck width.

3.29 Towing device. A ring or pin type towing device shall be provided at the rear of the truck. It shall not protrude beyond the path followed by the rear end of the truck when making a turn of minimum turning radius. Pin type towing hook shall accept MS-51336 lunette without binding.

3.30 Slinging and Tiedown Attachments. Vehicles shall be equipped with slinging and tiedown attachments conforming to MIL-STD-209, Class 1, 2 or 3 for Type II or III equipment, excluding air transportation requirements. Also tiedown attachments shall meet the requirements of a Grade A item in Type A, HI (High-Impact) Shock as specified in MIL-S-901.

3.31 Operator's overhead guard. The truck shall be equipped with an overhead guard in accordance with ASME/ANSI B56.1. Whenever the collapsed mast height is lower than the overhead guard height the guard shall be removeable with hand tools. A non-removeable guard is permitted when the overhead guard is either the same or lower than the collapsed mast height. Guard design shall not interfere with operation of the truck, nor with normal movements of the operator when entering, leaving, or operating the truck.

3.32 Instrument panel. An instrument panel shall be installed which is visible to the seated operator. The instrument panel shall be installed on an inclined or vertical plane to facilitate drainage of water. On this panel shall be mounted the ammeter, oil pressure gauge, coolant temperature gauge, fuel gauge, indicator lights, hour meter, electrical switch, light switch, brake system warning indicator light, deadman indicator light, starter button or switch and any other instrument, when used. Starter button or switch may be located on the steering column in lieu of instrument panel.

3.33 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.

3.33.1 Electrical system monitor. A remote indicating ammeter or alternator indicator amber or red light shall be furnished. The ammeter 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".

3.33.2 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" when the engine oil pressure is below the pressure specified by the engine manufacturer.

3.33.3 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.

3.33.4 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.

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

3.33.6 Light switch. An "on-off" switch for simultaneous operation of the flood lights shall be furnished.

3.33.7 Electrical switch. The electrical switch shall require a key. 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.

3.33.8 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. A starter motor disconnect switch shall be provided to prevent reenergizing the starter motor when the engine is running.

3.34 Controls. All switch and lever type controls shall be provided with position markings (decals are not acceptable) either at the switch, or lever, or in the case of the directional speed controls, on a diagram visible to the 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).

3.34.1 Braking and inching pedal(s). Two foot pedals shall be provided for inching and braking controls. The braking pedal shall be located for right foot operation. The inching pedal shall be located for left foot operation. Each pedal shall be minimum 3 inches wide within a clear space at least 6 inches (150 mm) wide. Grease fittings shall be provided for lubricating moving parts of all pedals and shafts unless permenently lubricated bushings or bearings are provided. In lieu of two pedals for combination inching and braking one combination inching-braking pedal may be provided and located for right foot operation. Brake and inching pedals shall be equipped with replaceable rubber cap.

3.34.2 Parking brake control. The manual control shall be either hand or foot operated. The hand control shall be located within easy reach of a seated operator and in a position to permit movement on and off the vehicle from either side of truck or to allow unobstructed egress from the left side only for low silhouette type trucks. A foot operated control shall be installed for left foot operation. Foot operated brake pedal shall be equipped with replaceable rubber cap.

3.34.3 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). Accelerator pedal shall be equipped with replaceable rubber cap.

3.34.4 Directional speed 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 except low silhouette type trucks shall have right hand operation. Movement of the control lever in the forward or upward direction shall cause forward motion of the truck.

3.34.5 Lift, sideshift, fork positioners and tilt controls. Lift, sideshift, fork positioners and tilt controls shall be self-centering lever(s), located for hand operation in the seated position. Rearward or upward motion of lift and tilt control lever(s) shall raise and tilt load rearward. Rearward or upward motion of sideshift lever shall position the fork carriage to the right. Rearward or upward motion of fork positioner lever shall position the forks together.

3.35 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 electical

circuit shall be protected from electrical overload with circuit breakers in accordance with SAE J553. Fuses are not permitted. System shall conform to UL 558, Type DS.

3.35.1 Floodlight. Each truck shall be equipped with two sealed beam floodlights of not less than 35 watts. One floodlight shall be mounted on the front and one on the rear of the overhead guard. When removeable overhead guards are utilized means shall be provided to disconnect the floodlight electrical circuits without the use of hand tools. Directional focus of this light shall be vertically and horizontally hand adjustable without the use of hand tools. Vertical adjustment of these lights shall be a minimum of 60 degrees above and 30 degrees below horizontal plane. Horizontal adjustment shall be a minimum of 300 degrees rotation. Protection of the lights against damage shall be provided by either position or guards. Each floodlight shall be furnished with three set of lenses. Color of lenses shall be clear, red and yellow. Red and yellow lenses shall be stored in a pocket located on the back of the operator's seat.

3.35.2 Stoplight. One automotive, red, reflector type, combination stoplight and tail lamp of not less than 15 candle power and 3 candle power respectively shall be mounted at the rear of the overhead guard. When removeable overhead guards are utilized means to disconnect stoplight electrical circuit without the use of hand tools shall be provided. The stop light shall not operate when the electrical switch is in the off position.

3.35.3 Horn. Truck shall be equipped with an electric horn with push button mounted in the center of the steering wheel. Horn button assembly and electrical wiring for the horn shall be constructed to be moisture and weather resistant.

3.36 Weighing device. The truck shall be equipped with a weighing device to measure the amount of weight on the forks. The weighing device shall be connected to and operate from the system for raising and lowering the forks. The device shall be capable of measuring a minimum weight of 100 pounds (45 kg) and a maximum weight equal to the rated capacity of the truck plus 300 pounds (135 kg). Weighing device shall be capable of being adjusted for 25% tare. Either a digital readout or a bourdon tube dial indicator shall be provided. The entire instrument and connections shall be moisture and weather resistant. The weighing device shall be capable of withstanding the pressure caused by placing 150-percent of truck rated load on the forks without sustaining damage. The readout shall be readable by the operator when in the seated position.

3.36.1 Dial indicator. The dial shall be not less than 12 inches (300 mm) in diameter, and the increments shall be marked in 50-pound (23 kg) increments on gauges of 10,000-pound (4535 kg) or lesser capacity and in 100-pound (454 kg) increments on gauges of greater than 10,000-pound (4535 kg) capacity. The dial shall be capable of being rotated 360 degrees by means of an external tare adjusting knob. Bearing points or locking devices shall prevent dial rotation due to shock vibration. The indicating pointer shall be capable of 360 degrees rotation for full scale reading. The entire indicator case shall be filled with a liquid to provide movement lubrication and dampening of vibration-caused tube and pointer oscillation. There shall be sufficient air space left to allow for oil expansion owing to temperature changes. The indicator case shall be appropriately sealed to prevent leakage. The indicator shall be fitted with a fully adjustable pulsation damper located in an accessible position on the

case.

3.36.2 Digital indicator. The digital indicator minimum increments shall be 50 pounds (23 kg) for indicators up to 10,000 pound (4535 kg) capacity and 100 pound (454 kg) increments on indicators greater than 10,000 pound (4535 kg) capacity. The digits shall have a minimum height of .75 inches (20 mm) visible to direct sunlight and subdued night lighting. The indicator shall have an internal zero and span adjustment for initial calibration and taring out the weight of the forks. The indicator shall have an external push-button auto zero device to tare out extraneous weights on the fork. Indicator must maintain auto zero reference when power is turned on or off or and indicate loss of auto zero reference. Indicator must indicate a truck overload condition of tare load and live load on the forks. The zero button must have a locking device to prevent actuation caused by vibrations.

3.37 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.

3.37.1 Identification marking. Each truck shall be identified with an identification plate conforming to MIL-P-514, type I, style 1, Composition C, Grade A, Class I, 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 lifting capacity, lift height, 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, name or stamp of government inspector, and HI-Shock test date.

3.37.2 Instruction, warning, and caution plates. Each truck shall be equipped with instruction, warning, and caution plates conforming to MIL-P-514, type III, composition C, grade A, class I, prominently located and describing any special or important procedure to be followed in operating, lifting, and servicing of the truck or its components.

3.37.3 Shipping data plate. Shipping data plate shall conform to MIL-P-514, Type III, Composition C, of Type I, Grade A, Class 1 material and shall indicate the the silhouette of the forklift in transport position showing the center of gravity and the location and capacity of the lifting and tiedown attachments. Wheel loading information in 3.37.4 may be included on shipping data plate.

3.37.4 Wheel loading plate. Each truck shall be equipped with a wheel loading plate conforming to MIL-P-514, Type III, Composition C, of Type 1, Grade A, Class 1 material. As a minimum the plate shall have the following information:

Wheel loading (no load on forks)

Drive wheels (each wheel)	pounds (kg)
Steer wheels (each)	pounds (kg)

Wheel load (rated load on forks)

Drive wheels (each wheel at maximum sideshift)	pounds (kg)
Steer wheels (each	pounds (kg)

3.37.5 Safety rating plate. Each truck shall be equipped with a safety designation plate conforming to MIL-P-514, Type III. As a minimum, the plate shall indicate the truck manufacturer's name, truck model number, safety designation (Type DS), independent testing laboratory's name, independent testing laboratory's registration or index number assigned to the inspected truck and date and location of independent laboratory inspection.

3.37.6 Oil sampling valves. Each oil sampling valve shall be identified as to the type of oil being sampled. Plates shall conform to MIL-P-514, type III, composition C, grade A, class I.

3.38 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.

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

3.38.2 Registration number. Assigned USN registration number for each truck shall be three inches (75 mm) high located on each side and on rear of truck.

3.38.3 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 near the applicable tire.

3.38.4 Safety rating. Markers indicating the DS safety designation of truck shall be applied on each side and on the rear of the truck of the vehicle. These markers shall be in accordance with UL558.

3.38.5 Supplementary markings. Supplementary marking and load handling symbols as specified in ASME/ANSI MH11.3 are required.

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

3.38.7 Safety warning. Safety warning " no rider" shall be two inches (50 mm) high located on rear of mast.

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

3.38.9 Shipboard marking. Trucks shall be identified with the words "SHIPBOARD USE APPROVED", 1-1/2 inch (40 mm) high located on each side of truck.

3.38.10 Structural testing. Truck(s) which successfully pass the weight test specified herein shall be identified with the words Structurally Tested, date and By Manufacturer, 1 1/2 inch (40 mm) located on each side of truck. Example:

STRUCTURALLY TESTED
6 SEPTEMBER 1989
BY MANUFACTURER

3.39 Treatment and painting. All exterior surfaces of the truck shall be thoroughly cleaned and shall be dry and free from mill scale, oil, grease, dirt and rust and shall be painted as soon as practicable after cleaning with not less than one coat of metallic base primer and two coats of synthetic enamel. Primer and finish coats shall be applied in accordance with normal commercial practices to assure complete coverage and durability of the finish. The finish color shall be 13538 in accordance with FED-STD-595. When a first produced truck is required for test and evaluation it shall be painted with one primer coat only. The finish coat, when dry, shall be a smooth even surface, free from runs, sags, peels, chips, blisters, areas of thin film or no film. Surfaces of components and assemblies of the truck, not normally painted with a finish coat, shall be cleaned and protected in accordance with good commercial practice. Lift chains,sprockets,rollers, plastics, fabric hoses (except hydraulic hoses) and drive belts shall not be painted except that slight overspray will be accpepted 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.

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

3.40 Workmanship. The truck shall perform operations specified herein 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, risers, scale, flux, and other 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.

3.40.1 Welds. Welded joints shall be sound, smooth, free from harmful pits, holes, fissures, rough projecting edges, and slag; and shall be thoroughly fused to the base metal.

3.40.2 Bolted connections. 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 threads. 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 FED-STD-H28.

3.40.3 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 corroded 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 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 in the performance of designed heat treatment, and overheating shall be avoided in accordance with the recommendations of the metal manufacturer. All modular assembly fabrication shall provide for interchangeability of components.

3.40.4 Machine work. All machined parts shall be manufactured to insure accuracy of assembly through the use of correct jigs, fixtures, or tape controlled machines, or any desired combination of these. Like parts shall be interchangeable.

3.41 Performance.

3.41.1 Lifting speed. Speed of lift shall be not less than 55 feet per minute (.28 m/s) with rated load over the entire distance from ground level to maximum fork height.

3.41.2 Lowering speed. Speed of lowering of forks shall be not less than 50 feet per minute (.25 m/s) without rated load and not more than 80 feet per minute (.41 m/s) with rated load over the entire distance from maximum fork height to ground level. The hydraulic system shall provide for lowering of the rated load at a rate of 30 feet per minute maximum in the event of hydraulic fluid loss and/or failure of or damage to the hydraulic system.

3.41.3 Right angle turn. Trucks with rated load shall be capable of backing through a right angle turn in either direction with within the dimension specified on the appropriate specification sheet.

