

INCH- POUND

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SUPERSEDING
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MILITARY SPECIFICATION

TRUCKS, LIFT, FORK, INTERNAL-UMBWXION ENGINE,

2000-4000-6000 POUND CAPACITY, GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers the general requirements for internal combustion engine, industrial depot type forklift trucks.

1.2 Classification. Forklift trucks shall be of the following types as specified.

- a. Type G, D or LP- For general warehouse use.
- b. Type GS, DS or LPS - For handling of ammunition and explosives.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research, Development, and Engineering Center, ATTN: STRBE-TSE, Fort Belvoir, VA 22060-5606, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 3930

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2.1.1 Specifications, standards and handbooks. The following specifications, standards, and handbooks form apart of this document to the extent specified herein. Unless otherwise specified, the issue of these documents are 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).

SPECIFICATIONS

FEDERAL

- GG-P-455 - Plates and Foils, Photographic (Photosensitive Anodized Aluminum).
- VV-F-800 - Fuel, Oil, Diesel.

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- MIL-P-514 - Plate, Identification, Instruction, and Marking, Blank.
- MIL-T-704 - Treatment and Painting of Materiel.
- MIL-L-2104 - Lubricating Oil, Internal Combustion Engine, Tactical Service.
- MIL-L-2105 - Lubricating Oil, Gear, Multipurpose (Metric).
- MIL-G-3056 - Gasoline, Automotive, Combat.
- MIL-G-10924 - Grease, Automotive and Artillery.
- MIL-S-43926 - Suit, Chemical Protective.
- MIL-G-43976 - Glove and Glove Set, Chemical Protective.
- MIL-F-43987 - Footwear Cover, Chemical Protective (Overbooks).
- MIL-A-46153 - Antifreeze, Ethylene Glycol, Inhibited, Heavy Duty, Single Package.
- MIL-L-46167 - Lubricating Oil, Internal Combustion Engine, Arctic.
- MIL-B-46176 - Brake Fluid, Silicone, Automotive, All Weather, Operational and Preservative (Metric).
- MIL-M-51282 - Mask, Chemical Biological, Field M17a.
- MIL-H-51291 - Hood, Chemical Biological Mask M6a2.
- MIL-V-81940 - Valve, Sampling and Bleed, Hydraulic, Type II Systems.
- MIL-T-83133 - Turbine Fuel, Aviation, Kerosene Types Nato F-34 (Jp-8) and Nato F-35.

(See supplement 1 for list of associated specifications.)

STANDARDS

FEDERAL

- FED-STD-H28 - Screw Threads Standards for Federal Services.

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- MIL-STD-162 - Materials Handling Equipment, Preparation for Shipment, Storage, Cyclic Maintenance, Routine Testing and Process.
- MIL-STD-209 - Slings and Tiedown Provisions for Lifting and Tying Down Military Equipment.
- MIL-STD-810 - Environmental Test Methods and Engineering Guidelines.
- MIL-STD-889 - Dissimilar Metals.
- MIL-STD-1474 - Noise Limits for Army Materiel.
- MIL-STD-1791 - Designing for 'Internal Aerial Delivery in Fixed wing Aircraft.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DEPARTMENT OF AGRICULTURE

Forest Service Standard 5100-1a

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 24401.)

DEPARTMENT OF LABOR (DOL)

CFR Title 29 Chapter XVII Part 1910
29 CFR1910 - Occupational Safety and Health Administration (OSHA).

(Application for copies should be addressed to a DOL Officer or the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.)

ENVIRONMENTAL PROTECTION AGENCY (EPA)

40 CFR, Part 86, Subpart B

Emission. Regulation for 1977 and Later Model Year New Light Duty Vehicles and New Light Duty Trucks; Test Procedures (particulate tunnel and. sampling system) pp 402-465, 1 July 1983.

40 CFR, Parts 81 to 99, Subparts D) and I

Protection of Environment.

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(Application for copies should be addressed to the Superintendent of Documents, US Government Printing Office, Washington, DC 20402.)