3.41.4 Steering. The steer wheels shall be capable of being turned from extreme right to extreme left or vice versa in not more than 6 complete turns of the hand steering wheel. The maximum steering effort through the entire turn shall be not less than 2 pounds (.09kg) nor more than 10 pounds (4.5kg) when measured under the same conditions. Steering mechanism wear (free play) shall not exceed 3 inches (75 mm) total with engine at idle speed. The steering gear assembly shall be capable of withstanding the 150 pounds (68 kg) unbalanced tangential force applied at the rim of the hand steering wheel. Steering maneuverability features shall meet the reliability test course requirements specified herein. In the event of power steering failure or engine failure, and without rated load on the forks, the steering shall be operable with a force not to exceed 50 pounds.

3.41.5 Speed. Trucks shall be capable of attaining speeds in both directions of six mph minimum with rated load on a level surface and 10 MPH (16km/h) maximum without rated load in both foward and reverse directions.

3.41.6 Slope ascension, first speed, forward direction. The truck shall be capable of ascending a mininum of 22 percent grade (12.4 degrees) on paved surfaces with and without rated load. Truck shall be able to accelerate from a dead stop on this slope when carrying rated load.

3.41.7 Upright tilt. On trucks up to and including 6000 pound capacity the truck mast shall have a forward tilt of 3 degrees (plus or minus 1/2 degrees) and a rearward tilt of 6 degrees (plus or minus 1/2 degrees) without rated load. On trucks over 6000 pound capacity the truck mast shall have a forward

tilt of 3 degrees (plus or minus 1/2 degrees) and a rearward tilt of 10 degrees (plus or minus 1/2 degrees) without rated load.

3.41.8 Collapsed mast (upright) height. The truck collapsed mast height measurement without rated load shall not exceed that specified on the individual specification sheet.

3.41.9 Lift height. The truck lift height with rated load shall be not less than that specified on the individual specification sheet.

3.41.10 Free lift height. The height of the forks with rated load and without any increase in the specified collapsed mast height shall be not less than that specified on the individual specification sheet.

3.41.11 Underclearance. The truck with rated load shall have sufficient underclearance to permit operation from one horizontal plane to another, up or down the slope required by 3.41.6 and the obstacle course specified herein. The minimum underclearance, with rated load, beneath the mast assembly and drive and steer axles shall not be less than that specified on the individual specification sheet.

3.41.12 Drift of lift assembly. The lift assembly shall be capable of holding the rated load at the minimum lift height for not less than ten minutes with not more than one inch (25 mm) of vertical drift and not more than one degree of rotational drift from the vertical.

3.41.13 Overload. The truck shall be capable of sustaining 300 percent overload for a minimum of ten minutes.

3.41.14 Hydraulic system. The contamination levels for the hydraulic system shall not exceed 2000 particles per milliliter greater than 10 microns (.01 mm) and 100 particles per milliliter greater than 20 microns (.02 mm)".

3.41.15 Service brakes. A brake pedal pressure of not more than 100 pounds and not less than 50 pounds (23 kg) shall attain the stopping distance specified in ASME/ANSI B56.1 with and without rated load. Also, the brake system shall be capable of withstanding a brake pedal force of 300 pounds (200 kg) for five minutes without failure of any component and without loosening of any part designed to be rigid.

3.41.16 Parking brake and deadman control. The parking brake and deadman control shall be capable of retaining the truck on the slope specified in 3.41.6 with rated load for 30 minutes. The maximum force required to activate the parking brake shall not exceed 100 pounds.

3.41.17 Stability. The truck shall meet the stability requirements for stacking and traveling, both longitudinally and laterally, indicated on the applicable specification sheets.

3.41.18 Overhead guard strength. The overhead safety guard shall be capable of withstanding the tests specified in ASME/B56.1.

3.41.19 Resistance to saline atmosphere. The truck shall be designed to withstand the corrosive effects of saline atmosphere without any loss or deterioration of performance and without sustaining evidence of harmful

corrosion, loss of mobility of parts and a inability to disassemble parts for service or repair. Also, operation of all components within the electrical system shall remain operative.

3.41.20 Truck weight. The truck without rated load shall not exceed the weight listed on the applicable specification sheet.

3.41.21 HI (High-Impact) shock requirement. The truck shall be designed to operate as specified herein when subjected to Type A HI Shock.

3.41.22 Slinging and tiedown attachments. Each lifting and tiedown provison shall be capable of withstanding the loads indicated in MIL-STD-209. Also, tiedowns shall withstand Type A Hi-shock as specified herein.

3.41.23 Inching control. Truck shall be capable of simultaneously lifting rated load at maximum speed with truck inching forward and reverse at 1/2 mile per hour (.80 km/h).

3.41.24 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:

(a) Remove,replace, and adjust all engine driven belts - 3/4 hour. Exclude engine timing belt(s).

(b) Remove and replace alternator - 1/2 hour.

(c) Remove and replace regulator - 1/2 hour.

(d) Remove and replace all filters, screens, and strainers in all 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 replace fuel filter elements and drain water separator - 1/4 hour.

(h) Disconnect battery cables, remove and replace batterie(s), 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 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.

3.41.25 Towing hook strength. The towing hook shall have a minimum towing strength of 30% of the total weight of truck plus rated load without permanent deformation.

3.41.26 Load backrest. The backrest shall have sufficient strength and stiffness to prevent the rated load from forcing backrest against the uprights when the mast is at maximum rearward tilt. Also, backrest shall be capable of withstanding the resultant force of the rated load, without permanent deformation, when the mast is positioned at maximum rearward tilt.

3.41.27 Tire loading. Tire loadings shall not exceed the values shown in the Year Book of the Tire and Rim Association or the Tyre and Rim Data Book in the European Tyre & Rim Technical Organisation at the truck maximum speed.

3.41.28 Noise limits. The sound level at the operator's station shall not exceed 85 dB(A).

3.41.29 Deck loading. Truck individual wheel loading with rated load and forks at maximum sideshift position shall not exceed the weight listed on the applicable specification sheet. The minimum dimension measured across the bearing area of each individual tire shall not be less than 6 inches (152 mm) under the wheel loading specified herein. In no case shall deck loading exceed 125 psi (862 kPa).

3.41.30 Electromagnetic interference characteristics. The truck shall be suppressed in accordance with class C1, group 2, part 8 of MIL-STD-461.

3.41.31 Exhaust emission requirements. The exhaust emission constituents shall not exceed the limits specified herein . The emission tests shall be conducted with a fuel delivery system identical to and calibrated to give the same fuel delivery rate as the engine used during the First Article Tests. The engine shall be capable of satisfying the emission requirements without the use of a catalytic convertor, trap oxidizer, water scrubber or other type of exhaust gas processor with the exception of the DS rated muffler.

3.41.31.1 Brake specific exhaust emission of hydrocarbons (HC), carbon monoxide (CO) and nitric oxides (NOx). The brake specific exhaust emission of HC shall not exceed 0.5 g/bhp-hr; of CO shall not exceed 5.0 g/bhp-hr; and of NOx shall not exceed 6.0 g/bhp-hr.

3.41.31.2 Total suspended particulate (TSP). The TSP shall not exceed 15 g/hr for 3, 4, 10, and 11 modes of the 13 mode Federal Test Procedure.

3.41.31.3 Steady state smoke opacity (SSSO). The SSSO shall not exceed 5 percent for any mode of the 13 mode Federal Test Procedure excluding the high load modes of 5, 6, 8, and 9.

3.41.32 Reliability. The truck shall be capable of completing 2000 circuits of the test course specified herein.

3.41.33 Sideshift attachment. The sideshift attachment shall be capable of side shifting the rated load without deformation to the attachment, truck carriage or upright. Sideshift mechanism shall operate forks either side of center while carrying rated load a minimum of 4 inches (100 mm) for trucks up to but not including 10,000 pounds (4535 kg) capacity (8 inches total) and 6 inches (150 mm) for trucks of 10,000 pound (4535 kg) capacity and above (12 inches total).

3.41.34 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.

3.41.35 Weighing device. Weighing device shall be accurate to 1/2 of 1% and shall read to an accuracy of 5% of full scale.

3.41.36 Truck configuration. Truck configuration shall not exceed the dimensions indicated on the applicable specification sheets.

3.41.37 Fork spacing. Fork spacing measured between the outer edges of the forks shall not be less than the dimensions listed on the applicable specification sheet.

3.41.38 Weight testing. Each truck shall be capable of sustaining 150 percent of the rated load without damage to the truck in the operational mode.

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 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 responsibliity 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 4.5).

(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 truck(s) shall be the first production item. The first article shall consist of one unit, except at the contractor's option, a second unit may be used for the HI Shock and saline atmosphere tests. Prior to examination and test of the truck(s) the following shall be performed:

(a) Furnish a schedule of maintenance to be followed during all testing of the first produced truck. A list of special tools, if any, required to perform this maintenance shall also be provided.

(b) Service the truck with oils and greases specified herein and designated for use in the ambient temperature at which the tests will be conducted.

(c) If required, break in the truck as prescribed by the contractor.

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.

4.3.1.1.1 Safety examination. Safety examinations shall be conducted to insure that the trucks furnished under this specification meet or exceed the safety requirements of UL558, Type DS. Acceptable evidence of meeting these requirements shall be a certified report(s) from recognized independent testing laboratories acceptable to the government, indicating that the trucks conform to the requirements of UL558.

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 herein, 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 the tests.

(b) Tests may be conducted in any order desired except the reliability 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 load equivalent to an unrestrained cube with overall dimensions twice the required load center dimension. Rated load weight tolerances shall be plus or minus one (1) percent.

(d) Load center is defined as the horizontal longitudinal distance from the intersection of the horizontal load carrying surfaces and vertical load-engaging faces of the forks to the center of gravity of the load. Tolerance for dimensions shall be plus or minus one half (1/2) percent.

Table I. First article examination schedule

First Produced Examination	Defect	Requirements
1	2	3
x	Design not as specified	3.3
x	Lubrication fittings not as specified	3.7.2
x	Screw threads not as specified	3.9
x	Plating not as specified	3.10
x	Bearings not as specified	3.11
x	Drive belts not as specified	3.12
x	Fungus and moisture protection not as specified	3.13
x	Engine not as specified	3.14
x	Engine accessories not as specified	3.14.1
x	Alternator not as specified	3.14.1.1
x	Alternator regulator not as specified	3.14.1.2
x	Starting system not as specified	3.14.2
x	Battery not as specified	3.14.2.1
x	Battery mounting not as specified	3.14.2.2
x	Battery cables not as specified	3.14.2.3
x	Fuel system not as specified	3.14.3
x	Fuel filter, strainer & water separator not as specified	3.14.3.1
x	Air induction system not as specified	3.14.4
x	Cooling system not as specified	3.14.5
x	Fan not as specified	3.14.5.1
x	Thermostat not as specified	3.14.5.2
x	Radiator not as specified	3.14.5.3
x	Coolant hoses not as specified	3.14.5.4
x	Governor not as specified	3.14.6
x	Exhaust system not as specified	3.14.7
x	Oil filter not as specified	3.14.8
x	Cold weather system aids not as specified	3.15
x	Oil sample valves not as specified	3.16
x	Drive assembly not as specified	3.17
x	Power shifted transmission not as specified	3.17.1
x	Hydrodynamic transmission not as specified	3.17.1.1
x	Hydrostatic transmission not as specified	3.17.1.2
x	Oil filter not as specified	3.17.2
x	Hydraulic system not as specified	3.18
x	Reservior not as specified	3.18.1
x	Filter not as specified	3.18.2
x	Relief valve not as specified	3.18.3
x	Hydraulic control valves not as specified	3.18.4
x	Cylinders not as specified	3.18.5
x	Hose reels not as specified	3.18.6

Table I First article examination Schedule Continued

First Produced Inspection	Defect	Requirements
1	2	3
x	Valves & cylinder fittings not as specified	3.18.7.1
x	Tubing fittings not as specified	3.18.7.2
x	Hose fittings not as specified	3.18.7.3
x	Hoses not as specified	3.18.8.1
x	Tubing not as specified not as specified	3.18.8.2
x	Steering not as specified	3.18.9
x	Upright and carriage not as specified	3.19
x	Forks not as specified	3.19.1
x	Fork positioner not as specified	3.19.2
x	Fork sideshift not as specified	3.19.3
x	Load backrest not as specified	3.19.4
x	Wheels for solid or cushion tires not as specified	3.20.1
x	Solid or cushion tires not as specified	3.20.2
x	Wheels for pneumatic tires	3.20.3
x	not as specified	
x	Pneumatic tires not as specified	3.20.4
x	Tubes not as specified	3.20.4.1
x	Service brakes not as specified	3.21
x	Parking brake not as specified	3.22
x	Deadman control not as specified	3.23
x	Body not as specified	3.24
x	Access openings not as specified	3.24.1
x	Chassis and frame not as specified	3.25
x	Cowl or hood not as specified	3.26
x	Seat not as specified	3.27
x	Wheel guards not as specified	3.28
x	Towing device not as specified	3.29
x	Slinging & Tiedowns attachments not as specified	3.30
x	Overhead guard not as specified	3.31
x	Instrument panel not as specified	3.32
x	Instruments not as specified	3.33 to 3.33.8
x	Controls not as specified	3.34 to 3.34.5
x	Electrical system not as specified	3.35
x	Floodlight not as specified	3.35.1
x	Stoplight not as specified	3.35.2
x	Horn not as specified	3.35.3
x	Weighing device not as specified	3.36 to 3.36.2
x	Identification plates not as specified	3.37 to 3.37.6