MILITARY TRAFFIC MANAGEMENT COMMAND (MTMC/TEA)

Pamphlet 70-1 - - Transportability for Better Strategic Mobility.

(Application for copies should be addressed to the Military Traffic Management Command, Transportation Engineering Agency (MTMC/TEA), ATTN: MT-TR, P.O. Box 6276, Newport News, VA 23606-2076.)

2.2 Non-Government publication. The following document (s) form a part of this document 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 cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the solicitation (see 6.2).

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

B56.1		Safety Standard for Powered Industrial Trucks
B56.11.3	-	Load Handling Symbols for Powered Industrial Trucks.
B56.11.4	-	Hook Type Forks and Fork Carriers for Powered Industrial Trucks .

(Application for copies should be addressed to the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION INC. (NMFTA)

National Motor Freight Classification Rules.

(Applications for copies should be addressed to the American Trucking Association, Inc., ATTN: Traffic Order Section, 2200 Miill Rd, Alexandria, VA 22314.)

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

J154	Operator Enclosures, Human Factor Design Considerations.
J209	Instrument Face Design and Location for Construction and Industrial Equipment.
J514	Hydraulic Tube Fittings.
J516	Hydraulic Hose Fittings.
J517	Hydraulic Hose.
J518	Hydraulic Flanged Tube, Pipe, and Hose Connections, 4-Bolt Split Flange Type.
J524	Seamless Low Carbon Steel Tubing Annealed for Bending and Flaring.
J525	Welded and Cold Drawn Low Carbon Steel Tubing Annealed for Bending and Flaring.

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J534	Lubrication Fittings.
J537	Storage Batteries.
J551	Limits and Methods of Measurement of Radio Interference Characteristics of Vehicles and Devices.
J598	Sealed Lighting Units for Construction, Industrial and Forest Machinery.
J614	Engine and Transmission Dipstick Marking.
J753	Lubrication Chart-Construction and Industrial Machinery.
J759	Lighting Identification Code.
J833	USA Human Physical Dimensions.
J899	Operator's Seat Dimensions for Off-Road Self-Propelled Work Machines.
J 9 2 5	Minimum Semite Access Dimensions for Off-Road Machines.
J 9 3 1	Hydraulic Power Circuit Filtration.
J1127	Battery Cable,
J1176	External Leakage Classifications for Hydraulic Systems.

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

TIRE AND RIM ASSOCIATION, INC. (TRA)

Tire and Rim Association Yearbook.

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

UNDERWRITERS LABORATORIES INC. (UL)

UL 558 - Internal Combustion Engine - Powered Industrial Trucks.

(Applications for copies should be addressed to Underwriters Laboratories, Inc., Publications Stock, 333 Pfingsten Road, Northbrook, IL 60062.)

UNIFORM CLASSIFICATION COMMITTEE AGENT (UCC)

Uniform Freight classification Rules.

(Applications for copies should be addressed to the Uniform Classification Committee, Rm 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Non-government standards and other publications are normally available from the organizations that prepare or 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

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document take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specofocatopm 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 Descriptiona. The forklift truck, herein after call "truck" shall be a sit-down rider, four-wheeled, counterbalanced truck with front wheel drive, rear wheel steer, equipped with a power shift or hydrostatic transmission. The truck shall have an internal combustion engine, powered by gasoline, diesel, or liquid petroleum gas (LPG).

3.2.1 Standard product. The truck shall be the manufacturer's current commercial product. The truck shall be complete with all components that are standard with the contractor's products, whether stipulated herein or not, together with such accessories as may be specified herein.

3.3 First article. Unless otherwise specified (see 6.2), a sample shall be subjected to first article inspection (see 6.4) in accordance with 4.4.

3.4 Materials. Materials shall be as specified herein Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification.

3.4.1 Material deterioration prevention and control. The truck shall be fabricated from compatible materials, inherently corrosion and deterioration resistant or permanently treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable operating and storage environments to which the truck may be exposed.