Table I First article examination Schedule Continued

First Produced Inspection	Defect	Requirements
1	2	3
x	Vehicle marking not as specified	3.38 to 3.38.9
x	Treatment & painting not as specified	3.39
x	Walkway coating not as specified	3.39.1
x	Workmanship not as specified	3.40 to 3.40.4

Table II. First Article Test Schedule

First Produced	Post Test	Test	Performance Paragraph	Test Para	Test Method
1	2	3	4	5	6
x	x	Lifting speed	3.41.1	4.3.2.1	1
x	x	Lowering speed	3.41.2	4.3.2.1	1
x	x	Right angle turn	3.41.3	4.3.2.2	2
x	x	Steering	3.41.4	4.3.2.3	3
x		Speed	3.41.5	4.3.2.4	4
x		Slope ascension	3.41.6	4.3.2.5	5
x		Upright tilt	3.41.7	4.3.2.6	6
x		Collapsed mast height	3.41.8	4.3.2.7	7
x		Lift height	3.41.9	4.3.2.7	7
x		Free lift height	3.41.10	4.3.2.7	7
x		Underclearance	3.41.11	4.3.2.5	5
x	x	Drift	3.41.12	4.3.2.8	8
x		Overload	3.41.13	4.3.2.9	9
x		Hydraulic system	3.41.14	4.3.2.10	10
x	x	Service brakes	3.41.15	4.3.2.11	12
x	x	Parking brake & Deadman control	3.41.16	4.3.2.5	5
x		Stability	3.41.17	4.3.2.17	-
x		Overhead guard	3.41.18	4.3.2.18	-
x		Saline atmosphere	3.41.19	4.3.2.23	-
x		Truck weight	3.41.20	4.3.2.25	-
x		HI-Shock	3.41.21	4.3.2.28	-
x		Slinging & tiedown	3.41.22	4.3.2.19	-
x		Inching controls	3.41.23	4.3.2.12	11
x		Maintainability	3.41.24	4.3.2.21	-
x		Towing hook	3.41.25	4.3.2.13	12
x		Load backrest	3.41.26	4.3.2.20	6
x		Tire loadings	3.41.27	4.3.2.14	13
x	x	Noise	3.41.28	4.3.2.29	-
x		Deck loading	3.41.29	4.3.2.14	13
x		E.M.I.	3.41.30	4.3.2.22	-
x		Diesel emissions	3.41.31	4.3.2.15	-
x		Reliability	3.41.32	4.3.2.16	14
x		Sideshift	3.41.33	4.3.2.24	-
x		Starter disconnect	3.41.34	4.3.2.26	-
x		Weighing device	3.41.35	4.3.2.27	-
x		Truck configuration	3.41.36	4.3.2.30	-
x		Fork spacing	3.41.37	4.3.2.30	-

4.3.2.1 Lift and lowering speeds. Test the truck in accordance with Test Method No. 1. Failure to conform with the requirements of 3.41.1 and 3.41.2 constitute failure of this test.

4.3.2.2 Right angle turn. Test the truck in accordance with Test Method No. 2. Failure to conform with the requirements of 3.41.3 shall constitute failure of this test.

4.3.2.3 Steering. Test the truck in accordance with Test Method No. 3. Nonconformance with the requirements of 3.41.4 shall constitute failure of this test. Failure of tne unbalanced tangential force test is defined as any fluid leak, ruptured lines or permanent deformation in the steering system.

4.3.2.4 Speed. Test the truck in accordance with Test Method No. 4. Nonconformance to 3.41.5 shall constitute failure of this test.

4.3.2.5 Slope ascension, parking brake, deadman controls and underclearance. Test the truck in accordance with Test Method No. 5. Nonconformance to 3.41.6, 3.41.11 and 3.41.16 shall constitute failure of this test.

4.3.2.6 Upright tilt. Test the truck in accordance with Test Method No. 6. Nonconformance to 3.41.7 shall constitute failure of this test.

4.3.2.7 Maximum lift height, collapsed mast height, and free lift height. Test the truck in accordance with Test Method No. 7. Failure to conform with the requirements of 3.41.8, 3.41.9, and 3.41.10 shall constitute failure of this test.

4.3.2.8 Drift. Test the truck in accordance with Test Method No. 8. Nonconformance to 3.41.12 shall constitute failure of this test.

4.3.2.9 Overload. Test the truck in accordance with Test Method No. 9. Nonconformance with the requirements of 3.41.13 shall constitute failure of this test. Failure is defined as permanent deformation, fractures, broken welds and leakage in the hydraulic system. This requirement does not include the hydraulic pump, the hydraulic relief valve and the weighing device.

4.3.2.10 Hydraulic System. Test the truck in accordance with Test Method No. 10. Nonconformance with contamination level requirements of 3.41.14. shall constitute failure of this test.

4.3.2.11 Service brakes. Test the truck stopping distance in accordance with the tests indicated in ASME/ANSI B56.1. Test brake strength in accordance with Test Method No. 12. Nonconformance with the requirements of 3.41.15 shall constitute failure of this test. Failure of tne brake strength test is defined as any fluid leak, ruptured lines or permanent deformation in the brake system.

4.3.2.12 Inching. Test the truck in accordance with Test Method No. 11. Nonconformance with the requirements of 3.41.23 shall constitute failure of this test.

4.3.2.13 Towing hook. Test the truck in accordance with Test Method No. 12. Nonconformance with the requirements of 3.41.25 shall constitute failure of this test.

4.3.2.14 Tire and deck loading. Test the truck in accordance with Test Method No. 13. Nonconformance with requirements of 3.41.27 and 3.41.29 shall constitute failure of this test.

4.3.2.15 Diesel emissions test. Test the truck's diesel emmissions. Nonconformance with the requirements of 3.41.31 shall constitute failure of this test. Acceptable evidence of meeting these requirements shall be a certified report(s) from recognized independent testing laboratories acceptable to the government (see 6.6).

4.3.2.16 Reliability. Truck shall be tested in accordance with Test Method No. 14. The reliability test shall be conducted on a continuous basis during each operating 8 hour day (minimum). Testing shall be conducted at the rate of 20 to 25 laps per hour (minimum). The 2000 ciruits must be completed without any failures. If failure(s) occur before completion of 2000 circuits, the failure(s) must be corrected and test restarted beginning at the first circuit. Nonconformance with the requirements of 3.41.32 are defined as follows:

(a) Any malfunction which cannot be remedied by adjustment, repair or replacement action by contractor personnel using contractor tools and parts within 30 minutes.

(b) The totaled time of malfunctions exceeds 5% of the time required to complete the specified number of circuits.

(c) Failure to commence operation, cessation of operation or degradation of performance capabilities specified herein.

(d) Serious damage to the truck by continued operation such as fluid leaks, overheating or an internal component failure of the engine, transmission, axles, brakes, differential and hydraulic pump.

(e) Personnel safety hazard.

(f) Truck overturn or instability which results in either the steer or drive wheel losing contact with the ground for more than five seconds.

Notes: (1) Only routine maintenance as prescribed by the contractor prior to the test is permitted.

(2) Record the reason and amount of time involved for each truck stoppage or malfunction, including refueling, during the reliability test.

4.3.2.17 Stability. Test the truck in accordance with the test methods indicated in ASME/ANSI B56.1. The stability requirements indicated on the applicable specification sheet shall supercede ASME/ANSI B56.1 stability requirements. Nonconformance with the requirements of 3.41.17 shall constitute failure of this test.

4.3.2.18 Overhead guard strength. Test the truck in accordance with the tests indicated in ASME/ANSI B56.1. Nonconformance with the requirements of 3.41.18 shall constitute failure of this test.

4.3.2.19 Slinging and tiedown attachments. Test the truck in accordance with

tests indicated in MIL-STD-209. Nonconformance to 3.41.22 and requirements shall constitute failure of test.

4.3.2.20 Load backrest. Test the truck in accordance with Test Method No. 6. Nonconformance with the requirements of 3.41.26 shall constitute failure of this test.

4.3.2.21 Maintainability. Perform and record time of each operation. List any special tool required to perform any of the maintenance operations specified herein. Nonconformance to 3.41.24 shall constitute failure of this test.

4.3.2.22 Electromagnetic interference characteristics. The truck shall be tested as specified in MIL-STD-461. Nonconformance with requirements of 3.41.30 shall constitute failure of this test.

4.3.2.23 Saline atmosphere. The first article (first produced) truck shall be tested in accordance with MIL-STD-810, Method 509.2, Salt Fog. Preparation of the assembled truck prior to exposure to salt fog shall be in accordance with Method 509.2, Section II, paragraph II-2.5. Any evidence of non-compliance with 3.41.19 shall be cause for rejection of the truck. Pursuant to Method 509.2, Section I, paragraph I-4.2, the following details are designated:

a. Test duration: Exposure period shall be 72 hours followed by 168 hour drying period.

b. Configuration: All exterior surfaces of the truck, including the exposed surface of each piston rod, shall be cleaned and exposed to salt fog and the drying. The rod(s) of the tilt and of the side shift cylinder(s) shall be at full extension. The lift cylinder rod which is exposed when the lift assembly is lowered fully shall be so cleaned and exposed. Components such as bearings and lift chains which are permanently lubricated during service use shall be lubricated in accordance with instructions of supplier prior to test. Individual electrical components may be tested separately instead of with the entire truck.

c. Cyclic conditions: Not required.

d. Salt concentration: 5 percent.

e. Additional guidelines:

(1) Visual inspection after 24 hour and 72 hour exposure, but no washing or operation until examination following full exposure and drying period. Truck shall be dried at room temperature while loosely covered with a sheet of clear plastic to retard drying and allow visual inspection.

4.3.2.24 Sideshift attachment. The following test shall be performed: Record the sideshift distance from center of carriage and operate the sideshift attachment for 100 full cycles at full speed from extreme left to extreme right and back to extreme left per cycle with the rated load on the forks. Test may be interrupted when hydraulic system temperatures exceeds the maximum safe operating temperature. During the last 50 cycles, the control shall be

released abruptly when the load is in approximately mid position between the left and right extremes. Upon completion of the 100 cycles, the attachment and its components shall be examined for compliance with 3.41.33. Any evidence of damage shall constitute failure of this test.

4.3.2.25 Truck weight. Truck weight shall be determined. Nonconformance with requirements of 3.41.20 shall constitute failure of this test.

4.3.2.26 Starter motor disconnect. Start the truck engine by energizing the starter motor switch with the transmission control lever in the neutral position. Release starter switch for a minimum of five (5) seconds, and attempt to reactivate starter switch while engine is operating. Attempt to start the engine with the transmission control lever in each position other than neutral. Any evidence of starter motor engagement shall constitute nonconformance to 3.41.34 shall constitute failure of this test.

4.3.2.27 Weighing device. The weighing device shall be tested for conformance to the requirements of 3.41.35. With the truck at rest on a smooth, level surface and with the mast vertical, the unloaded forks shall be elevated to a height of 20 - 24 inches (508 to 610 mm). By use of the control valve, the forks shall be dropped 1 to 4 inches and abruptly stopped. Repeat four times. Adjust tare to show zero load where readout most consistently came to rest each time within approximately the first ten seconds and mark the zero position. With the truck at rest on a smooth level surface and with the mast vertical the forks shall elevate a calibrated load equal to the rated capacity of the truck plus or minus 1-percent to a height of 20 to 24 inches (508 to 610 mm) and through the control valve the load shall be dropped from 1 to 4 inches (25 to 102 mm) and then stopped abruptly. This procedure shall be repeated four times. Record the weights indicated on the indicator. The average of the four readings shall be used to determine weighing scale accuracy.

4.3.2.28 HI Shock test. Prior to actual test, contractor shall submit a formal procedure to be used during the tests. Procedure shall indicate applicable documents, test requirements, description of test, hardware configuration, preparation for testing, visual inspections, initial operational tests, deck simulator fixture operational tests, evaluation of damage,definition of failure, causes for rejection, and post operational tests. Operational tests shall consist of lifting speed, speed, slope ascension and stopping distance. Truck shall be tested in accordance with MIL-S-901. Refer to paragraph 6.6 for pretest requirements. Pursuant to 6.1 of MIL-S-901, the following ordering data shall apply to the test truck with battery which shall be mounted on the Floating Shock Platform during test and to the trucks furnished by the supplier:

(a) "Shock tests: HI (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements For", MIL-S-901.

(b) Issue of DODISS shall be the issue in effect on the date ofinvitation for bids or request for proposals.

(c) Grade A shock proofness required.

(d) The truck is class I, modified. The modification is that the truck rests on solid or pneumatic rubber tires which are similar in action to some resilient mountings.

(e) Type A test.

(f) The truck is deck mounted.

(g) The truck is base mounted.

(h) The truck has unrestricted orientation.

(i) The truck with battery installed shall be secured to the deck simulator of the floating shock platform with tiedowns furnished by the testing laboratory.

(j) N/A

(k) The truck shall not be operated during the shocks, but it shall be operated briefly after each shock, to show lifting, lowering, drive wheels jacked up and rotating forward and reverse, sideshift operation and steering.