3.4.1.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.4.2 Identification of material and finishes. The contractor shall identify the specific material, material finish or treatment for use with components and subcomponents, and shall make information available, upon request, to the contracting officer or designated representative.

3.4.3 Recovered materials. For the purpose of this requirement, recovered materials are those materials which have been collected from solid waste and reprocessed to become a source of raw materials, as distinguished from virgin raw materials. The components, pieces and parts incorporated in the trucks may be newly fabricated from recovered materials to the maximum extent

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practicable, provided the truck produced meets all other requirements of this specification. Used, rebuilt or remanufactured components, pieces and parts shall not be incorporated in the trucks.

3.4.4 Screw Thread. Screw threads shall be in accordance with FED-STD-H28.

3.5 Operating temperature. The truck shall operate as specified herein with 15 minutes after engine start in any ambient temperature in the range of minus 25 °F (-32 °C) to plus 120 °F (49 °C) when tested in accordance with 4.7.1. When specified (see 6.2) the operating temperature shall be 0 °F (-18 °C) to 120 °F (49 °C).

3.6 Performance.

3.6.1 Upright tilt. When unloaded, truck mast shall have the forward and rearward tilt specified on the applicable specification sheets.

3.6.2 Collapsed mast height. The collapsed mast height of a truck with capacity load measured from the ground to the top of the uprights in a vertical position shall not exceed that specified on the applicable specification sheet.

3.6.3 Maximum fork height. The maximum fork height of a truck with capacity load, with the uprights fully extended, measured from the ground to the load carrying surface of the forks at the capacity load center, shall be not less than that specified on the applicable specification sheet.

3.6.4 Free lift height. Height forks will lift from ground level to the load carrying surface of the forks without increasing the specified collapsed mast height, shall not be less than that specified on the applicable specification sheet.

3.6.5 Drift. The lift assembly shall be capable of holding the rated load at maximum lift height for not less than 10 minutes with not more than 1-3/4 inch (44.5 mm) of vertical drift and not more than 1 degree of rotational drift.

3.6.6 Side shift. Unless otherwise specified (see 6.2) trucks shall be equipped with a side shift mechanism. The mechanism shall be hydraulically operated to move the forks a minimum of 4 inches (10.2 cm) to both the left and right of the center with capacity load. The fork hanger shall permit fork removal without removing the load backrest.

3.6.7 Fork size and spacing. Fork size and spacing shall be as specified on the applicable specification sheet.

3.6.8 Lifting speed. Lift speed with capacity load on the forks shall not be less than 60 feet per minute (18.29 meters per minute) over the entire distance from ground level to maximum fork height.

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3.6.9 Lowering speed. Speed of lowering of unloaded forks shall not be less than 40 feet per minute (12.19 meters per minute) over the entire distance from maximum fork height to ground level. Speed of lowering forks with capacity load shall be not more than 80 feet per minute (24.38 meters per minute) over the entire distance from maximum fork height to ground level.

3.6.10 Right angle turn. Trucks, when carrying capacity load, shall be capable of backing through a turn in either direction and returning to the same or parallel position within dimension specified on the applicable specification sheet, when operated as specified herein.

3.6.11 Slope ascension. forward direction. Trucks shall be capable of ascending a 20 percent grade on asphalt, concrete or equivalent surface with and without capacity load. Trucks shall be able to accelerate from a dead stop on this slope when carrying capacity load.

3.6.12 Underclearance. The truck with capacity load shall have sufficient underclearance to permit operation from one horizontal plane to another up or down a 20 percent slope and over the obstacle course described in Test Method No. 1. Minimum underclearance beneath the mast assembly, when in true vertical position, shall be not less than that specified on the applicable specification sheet when the truck is loaded. Hydraulic fittings, hoses, tubing, and mechanical linkages shall not be the lowest portion of the truck or shall be protected by removable structural plates from striking obstacles.

3.6.13 Stability. The truck shall conform to "forward stacking", "forward travel", "lateral stacking", and "lateral travel" stability requirements of ASME/ANSI B56.1.