(l) Following the explosion of the depth charge at 20-foot (6 m) standoff, the truck shall comply with (k). Failure of the truck to comply with (k) or permanent deformation of any component preventing operation of truck shall be regarded as failure of the truck to meet the H. I. Shock requirement.

(m) Acceptance authjority is Navy Ships Parts Control Center, Code 0361, 5450 Carlisle Pike, P.O. Box 2020, Mechanicsburg, PA 17055-0788.

4.3.2.29 Noise level measurement. The maximum steady state noise level shall be measured at the operator's station (microphone located no more than six (6) inches from operator's approximate ear location). Noise level measurement shall be in accordance with MIL-STD-1474 with engine operating at maximum (no load) governed speed and at the speed required for the rated brake power necessary to lift the rated load. Nonconformance to 3.41.28 shall require that a hazard warning plate conforming to MIL-STD-1474 be located in clear view of the operator. Warning plates shall include the requirement for hearing protection. In no case shall the noise level exceed 90 dB(A).

4.3.2.30. Truck Configuration and fork spacing. Truck overall width, length, guard height, fork size and fork spacing shall be determined and recorded. Measurements exceeding the dimensions indicated on the applicable specification sheet shall constitute nonconformance to 3.41.36 and 3.41.37 shall constitute failure of this test.

4.4. Post tests. Upon successfull completion of tests listed in 4.3.2 the truck shall be subjected to the tests marked "X" in column 2 of Table II. Nonconformance with performance requirements specified herein shall constitute failure.

4.5 Quality conformance examination and tests.

4.5.1 Examination. Each production truck shall be examined for the following defects. Presence of one or more defects shall be cause for rejection.

	Defect	Requirement paragraph
(a)	Identification plates not as specified	3.37 to 3.37.5
(b)	Vehicle marking not as specified	3.38 to 3.38.9
(c)	Treatment and painting not as specified	3.39
(d)	Walkway coating not as specified	3.39.1
(e)	Workmanship not as specified	3.40 to 3.40.4

4.5.2 Tests. Each production truck shall be tested as follows:

Test	Test Paragraph	Test Method
Lift speed, Lowering speed	4.3.2.1	1
Slope ascension, Parking brake, Deadman controls;	4.3.2.5	5
Service brakes	4.3.2.11	12

Failure of any test shall be cause for rejection.

4.5.2.1 Weight testing. Each truck shall be tested for conformance to the requiements of 3.41.38. Position the truck at rest on a smooth level surface, the mast vertical and the forks 6 inches (150 mm) above the floor. Secure truck as necessray to prevent truck overturn. With crane or another forklift truck place the 150 percent test load on the forks such that the center of mass of the test is on the truck's centerline and at the rated load center. Let the 150 percent test load on the truck for ten minutes. Remove load and restraints and visually inspect the forks, mast and other structural components for cracks, elongation, permanent deformation, fractures or failures. Failure is defined as any evidence of cracks, elongation, permanent deformation, fractures or failure.

4.5.2.2 Weighing device. Each truck weighing device shall be adjusted to zero and calibrated in accordance with 4.3.2.27. By use of a load equal to the rated truck capacity plus or minus 1-percent, the accuracy of the weighing device to weigh the calibrated load shall be demonstrated. Failure to comply with this required accuracy shall be cause for rejection.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packing, and marking. When Level A or B is specified (see 6.2) each truck shall be preserved, packed and marked in accordance with MIL-STD-162 for type I mobile or type II crated. The degree of preservation and packing shall be level A or B as specified (see 6.2). When Level C is specified (see 6.2), each truck shall be preserved, packed and marked in accordance with ASTM D 3951.

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

5.3 Inspection of Preparation of Delivery. The preservation, packing and marking shall be inspected todetermine compliance with MIL-STD-162 and ASTM D 3951.

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

6.1 Intended use. Trucks described herein are intended for stacking, unstacking, and moving cargo on weather decks and hanger decks onboard marine vessels.

6.2 Acquisition requirements. Acquisition documents must specify the following:

(a) Title, number and date of this specification.

(b) Type and size required and applicable specification sheet.

(c) When a first article inspection is required and location where truck(s) are to be tested (see 4.1).

(d) Specify level of preservation, packaging and packing (see 5.1and 6.4).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data is requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To insure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
3.2	DI-T-4902	First Article Inspection Inspection Test Report	none

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

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

6.5 First article. When a first article inspection is required, the contracting officer should provide specific guidance to offerors whether the

item should be a preproduction sample, a first article sample, a first production item, a standard production item from the contractor's current inventory (see 3.2.) and the number of items to be tested as specified in 4.3. The contracting officer shall also include specific instructions in acquisition documents regarding arrangements for examinations, approval of the first article test results, and disposition of the first articles. Invitation 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. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.6 HI Shock and diesel emissions tests. The contracting officer shall include in the solicitation the requirement that the manufacturer shall locate non-government shock test facilities to conduct the HI-Shock and diesel emissions tests.

6.7 Conditions for use of level A or B preservation. When level A or B preservation is specified (see 5.1), this level of protection should be reserved for the acquisition of forklift trucks for resupply worldwide under known favorable handling, transportation and storage conditions.

6.8 Subject Term (Key Word Listing).

Truck Lift
Diesel Engine Driven
Shipboard

6.9 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	None
Navy	-SA
Air Force	None

Preparing Activity

Navy SA

Project No 3930-0645

Interested Activities

User and Review - Navy- SH,

APPENDIX

FOR

TRUCK, LIFT, FORK, DIESEL

10. SCOPE The test methods contained within this appendix are to determine whether trucks procured under this specification conform to the requirements set forth.

20. APPLICABLE DOCUMENTS. This section is not applicable to this appendix.

TEST METHOD NO. 1

LIFTING SPEED

LOWERING SPEED

1. Test Course:

(a) Level paved surface.

2. Test Apparatus:

(a) Tape measure.
(b) Timing device

3. Test Procedure:

PART I LIFTING SPEED

(a) Position truck on test course and record the time in seconds required to raise the rated load to maximum lift height using a timing device. Record the difference between maximum lift height and the height of the forks in the fully lowered position. Repeat the test three times and record the lifting speed in feet per minute. The test result shall be the average of the three tests.

PART II LOWERING SPEED

(a) Position truck on test course and record time to lower rated load at maximum speed (full open valve) to one foot (305 mm) height. Record the difference between maximum lift height and the one foot height (305 mm). Repeat the test three times and record the lowering speed in feet per minute. The test result shall be the average of the three tests.

(b) Repeat operation (a) without rated load.

(c) Raise the rated load to maximum lift height with the mast in the vertical position. No personnel shall be located under or in front of the rated load for the next step. Cut or disconnect a hydraulic line that supplies pressure to the main lift cylinder and record the time for the rated load to reach the test course.

TEST METHOD NO.2

RIGHT ANGLE TURN

1. Test Course:

(a) Level paved surface
(b) Test course in accordance with "course layout" (see Figure A-1).

2. Test Apparatus:

(a) Tape measure.
(b) Movable vertical barrier.

3. Test Procedure:

(a) Truck is placed on the test course with the most forward edge of centered rated load coincident to line "B". (see Figure A-1). When forks are longer than rated load, the fork tips shall touch line "B" and the fork length is included in the "A" dimension. Mast shall be in the vertical position.

(b) Rated load shall be raised to 6 inches (152 mm) above floor.

(c) Position movable vertical barrier within 4 inches (102 mm) of counterweight of truck.

(d) Turn steer wheels to the extreme left position and back truck through 90-degree turn.

(e) Measure the perpendicular distance from line "B" to the position assumed by the movable barrier. This is dimension "A".

(f) Return truck to initial position.

(g) Turn steer wheels to extreme right and repeat (a) through (e).

Figure A-1. COURSE LAYOUT

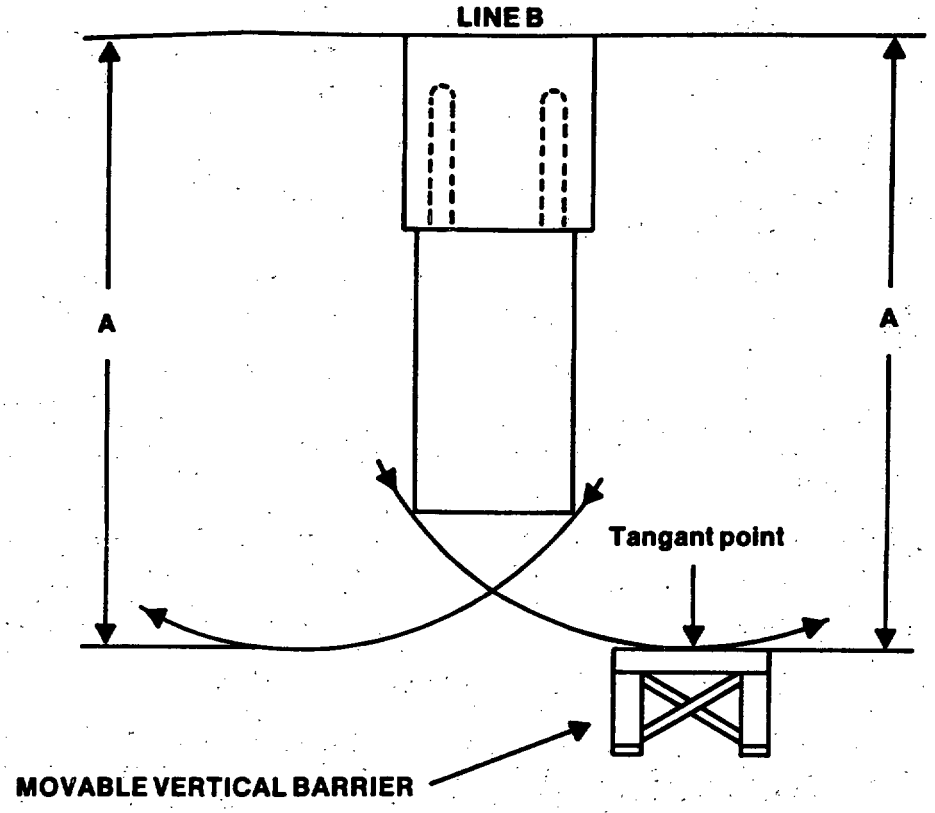


Figure A-1. COURSE LAYOUT

TEST METHOD NO. 3

STEERING WHEEL WEAR, TURNS, EFFORT, FAILURE and UNBALANCED TANGENTIAL FORCE

1. Test Course: Level paved surface.

2. Test Apparatus:

   (a) Piece of stiff fiber board.
   (b) Ruler.
   (c) Steering wheel adapter pulley.
   (d) Tension dynamometer or springscale.

3. Test Procedure:

PART I. WEAR (free play).

(a) Place truck without rated load on test course with its drive wheels parallel to the longitudinal axis of the truck.

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

(c) Mark a reference point on the upper portion of the outer edge of the steering wheel; mark a corresponding point on the fiber board template.

(d) Turn the steering wheel counterclockwise until the steer wheels of the truck begin to turn. Mark a point on the fiberboard template.corresponding to the reference point on the outer edge of the steering wheel.

(e) Repeat operation (d) in the clockwise direction.

(f) Remove the fiber board template from the truck and place it on a flat surface. Measure the distance between the 2 points made in accordance with operations (c), (d) and (e) above. This distance, in inches, is the free play of the steering wheel.

PART II. TURNS

(a) Place truck without rated load on test course with its drive wheels parallel to the longitudinal axis of the truck. Position the steer wheels at the extreme left position.

(b) Measure the number of turns of the hand steering wheel required to turn the steer wheels from the extreme left position to the extreme right position. Repeat operation in the opposite direction.

PART III STEERING EFFORT

(a) Place truck on test course with steer wheels in a straight ahead position and engine at idle speed.

(b) Attach an adapter pulley, having a root diameter equal to to the steering wheel diameter, to the spokes of the hand steering wheel.

(c) Apply a steady force to a dynamometer attached to the adapter pulley in a counterclockwise direction until the steer wheels begin to turn. Record the dynamometer reading. Continue applying force until steer wheels reach the extreme counterclockwise position. Record the dynamometer reading.

(d) Perform (c) in a clockwise direction.

PART IV ENGINE FAILURE

(a) Place truck on test course with steer wheels in a straight ahead position and engine shut off.

(b) Attach an adapter pulley, having a root diameter equal to to the steering wheel diameter, to the spokes of the hand steering wheel.

(c) Apply a steady force to a dynamometer attached to the adapter pulley in a counterclockwise direction until the steer wheels reach the extreme counterclockwise position. Record the dynamometer reading.

(d) Perform (c) in a clockwise direction.

PART V UNBALANCED TANGENTIAL FORCE

(a) Place truck on test course with steer wheels in a straight ahead position and engine at idle speed.

(b) Turn steering wheel clockwise until steer wheels hit the stop. Next, apply 150 lb. (68 kg) unbalanced tangential force with the dynamometer to the steering wheel and maintain force for a minimum of 15 seconds. Perform this operation two more times.

(c) Repeat step (g) in counterclockwise direction.

TEST METHOD NO. 4

SPEED

1. 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 measured distance, plus a safe stopping distance.

2. Test Apparatus:

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

3. Test Procedure:

(a) Drive the truck with rated load a sufficient distance to attain maximum speed in high gear prior to entering the measured test course.

(b) 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).

(c) Repeat for a total of six runs, in forward gear, three in each direction, except only time measurement is required.

(d) Repeat total of six runs in reverse gear, three in each direction, except only time measurement is required.

(e) Travel speeds in forward and reverse shall be the average of the six runs .

(f) Repeat operations (a) through (e) without rated load.

TEST METHOD NO.5

SLOPE ASCENSION - PARKING BRAKE - DEADMAN CONTROLS- UNDERCLEARANCE

1. Test Course:

   (a) Tilt table or ramp.

2. Test Apparatus:

   (a) Clinometer.
   (b) Spring scale.

3. Test Procedure:

   (a) Drive truck forward with rated load along horizontal approach and onto ramp of 22 percent (12.4 degrees) and bring to complete stop (all wheels supported on the ramp).

   (b) Apply parking brake, release service brakes and observe whether truck remains stationary.

   (c) Reapply service brake, release parking brake and upon removal of operators weight from seat and release of service brakes observe whether truck remains stationary and the deadman control automatically returns the transmission contol lever to neutral or activates the indicator light.

   (d) Starting from a standstill on the ramp, proceed up and onto a horizontal surface. Stop the truck with the drive wheels on the horizontal surface and the steer wheels on the ramp. Measure and record underclearance beneath the mast assembly beneath each axle and the frame of the truck. Record the underclearance of the lowest component and note the component. Note whether any hydraulic components and linkages are not protected.

   (e) From a horizontal surface drive truck in reverse down slope, stop on slope and repeat steps (b) through (d).

   (f) Repeat steps 3(a) through 3(e) without rated load.

TEST METHOD NO. 6

UPRIGHT TILT - LOAD BACKREST

1. Test Course:

   (a) Level, paved surface.

2. Test Apparatus:

   (a) Clinometer.

3. Test Procedure:

PART I TILT

(a) Place truck without rated load on test course, using clinometer to insure truck is level.

(b) Raise forks to an elevation of 2 feet (610 mm) above the surface, tilt mast as far forward as possible, and record angle of tilt shown on clinometer located on front or rear surface of outer mast channel. Next tilt boom as far rearward as possible and record angle of tilt on clinometer located on front surface of outer mast channel.

PART II LOAD BACKREST

(a) Place truck with rated load on flat level surface, using clinometer to insure truck is level.

(b) Raise forks to an elevation of 2 feet (610 mm) above the surface, tilt mast as far rearward as possible, and record angle of tilt shown on clinometer located on front surface of outer mast channel. Next, observe if load backrest has experience any permanent deformation.

TEST METHOD NO. 7

COLLAPSED MAST HEIGHT - FREE LIFT HEIGHT - LIFT HEIGHT

1. Test Course:

(a) Level, paved surface.

2. Test Apparatus:

(a) Tape measure.
(b) Plumb bob.
(c) Liquid level or clinometer.

3. Test Procedure:

PART I COLLAPSED MAST (UPRIGHT) HEIGHT

(a) Without rated load and with the forks sitting on the test course measure and record the true vertical distance from floor to uppermost projection of the upright assembly with mast in true vertical position (determined by a clinometer).

PART II FREE LIFT HEIGHT

(a) Raise the rated load until the inner mast begins to exceed the collapsed mast height determined in PART I (a). Stop raising the rated load and measure and record the true vertical distance from the test course to the top surface of the forks.

PART III LIFT HEIGHT

(a) Lower rated load to 12 inches (305 mm), plus or minus 4 inches (102 mm), above ground level and position mast in true vertical position using clinometer. Attach a plumb bob to the theoretical intersection of the front surface and top surface of the forks and mark a reference point on the ground.

(b) Elevate the rated load to the maximum lift height and check the reference point. If necessary, reposition the mast so that the plumb bob is directly over the original reference point. Measure and record the true vertical distance from test course to the top surface of the forks.

TEST METHOD NO. 8

LIFT ASSEMBLY DRIFT

1. Test Course:

   (a) Level paved surface.

2. Test Apparatus:

   (a) Temperature thermocouples.
   (b) Clinometer.

3. Test Procedure:

   (a) Install thermocouple in the hydraulic reservoir. Position the truck on the test course and heat the hydraulic oil to 120 degrees minimum by exercising the lift and tilt functions. Maintain hydraulic oil temperature at or above above 120 degrees F (49 degrees C.) temperature during the duration of the test.

   (b) Raise rated load to maximum fork height obtainable with outer channel in true vertical position determined with the clinometer. Mark reference points on mast upper stage.

   (c) Record initial outer mast position and hydraulic oil temperatures.

   (d) Hold for not less than ten minutes and record downward drift, rotational drift, and hydraulic temperature.

TEST METHOD NO. 9

OVERLOAD

1. Test Course:

   (a) Level paved surface.
   (b) Anchor.

2. Test Apparatus:

   (a) Magnetic particle or dye penetrant capability.
   (b) Wood blocks.

3. Test Procedure:

   (a) Place truck on test course and support truck with blocks under the axle or frame to relieve weight on wheels and tires. Secure truck as necessrary with safety cables to prevent truck overturn and to compensate for the test loads to be placed on forks. Position mast in true vertical position. External means may be utilized to hydraulically lock the tilt cylinders.

   (b) With crane or another forklift truck, place first test load of the rated capacity such that the center of mass of the test load is on the truck's longitudinal centerline and at the rated load center.

   (c) With crane or another forklift truck, place second test load of the rated capacity in position over the first test load such that the center of mass of the test load is on the truck's longitudinal centerline and at the rated load center.

   (d) Check strain on safety cables and inspect the entire truck to determine whether the third test load can be placed on forks. Ascertain if additional safety cables are necessary prior to placement of third test load.

   (e) With the crane or another forklift truck, place third test load carefully in position over the first two loads so that the center of mass of load is on the longitudinal centerline of the truck and at the rated load center.

   (f) When placing test loads on truck, personnel should stand clear and crane or forklift operator should stand by to remove load if there is any evidence of immediate collapse or truck structure failure.

   (g) The 300 percent rated load may be applied as one load in lieu of three loads as described in (a) through (f).

   (h) If truck accepts the test load(s) without immediate failure, let overload stand on truck for 10 minutes.

TEST METHOD NO. 9 CONTINUED

(i) Remove loads.

(j) Inspect truck structure, frame, mast assembly, the hydraulic system for evidence of deformation, fractures, leakage in hydraulic system, broken welds, etc.

(k) Inspect forks a minimum of 6 inches (152 mm) each side of heel by magnetic particle for steel forks or dye penetrant method for non ferro magnetic forks.

TEST METHOD NO. 10

HYDRAULIC SYSTEM CLEANLINESS

1. Test Apparatus:

(a) Liquid Automatic Particle Counter.

2. Test Procedure:

(a) When hydraulic line volume exceeds 1/2 the volume of the related cylinder, connect the hydraulic lines on the cylinders to bypass related components.
(b) Run the engine at no-load governed speed pumping the oil through each circuit for not less than 5 minutes. Perform the particle count as described in (d) below.
(c) Connect each line to its related component. Operate each previously bypassed function of the system for 5 minutes continuously through full stroke and at maximum rates. Perform the particle count as described in (d) below.
(d) The procedure for determining contamination shall be as follows:

(1) Contamination levels shall be determined by particle counts. The particle counter used for evaluation of the samples shall be calibrated in accordance with ANSI Recommended Standard Method for Calibration of Liquid Automtic Particle Counters using "AC" Fine Test Dust (ANSI B93.28). The required counts shall be the average of not less than three consecutive counts. Samples may be taken from the reservoir or upstream of the filter(s) used for cleanup.
(2) Use any combination of on-the-truck and off-the-truck filtration for cleanup.
(3) When bottle sampling is used, extract a sample for analysis from a turbulent point in the system with the engine running or within 2 minutes of shutdown. When dynamic sampling is used, connect the counter sensor to the system, using a bypass line and a branch line. The bypass line shall connect to the system, have a flow rate not less than five times the sensor flow rate, and may return fluid directly to the reservoir. The branch line to the sensor shall tie into the bypass line and shall be not more than 12 inches in length. Any flow restriction devices shall be placed downstream of the particle counter sensor. Start engine and operate at not less than 1000 rpm. Particle counts should be allowed to stabilize before recording counts.

(e) Continue cleanup procedures as described in respective paragraphs above until the average of not less than three consecutive counts is less than 2000 particles per milliliter larger than 10 micrometers and less than 20 particles per milliliter larger than 100 micrometers.

TEST METHOD NO. 11

INCHING MECHANISM

1. Test Course:

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

2. Test Apparatus:

(a) Tape measure.
(b) Timing device

3. Test Procedure:

(a) Place truck on test course with rated load on forks.

(b) Position mast at rearward tilt and raise rated load to travel position.

(c) With direction control in forward position, accelerate the truck and at the same time actuate the inching pedal. Record length of measured distance and time to traverse measured distance. Measured distance shall be equal to or greater than 44 feet (13 m). Record time in seconds required to raise rated load to maximum lift height during inching.

(d) Repeat for a total of six runs. Test result shall be the average of six runs.

(e) Repeat above procedure in reverse direction.

TEST METHOD NO. 12

SERVICE BRAKE STRENGTH - TOWING HOOK STRENGTH

1. Test Course:

Level paved surface.

2. Test Apparatus:

(a) Pedal force gage.
(b) Tension dynamometer.
(c) Chain hoist.
(d) Anchoring device.
(e) Towing cable.

3. Test Procedure:

PART I SERVICE BRAKE STRENGTH

(a) Position truck on test course and attach the pedal force gage to the brake pedal in a manner which enables force to be applied to the gage.

(b) Apply 300 pound (113 kg) force to the brake pedal, hold for five minutes and release. Repeat this operation three times.

(c) Inspect for component failure.

PART II TOWING HOOK STRENGTH

(a) Determine gross weight of truck with rated load.

(b) Position truck on test course equipped with two anchoring devices.

(c) Attach a tension dynamometer to the front of the truck.

(d) Attach one end of chain hoist, or similar mechanical device, to the tension dynamometer, and the other end to an anchoring device. Attach one end of towing cable to the truck towing hook and the other end to an anchoring device.

(e) With transmission in neutral, tow truck with chain hoist or similar mechanical device.

(f) Produce sufficient force with chain hoist to produce a force recorded on dynamometer equal to 30% of the total weight of truck plus rated load and record dynamometer reading.

(g) Examine towing hook for permanent deformation.

TEST METHOD NO. 13

TIRE LOADING - DECK LOADING

1. Test Apparatus:

(a) Platform scales.
(b) Plywood panel

2. Test Procedure:

PART I TIRE LOADING

(a) Determine the weight supported by each steer wheel without rated load on the forks by driving the steer wheels onto a platform scale or jacking them up with two axle scales. When the trail wheels are weighed together, the total weight should be divided by the number of steer tires. The upright shall be in a vertical position, carriage centered and the forks positioned approximately 12 inches (305 mm) above the floor. Determine the tire contact area as indicated in PART II.

(b) Determine the weight supported by the drive wheel(s) without rated load on the forks by driving the left side drive wheel(s) onto a platform scale or utilizing an axle scale. When dual wheels are weighed, divide the total weight by two to determine each tire loading. The upright shall be vertical, carriage positioned at maximum left sideshift position and the forks positioned approximately 12 inches (305 mm) above the floor. Determine the tire contact area as indicated in PART II.

(c) Determine the weight supported by the drive wheel(s) without rated load on the forks by driving the right side drive wheel(s) onto a platform scale or utilizing an axle scale. When dual wheels are weighed, divide the total weight by two to determine each tire loading. The upright shall be vertical, carriage positioned at maximum right sideshift position and the forks positioned approximately 12 inches (305 mm) above the floor. Determine the tire contact area as indicated in PART II.

(d) Repeat steps (a), (b) and (c) with rated load on the forks.

PART II DECK LOADING

(a) Cover the bottom of the steer and drive tires completely with slow drying paint and lower the wheels onto 1/4 inch plywood panel to establish each tire contact area. When applicable, record each tire pressure.

(b) Calculate and record the actual deck loading for each wheel by dividing the wheel weights determined by PART I TIRE LOADING by the tire contact area determined in step (a).

TEST METHOD NO. 14

RELIABILITY TEST

1. Test Course:

(a) Layout of course. The test course shall be set up equivalent to the provisions of Figure A-2. Aisle widths shall not exceed the dimensions shown in Table A-I. The course perimeter shall be demarcated with suitable barriers or indicators. Rubber pylons or other suitable marking shall be placed on all corners and other critical points to assist in keeping the truck being tested within the course limits.