3.6.14 Travel speed. While carrying the capacity load on a level surface, trucks shall be capable of attaining speeds specified on the applicable specification sheet in both the forward and reverse directions.

3.6.15 Acceleration. From a standing start, the truck when carrying capacity load shall have an acceleration in the forward direction such as to negotiate the specified distance in not more than the designated time as specified on the applicable specification sheet.

3.6.16 Endurance. The truck shall be capable of completing 280 hours of endurance testing on a course as specified in 4.7.2.15. When specified (see 6.2), the number of hours of endurance shall be 24 hours conducted continuously, nonstop, except for refueling. The average cycle timing shall not exceed the values listed in the applicable specification sheets.

3.7 Safety. The trucks shall conform to the applicable requirements of ANSI B56.1, and UL 558, and CFR Title 29 Part 191(3 in effect at the time of manufacture and other requirements specified herein. Unless otherwise specified, trucks shall be type GS, type DS, or type LPS (see 6.2). Individual trucks shall be labeled with safety rating. Safety rating markings shall be in accordance with UL 558.

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3.7.1 Safety certification. The truck shall bear U.L. stamp of approval as specified. In addition, the contractor shall submit to the contracting officer or authorized representative satisfactory evidence that the truck furnished under this specification meet or exceed the requirements of 3.7. Acceptable evidence of meeting these requirements shall be certified test reports from recognized independent testing laboratories acceptable to the Government, indicating that the truck conforms to the requirements of 3.7. Also, the truck shall be furnished with a safety nameplate specified here in (see 3.26).

3.8 Human factors engineering. The truck shall be operable and maintainable by 5th percentile female through 95th percentile male operators, in accordance with SAE J154 and SAE J833, who are wearing cold weather clothing, or when specified (see 6.2) wearing NBC protective gear (see 3.8.1).

3.8.1 Nuclear- biological - chemical (NBC) operability. When specified (see 6.2), the truck shall be operable by personnel wearing the following complete protection ensemble:

- Mask, chemical biological, Field M17a, MIL-M-51282.
- b. Hood, chemical biological, mask M6a2, MIL-H-51291.
- c. Suite, chemical protective, MIL-S-43926.
- d. Glove and glove set, chemical protective, MIL-G-43976.
- e. Footwear cover, chemical protective (overboots), MIL-F-43987.

The operator shall be capable of actuating all controls (i.e., levers, switches, PEDALS, knobs, and handles) without interference caused by the ensemble that is detrimental to the operation of the truck. The truck shall complete two cycles in 7 minutes or less on the truck operator's course (test method 1). The protective ensemble as listed above, will be furnished as Government loaned equipment (GFE) to the contractor in order to permit performance of the test.

3.9 Maintainability. Provision shall be made for adjustment, servicing, and replacement of all electrical assemblies and components, hydraulic system components, battery, wearing parts of lift and tilt mechanism brakes and components, wear parts of steering assembly, tires, wheels, lights, and horn. If hand access openings are required to perform maintenances, the edges of each opening shall be smooth and the opening shall be provided with a removable or hinged cover. Dimensions of access openings shall be in accordance with SAE J925 for mittened hand. There shall be no interference with the servicing or drawing of oils and lubricants to or from any assembly or component by frame members or other obstructions. Oil and lubricants shall be capable of being drained into a suitable container without requiring the use of flexible connections. All drains shall provide for complete drainage. Engine, transmission and hydraulic system, steering system and service brakes shall be furnished with dipsticks in accordance with SAE J614. In lieu of dipstick to check service brake and hydraulic system fluid levels, visual inspection is acceptable.