Table A-I

Aisle Widths For Test Course (feet)		
Capacity (lb)	Solid Tired Trucks	Pneumatic Tired Trucks
6,000 (2722 Kg)	14 (4267 mm)	18 (5486 mm)
15,000 (6803 kg)	--	25 (7620 mm)
20,000 (9070 kg)	--	25 (7620 mm)

(b) Obstacle inclusion. The obstacle test shall be set up in accordance with the provisions of Figure A-3 or A-4, as applicable, as a part of the test course. Iron, wood, cement or steel blocks may be used. A guideline 15 feet (4572 mm) long shall be provided to the left of the centerline of the course and parallel to it. The inner edge of this guideline shall be at a distance from the course centerline equal to one-half of the truck width or one-half of the load width (whichever is greater) plus 6 inches (152 mm). This spacing and arrangement will allow the left wheels of the truck under test to pass over the first block and then the right wheels to pass over the second block while the truck is moving forward in a straight line parallel to the guideline.

(c) Ramp inclusion. The course shall include a ramp constructed in accordance with the provisions of Figure A-5.

(d) Course surface. The course shall be paved and shall be clean and free of any nonplanned obstacles or foreign material while conducting the reliability test.

(e) Pallet areas. Position 1: Pallet loads in the first pallet area shall be stacked in accordance with Figure A-6 or A-7, as applicable. They shall be placed 2 inches (51 mm) apart in a direction parallel to, and touching in a direction perpendicular to, the axis of the test course at that point. The stacked marked "X" on Figure A-2 and the

limiting (side) stacks shall be high enough that the bottom of the top face of the pallet shall be 6 inches (152 mm) below the maximum lift height of the vehicle under test.

Position 2: Pallet loads in the second pallet area shall be stacked in accordance with Figure A-8 or A-9, as applicable. They shall be placed 2 inches (51 mm) apart in a direction parallel to, and touching in a direction perpendicular to, the axis of the test course at that point. The stack marked "Y" on Figure A-2 and limiting (side) stacks shall be high enough that the bottom of the top face of the pallet shall be at the midpoint between ground level and the maximum lift height of the vehicle under test.

Position 3: Pallet loads in the third pallet area shall be stacked in accordance with Figure A-10. They shall be placed 2 inches (51 mm) apart, positioned as shown on Figure A-2, in a direction parallel to, and touching in a direction perpendicular to, the axis of the test course at that point. The stack marked "Z" on Figure A-2 and limiting (side) stacks shall be high enough that the bottom of the top face of the pallet shall be at 48 inches (1220 mm) height.

2. Test Procedure:

(a) The light switch shall be turned "off" and "on" at the beginning of each lap and upon entering each pallet area.

(b) The truck under test shall begin each lap at the point labeled "STOP & START" on Figure A-2. After the operator starts the truck engine, he shall operate the horn for approximately one second. On lap number 1, the truck shall proceed in a forward direction, following the centerline along the portion of the course marked "A" until it reaches the position 1 pallet area. The rated load will have been previously placed in this location on the stack marked "x".

(c) The truck shall make a 90-degree right-hand turn in one motion without requiring backing operations, proceed to the face of the pallet stack marked "X", raise forks to maximum fork height, then adjust fork height and remove loaded pallet. The truck shall back out of the stack aisle into the main aisle making a 90-degree left-hand turn in one motion, without going forward, and proceed rearward (in reverse) along the main aisle in the portion of the course marked "B" until it reaches position 2 pallet area.

(d) The truck shall proceed rearward (in reverse) to a point beyond position 2 pallet area opening, reverse its direction, and move forward to the face of the pallet stack marked "y", making the 90-degree right-hand turn in one motion without requiring backing operations. The rated load shall be placed on top of the pallet stack marked "Y".

(e) The truck shall back out of the stack aisle into the main aisle, making the 90-degree left-hand turn in one motion without requiring

forward operations, and proceed forward along the main aisle in the portion of the course marked "C" until it reaches position 3 pallet area.

(f) The truck shall make a 90-degree right-hand turn in one motion without requiring backing operations and pick up rated load which had been previously placed in the location marked "Z". The truck shall back out into the main aisle, making the 90-degree right-hand turn in one motion without requiring backing operation, and proceed further along the main aisle in the portion of the course marked "D" until it reaches the portion of the course marked "E", containing the obstacle blocks.

(g) The obstacle blocks shall be traversed by the truck being driven through this area in a straight line so that its left wheels pass over the first block and the right wheels pass over the second block. This part of the test may be conducted at low speed with the transmission in low range. However, the truck shall not be stopped prior to or while going over the blocks.

(h) The truck shall proceed further along the main aisle in the portions of the course marked "F" and "G" until it reaches the position on the ramp labeled "Stopping Point". The driver shall stop the truck, activate the deadman control and then resume ascending the ramp. On the alternate lap the parking brake shall be activated in lieu of deadman control. After the top of the ramp is reached, proceed along the main aisle in the portion of the course marked "J", "K", and "L".

(i) When the truck reaches the portion of the course marked "M", the operator shall stop the truck and operate the sideshift control one time in each direction. On the alternate lap without loaded pallet the operator shall operate the fork positioner (when applicable). After every 25 laps the operator shall stop and restart the engine and test the starter motor safety interlock. After completion of this portion of the test, proceed along the main aisle and start the next cycle.

(j) The truck shall then reenter the portion of the course marked "A". In portions "A", "B", "C", and "D", the procedure shall be the same as described in preceding paragraphs, except that the truck shall place a test load at each point where it was previously indicated that the truck picked one up, and pick up a load where it was previously indicated one was placed. Maneuvers in the balance of the course beyond the portion marked "D" shall be the same as described in preceding paragraphs.

(k) One-half of the total number of laps shall be traversed in the opposite direction with all operations reversed accordingly. This may be accomplished after completion of each 8-hour operating day or multiple thereof. That is, 50 percent of the laps shall be accomplished in the clockwise direction and 50 percent in the counterclockwise direction or vice versa. The test course need not be

rearranged for the reverse travel.

(l) "The Hourly Time Record Sheet" contained herein shall be filled out for each operating hour of the performance test. The number of laps per hour, refueling, reasons for malfunctions, stoppages and safety hazards shall be recorded.

(m) Normal maintenance and inspections shall be performed in accordance with the contractor recommendations furnished prior to commencement of the reliability test.