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3.9.1 Maintenance operations. Unless otherwise specified herein, each operation in the following maintenance operations list shall be accomplished by one maintainer in not more than the time specified using common tools and the special tools, if furnished with the truck:

- Remove, replace and adjust all engine driven belts - 1/2 hour.
- b. Remove and replace alternator - 1/2 hour.
- c. Remove and replace all filters, screens and strainers in all hydraulic systems - 1 hour.
- d. Remove and replace fuel filter elements - 1/2 hour.
- e. Drain engine lubricating oil, remove and replace oil filter elements and refill crankcase - 1 hour.
- f. Remove and replace engine coolant system hoses - 1/2 hour.
- g. Disconnect battery cables, remove and replace batteries and reconnect battery cables - 1/2 hour.
- h. Drain transmission oil, remove and replace all filter elements and strainers and refill transmission - 1 hour.
- i. Remove and replace starter - 1 hour.
- j. Bleed and adjust brakes and refill master cylinder (two maintainers) - 3/4 hour.
- k. Remove and replace floodlights and tail-light bulbs - 1/4 hour each bulb .
- l. Remove, disassemble and reinstall air cleaner - 1/2 hour.
- m. Lubricate all lubrication fittings with 2 strokes per fitting using grease gun and extension - 1 hour.
- n. Time to remove, read and replace each dipstick - 2 minutes.

3.9.2 Lubrication. Lubrication means shall be provided for all moving parts that require lubrication, except where sealed permanent lubrication is provided. Each truck shall be serviced and run-in with military lubricants conforming to MIL-L-2104, MIL-L-2105, MIL-L-46167, and MIL-G-10924. Initial servicing and run-in may be accomplished with lubricants standard to the contractor's commercial practice (except for the braking system) if compatible with above military lubricants. (If commercial lubricants are utilized the manufacturer will provide certification from supplier's that commercial lubricants are compatible with military lubricants prior to the start of the first article test). A lubrication data plate in accordance with SAE J753 shall be mounted on the truck and shall identify all military lubricants and appropriate temperature ranges to be utilized when servicing the truck. Grease lubrication fittings shall conform to SAE J534 and shall be in a protected but accessible position.

3.10 Transportability. The trucks shall be capable of being transported by military or commercial trailers, trains, marine vessels without damage or permanent deformation. The trucks shall be equipped with tiedown and slinging provisions.

3.10.1 Slinging and tiedown provisions. The slinging provisions shall conform to MIL-STD-209, class 1 and 2 or 3, type III. The provisions shall enable the complete truck to be lifted in the normal operating position. All

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slinging/tiedo- provisions shall be labeled 'LIFT' 'TIEDOWN', OR 'LIFT TIEDOWN' as appropriate, in 1-inch (2.54 cm) high letters.

3.10.2 Air transportability. Unless otherwise specified (6.2) the trucks shall meet the requirements of MIL-STD-1791 for air transport in U.S. Air Force C-130, C-41 and C5-A aircraft.

3.10.3 Rail transportability. Unless otherwise specified (6.2) the truck shall be rail transportable in CONUS and NATO countries without restrictions. The truck shall have a dimensional profile within within the Gabarit International de Chargement (GIC) in accordance with MTMC/TEA pamphlet 70-1, outline diagram when loaded on a 50-inch (127 cm) high rail car. The truck shall be capable of withstanding shock loads resulting from rail impact testing in accordance with 4.7.5.3 without failure, damage, or permanent deformation.

3.10.4 Highway transportability. The truck when loaded on a semitrailer/tractor, shall be within the highway permit limits of all States.

3.10.5 Water transportability. Unless otherwise specified (see 6.2) the trucks shall be marine transportable on container or breakbulk cargo ships.

3.11 Engine. The truck shall be furnished with a gasoline, diesel or liquified petroleum gas, internal combustion engine as specified in 6.2. The engine shall be covered by engine cowl or hood which can be opened or removed without tools. The engine shall be capable of operating on the applicable military lubricants specified in 3.9.2. If a diesel engine is furnished it shall operate on fuel conforming to both W-F-800 grade DF2 and MIL-T-83133. If a gasoline engine is furnished it shall operate on fuel conforming to MIL-G-3056.

3.11.1 Gasoline or diesel engine fuel system. A fuel filter shall be provided and shall be accessible without removal of other components, from above or from the side. The fuel system shall include a water separator located in the fuel line before the fuel filter, with provisions for draining sediment. The capacity of the fuel tank shall insure not less than 8 hours of continuous operation during first article endurance testing (see 4.7.2.15). The tank shall be equipped with a safety filler-cap assembly painted with red enamel for gasoline system and green enamel for diesel system and shall incorporate a self-closing cap with retaining device, removable strainer, and means for padlocking. The fuel tank shall be equipped with a drain plug at the lowest point of the tank so that fuel can be completely drained. The drain plug shall be removable with hand tools without having to remove any other component. Fuel type shall be stenciled near fuel cap (see 3.26.1).

3.11.2 Liquified petroleum gas engine fuel system. A fuel filter shall be provided and shall be accessible from above or from the side without removal of other components. The capacity of the fuel container shall insure not less than 6 hours of continuous operation during first article endurance testing specified in 4.7.2.15. An automatic shut-off valve shall be provided in the

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fuel system to prevent flow of fuel when the ignition is off and the engine is not running or if the engine should stop.

3.11.3 Cold weather starting system. Unless otherwise specified (see 6.2), when diesel engine is specified, integral starting aids shall be provided to enable engine to be started under cold weather condition of down to -25 °F (-32 °C). If a cold weather start system using either is provided, then a measured shot system shall be furnished that is not functional before cranking engine and not functional after engine has started. LPG and gasoline engines shall start without starting aids.

3.11.4 Crankcase ventilation system. A positive crankcase ventilation system shall be furnished to prevent crankcase vapor from entering the atmosphere.

3.11.5 Alternator. A 12 volt alternator of not less than 40-ampere capacity shall be provided and shall provide charge at engine low idle speed and shall maintain battery charge at full electric load. An alternator regulator shall be furnished. The regulator may be integral with the alternator.

3.11.6 Starting system. A device shall be furnished to prevent re-energizing the starter motor after the engine has been started. Trucks shall be provided with an interlock in the starting system or other means to prevent energizing the starter motor except when the transmission is in the neutral position. Starting system shall operate on 12 volts.

3.11.7 Air cleaner. A dry, replaceable cartridge type air cleaner shall be furnished. The cleaner shall be a multi-stage air cleaner and shall include a dust scavenger. It shall be accessible without removal of other components when engine cowl or hood is open. A restriction indicator shall be furnished to indicate when the replaceable filter element shall be changed.

3.11.8 Exhaust system. Mufflers and exhaust piping shall conform to the requirements of UL 558. If a vertical exhaust is provided it shall be angled at the end or fitted with a rain cap to prevent entry of water. Exhaust discharges shall be directed away from the operator.

3.11.9 Oil filter. A replaceable full flow oil filter with emergency bypass shall be provided. Oil filter shall be located such that the filter element can be replaced without the removal of any other truck component.

3.11.10 Oil sampling valve. Unless otherwise specified (see 6.2) an oil sampling valve in accordance with MIL-V-81940 shall be provided on engines and transmissions. The valve shall be located in such a way as to insure that personnel will not be exposed to danger when taking oil samples with the engine running. The location of the oil tap shall be such that when samples are taken, it shall be a true representation of oil that is flowing while the engine is running. The sampling valve shall be labeled adjacent to the valve

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indicating the type of oil sampled (engine or transmission, whichever is appropriate).

3.11.11 cooling system. When a liquid cooled engine is furnished, the cooling system shall be of the closed pressure type, incorporating a radiator with a pressure cap hoses, thermostat, fan and coolant circulating pump. The cooling system fluid shall be a 50-50 mixture of antifreeze conforming to MIL-A-46153 and water. Accessible drain(s) shall be provided to completely drain the cooling system.

3.12 Drive train components.

3.12.1 Transmission. The truck shall be equipped with a torque converter and either a power shifted (hydrodynamic) continuous drive type or a hydrostatic type transmission. Transmission shall provide for positive inching control of the truck. The transmission and torque convertor fluid shall be filtered by a full flow filter having replacement filters, without removal of other components. These filters will conform to SAE J931.