FIGURE A-2 TYPICAL TEST COURSE

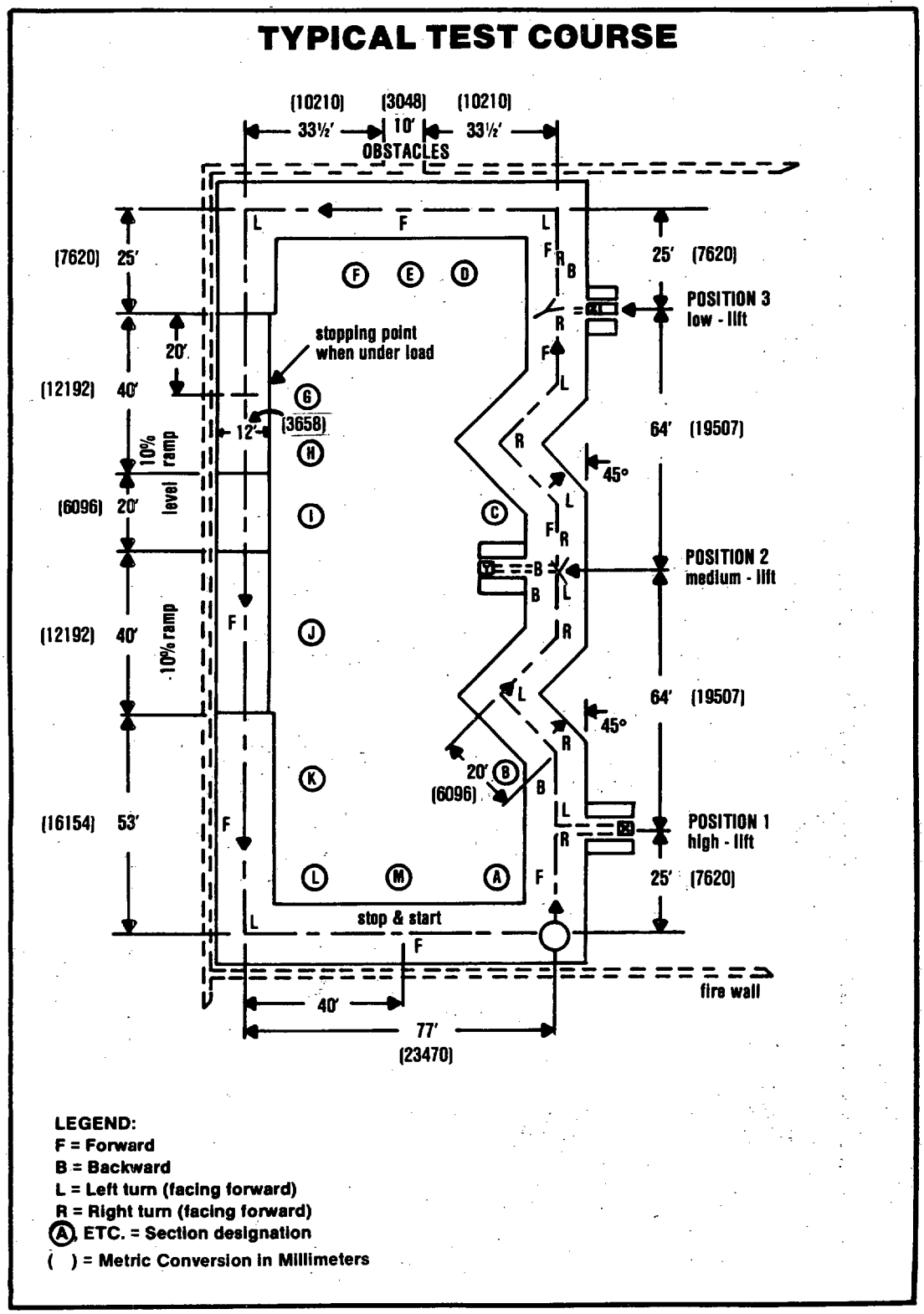


FIGURE A-2

Figure A-3. DETAILS OF OBSTACLE CONSTRUCTION FOR TRUCK, FORK, LIFT, SOLID RUBBER TIRES

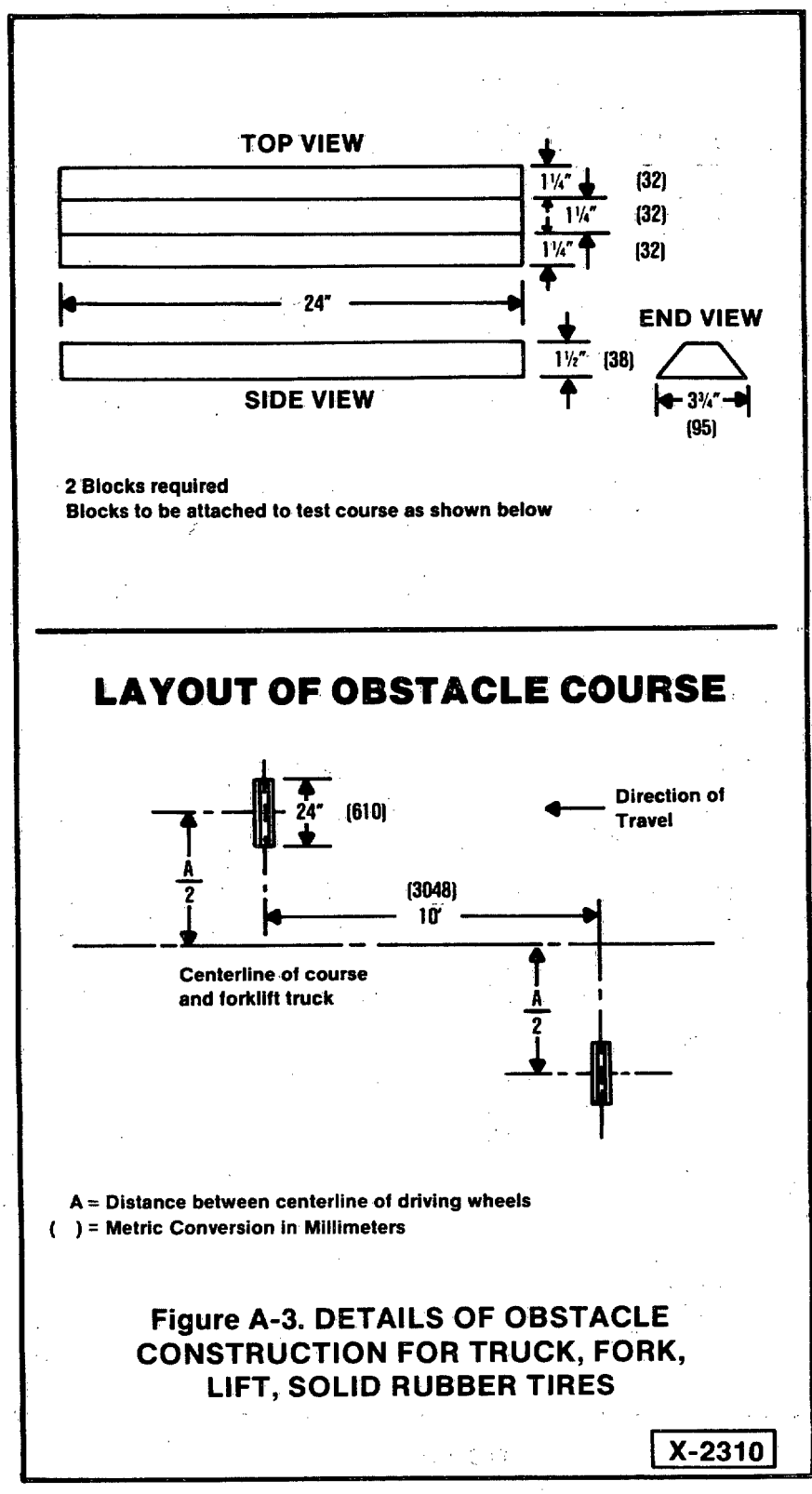


FIGURE A-4 DETAILS OF OBSTACLE CONSTRUCTION FOR TRUCK, FORK, LIFT, PNEUMATIC RUBBER TIRES

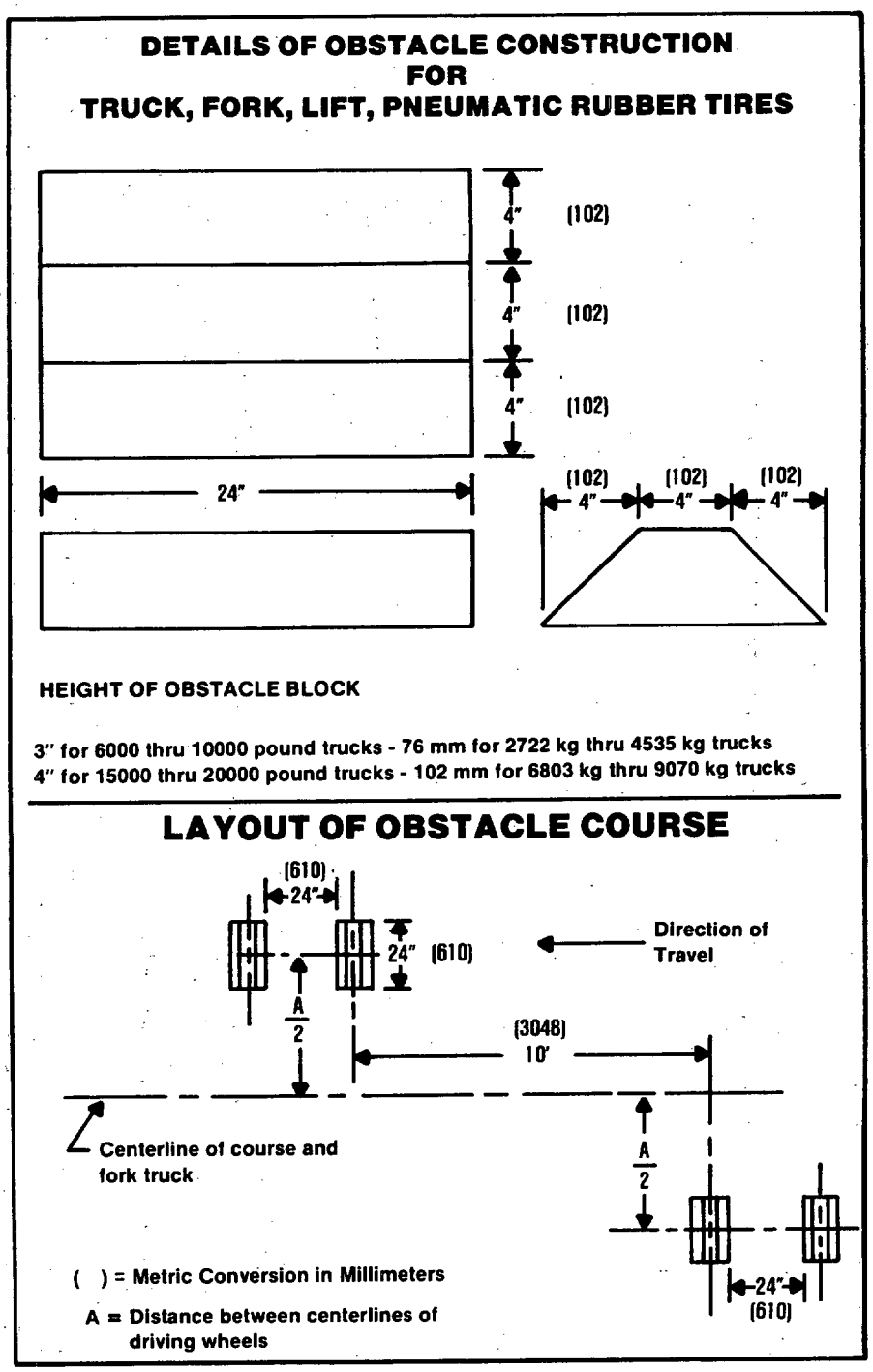


FIGURE A-4

Figure A-5. RAMP DESIGN

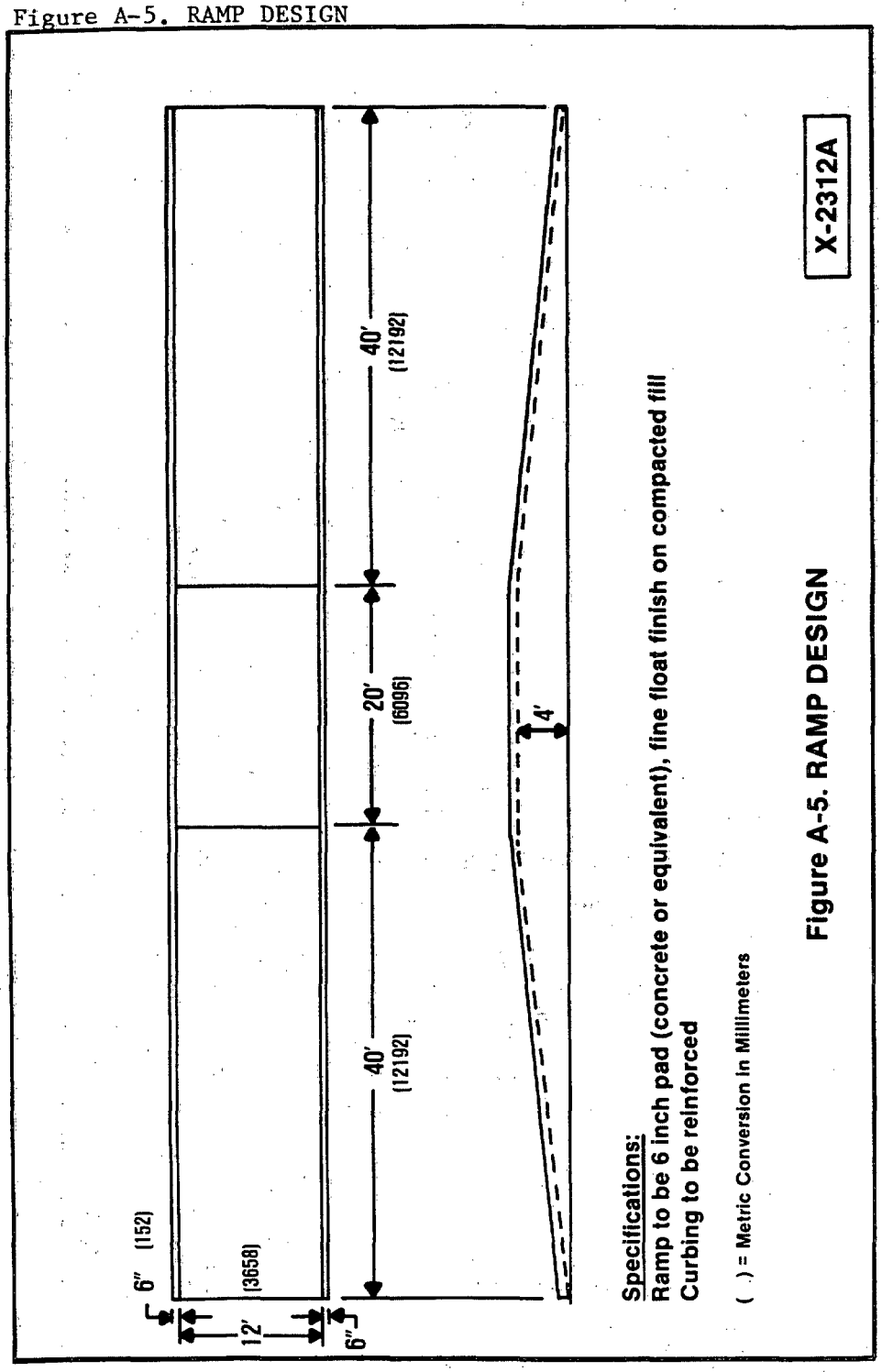
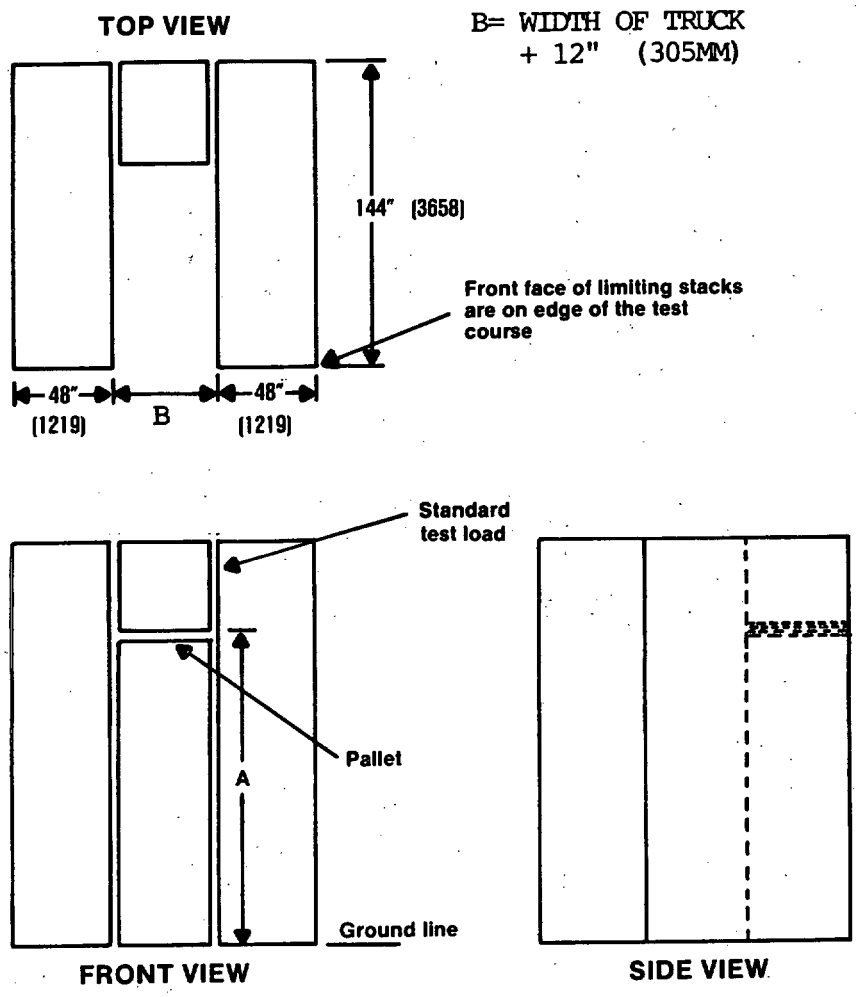


Figure A-6. STACK LAYOUT - POSITION 1 SOLID RUBBER TIRED TRUCKS



A = Maximum lift height for forks less 6 inches (152)

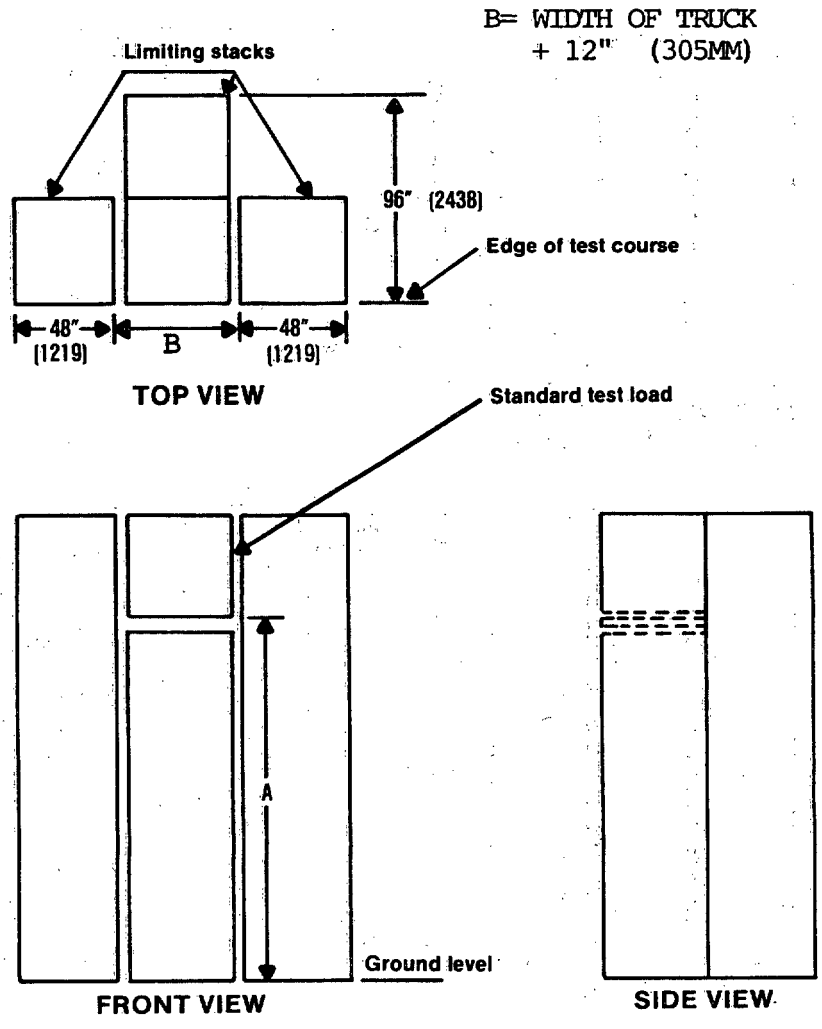
Support for standard load should be of suitable strength to sustain test load. Limiting stacks may be pallets, pallet racks or both.