3.12.2 Tires and tire loadings. Tire type shall be as specified on applicable specification sheet. Tire loadings shall not exceed the values in the Tire and Rim Association Year Book at speeds specified on applicable specification sheets. When specified (see 6.2) truck shall be equipped with solid tires on pneumatic tire rims. Tires shall be not more than 12 months old on date of acceptance by the Government. For trucks with pneumatic tires. tire pressure shall be stenciled on truck in accordance with. 3.26.1.

3.13 Hydraulic system. The hydraulic system shall consist of all hydraulic components necessary for operation of the load handling means system and shall not include brake and transmission operation. All hydraulic system component material shall be compatible with MIL-L-2104 and MIL-L-46167. The system shall provide for lowering of capacity load at a speed not to exceed 80 feet per minute (24.38 meters per minute) in the event of failure of or damage to hydraulic hose(s) supplying the lift cylinder. A straight thread o-ring boss test. point. for measuring pressure shall be located at the outlet. of each pump or pressure inlet of each control valve. Hydraulic hose(s) shall have a working pressure which is greater than the hydraulic system maximum relief valve setting. A system filter shall be furnished in either the suction or return line. The system filter shall meet the requirements of SAE J931. Hose reels shall be mounted such that they are within the plan outline of the truck . Positive means shall be furnished to prevent cavitation of the tilt cylinders.

3.13.1 Hydraulic tubing hoses and fittings. All hydraulic tubing, hoses and fittings shall meet the requirements of the applicable SAE standards J514, J516, J517, J518, J524 and J525 and shall be routed to preclude kinking, chafing, and twisting. All rubber hoses shall be no more than 12 months old on date of acceptance by the Government.

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3.13.2 External leakage. After completing tests specified in 4.7 degree of external hydraulic system leakage shall not exceed a class 4 for dust free conditions and a class 4 D for dusty conditions of SAE J1176. External hydraulic system leakage shall not exceed-a class 3 for production trucks under normal operation.

3.14 Uprights and carriage assembly. Uprights shall be high visibility telescopic roller me. Rollers shall be the permanently lubricated-for-life type. The forks and fork carrier shall conform to ASME B56.11.4. The fork carrier shall be free of obstruction to allow the forks to slide across the entire width of the carrier. A cut out shall be provided in the fork carrier so that the lower hook of the fork will fit through the slot and each fork shall be removable without removing the load backrest. Fork thickness shall not exceed 1/2 inch (1.27 cm) at the tips and the end taper shall be not less than 14 inches (35.6 cm) long.

3.14.1 Load backrest. A metal backrest, removable without disturbing any other component, shall be provided. There shall be no protruding bolts or appendages beyond the side plane of the load backrest. In conjunction with the fork and hanger design, it shall provide a vertical rear guard at least 48 inches high (122 cm), measured from the load carrying surface of the forks. and equal to the width of the carriage, or sideshift if equipped. Spacing between vertical members shall be not more than 6 inches (15.2 cm).

3.15 Steering. Power steering shall be furnished and shall be controlled by a steering wheel. In the event of power failure, steering shall require less than 50 pounds (22.68 kg) of pull at the rim to turn the steering wheel.

3.16 Brakes.

3.16.1 Service brakes. Hydraulically actuated service brakes shall be provided. Brakes shall be self adjusting. The truck shall use non-asbestos materials that do not degrade performance or increase maintenance. Copper lines shall not be used. The brake system performance shall be in accordance with ASME B56.1.

3.16.2 Parking brake. A parking brake shall be provided to lock a minimum of two wheels when the parking brake is applied. The braking capability shall be sufficient to hold the truck on the slope specified in 3.6.11. No more than 35 pounds (15.88 kg) of force shall be required to apply the parking brake.

3.16.3 Brake fluid. Brake system shall be compatible and filled with MIL-B-46176 brake fluid. All brake system components utilized within the truck brake system shall be compatible with silicone brake fluid. A metallic tag shall be attached to the brake master cylinder stating "Use Silicone Brake Fluid Only."