( ) = Metric Conversion in Millimeters

Figure A-6. STACK LAYOUT - POSITION 1 SOLID RUBBER TIRED TRUCKS

X-2313

Figure A-7. STACK LAYOUT - POSITION 1 PNEUMATIC RUBBER TIRED TRUCKS



A = Maximum lift height of forks less 6 inches (152)

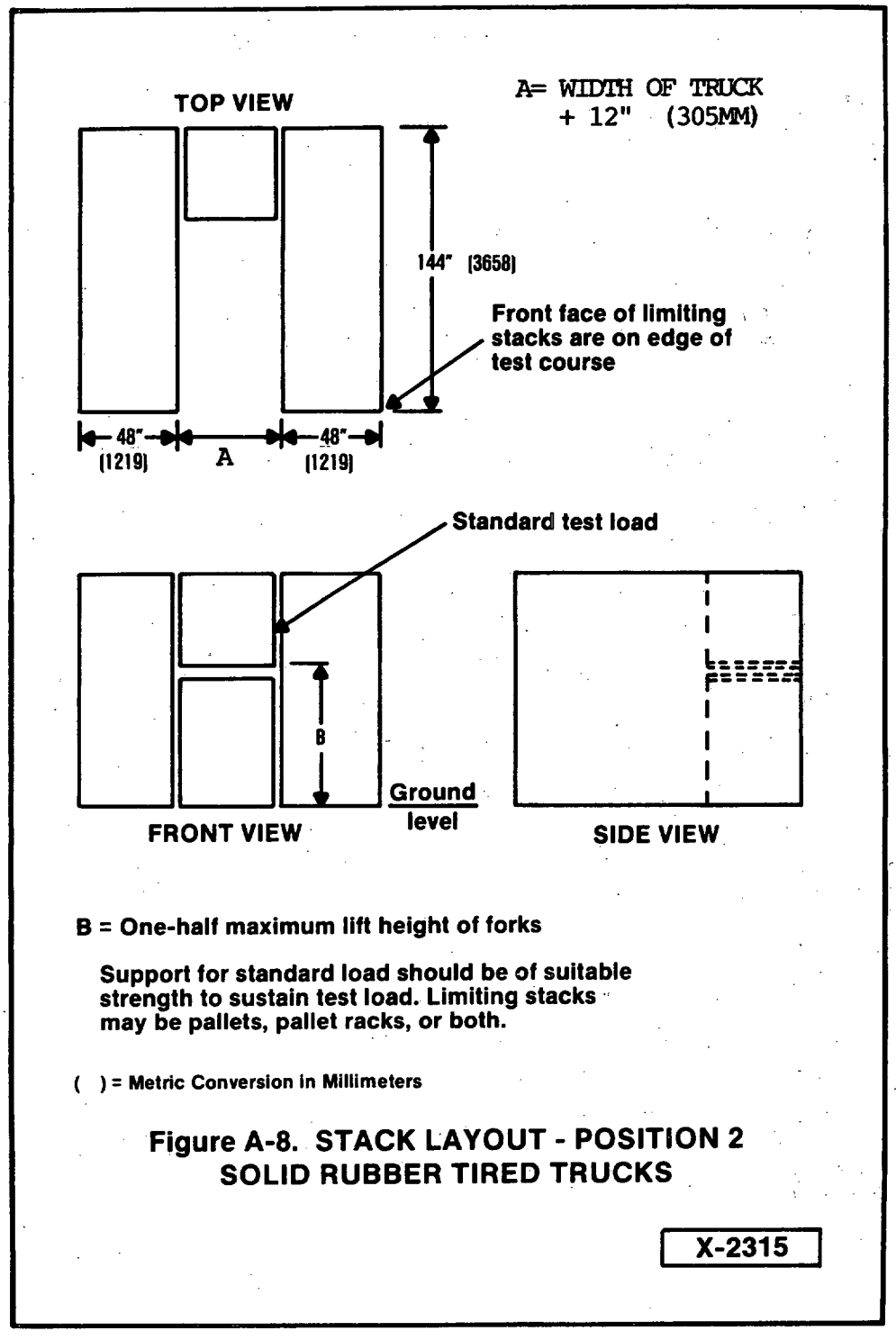
Support for standard load should be of suitable strength to sustain test load. Limiting stacks may be pallets, pallet racks or both.

( ) = Metric Conversion in Millimeters

Figure A-7. STACK LAYOUT - POSITION 1 PNEUMATIC RUBBER TIRED TRUCKS

X-2314

Figure A-8. STACK LAYOUT - POSITION 2 SOLID RUBBER TIRED TRUCKS



B = One-half maximum lift height of forks

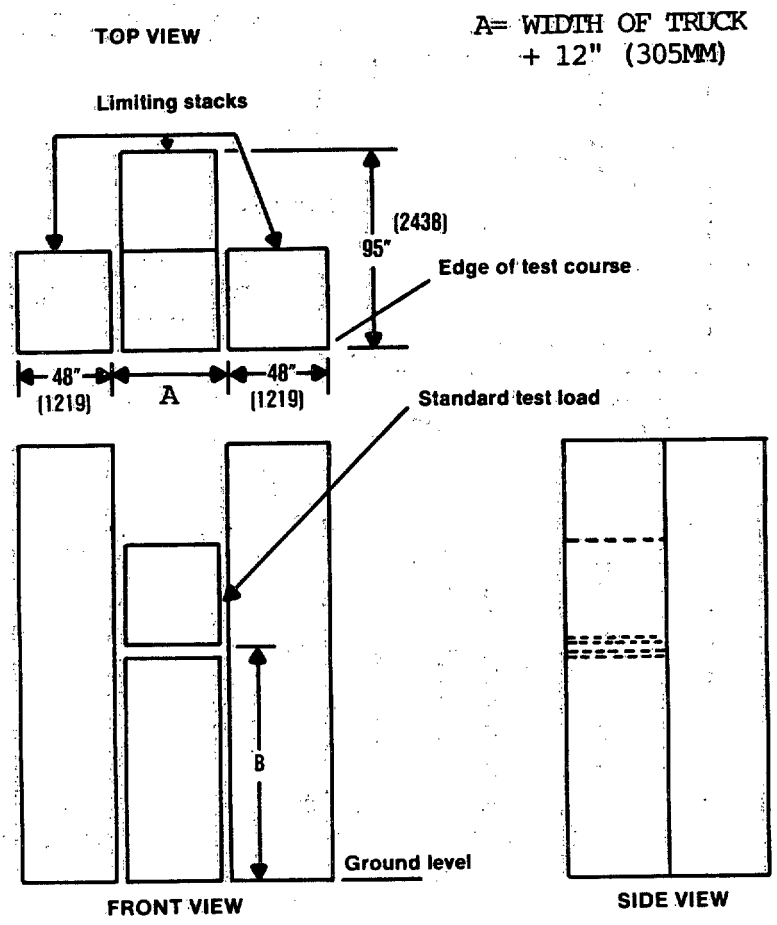
Support for standard load should be of suitable strength to sustain test load. Limiting stacks may be pallets, pallet racks, or both.

( ) = Metric Conversion in Millimeters

Figure A-8. STACK LAYOUT - POSITION 2 SOLID RUBBER TIRED TRUCKS

X-2315

Figure A-9. STACK LAYOUT - POSITION 2 PNEUMATIC RUBBER TIRED TRUCKS



B = One-half maximum lift height of forks

Support for standard load should be of suitable strength to sustain test load. Limiting stacks may be pallets, pallet racks, or both.

( ) = Metric Conversion in Millimeters

Figure A-9. STACK LAYOUT - POSITION 2 PNEUMATIC RUBBER TIRED TRUCKS

X-2316

Figure A-10. STACK LAYOUT - POSITION 3

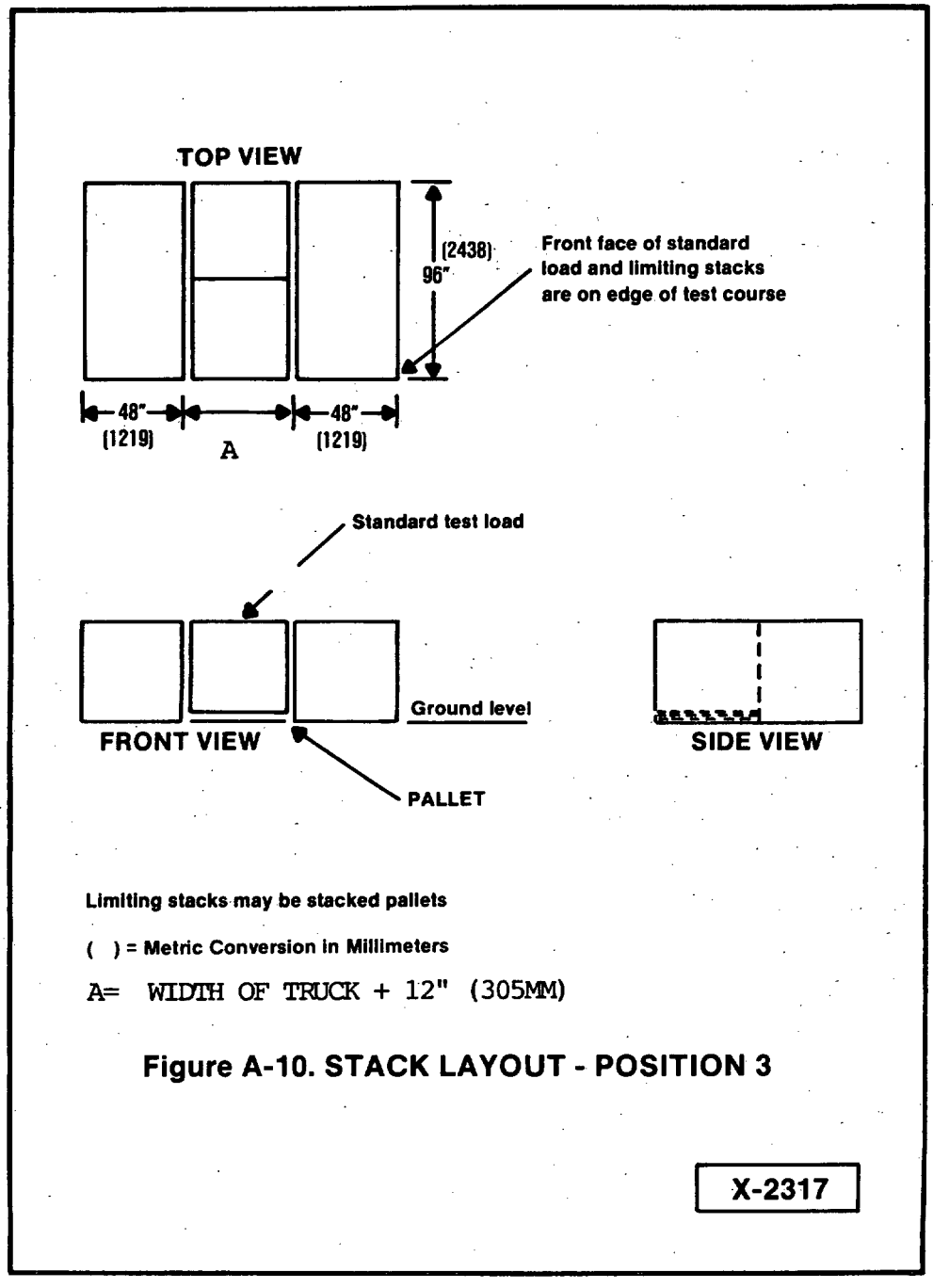


Figure A-10. STACK LAYOUT - POSITION 3

HOURLY TIME RECORD SHEET

Date _____

Truck Manufacturer _____ Clock Readings: _____

Model _____ Test Location _____ Start _____

Serial No. _____ Recorded by _____ Finish _____

Time	Laps	Average Lap Time	Comments

Instructions:

1. Start decimal minute stop watch at zero at beginning of each hour.

2. Record watch reading at end of each hour and record elapsed time.

☆U.S. GOVERNMENT PRINTING OFFICE: 1990 - 704-034/30163

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)