3.17 Towing device. A pin-type towing device shall be provided in the center rear of the truck.

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3.18 Controls and instrumentation. All load handling control symbolic markings shall be in accordance with ASME B56.11.3.

3.18.1 Instruments. An ammeter or indicator light, engine oil pressure gauge or Indicator light, transmission temperature gauge and fuel gauge shall be provided. All gauges and indicator lights shall be identified, designed and located in accordance with SAE J209. Trucks equipped with coolant cooled engine shall be equipped with an engine temperature gauge or indicator light. All gauges shall be weather resistant and internally lighted.

3.18.2 Hourmeter. An electrically operated hourmeter which registers the number of engine operating hours up to a minimum of 9999 hours shall be provided. The hourmeter shall be accessible for reading without removing any component of the truck.

3.19 Electrical system. Electrical system voltage shall be 12 Vdc.

3.19.1 Battery. Trucks shall be furnished with a minimum of one 12-volt battery conforming to SAE J537. Battery cables conforming to SAE J1127 shall be furnished with insulated covers. Positive and negative cable terminals shall be identified with a red sleeve and a black sleeve, respectively. Negative ground shall be provided.

3.19.2 Ignition switch. A key operated ignition switch shall be furnished. Two ignition keys shall be furnished with each truck. All keys shall be identical for every truck.

3.19.3 Floodlamp. Each truck shall be equipped with 4 sealed beam floodlamps which shall conform to SAE J598 Par 46, Trade No. 4478. The floodlamps shall be shock mounted in elastomer ring housings with 2 floodlamps mounted on the front of the overhead guard, and 2 floodlamps mounted on the rear of the overhead guard. Directional adjustment range of each floodlamp shall be a minimum of 45 degrees above and below the horizontal plane. Horizontal adjustment range of each floodlamp shall be a minimum of 90 degrees. Each floodlamp shall be protected against damage by a guard. One on-off switch for the 2 front mounted floodlamps, and one on-off switch for the 2 rear mounted floodlamps shall be provided within access of the seated operator.

3.19.4 Taillight. A minimum, of one combination spotlight and tail-lamp shall be provided and shall conform to SAE J759. The tail-lamp shall be mounted on the rear within the plan outline of the truck, and shall be protected against damage by a guard. The tail-lamp shall come on when the ignition switch is on.

3.20 Operator's overhead Guard. A removable overhead guard shall be furnished which meets applicable requirements of ASME B56.1. The overhead guard shall be removable with hand tools. Guard height, measured from ground level to the top side of the guard, shall not exceed height specified on applicable specification sheet. Guard design shall not interfere with the

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operation of the truck, nor with normal movements of the operator, when wearing an appropriate helmet, when entering, leaving or operating the truck. The overhead guard shall remain firmly secured to its support brackets under all operating conditions specified herein.

3.21 seat. The seat shall conform to the requirements of SAE J899 except armrests are not required.

3.22 Rearview mirror. When specified (see 6.2), the truck shall be equipped with the rearview mirror mounted on the left hand side within the operator's field of view.

3.23 Exhaust emission requirements for clean burn diesel engine. When clean burn diesel engine is specified (see 6.2), exhaust emission constituents shall not exceed the limits set forth below when tested in accordance with applicable exhaust emission test paragraph of section 4. These emission tests shall be conducted with a fuel delivery system identical to and calibrated to give the same fuel delivery rate as the production engine used to demonstrate conformance to the endurance requirement (see 3.6.16) and to the cold start requirement (see 3.5). The diesel engine as provided by the manufacturer shall be capable of satisfying the exhaust emission requirements without the use of a catalytic convertor, trap oxidizer, water scrubber or other type of exhaust gas processor with the exception that a mechanical spark arrestor which meets requirements of Forest Service Standard 5100-1a shall be provided. The spark arrestor shall be sized to meet requirements for engine exhaust flow at rated engine speed in accordance with Forest Service Standard 5100-1a. However, the spark arrestor shall not be installed during emission testing.

3.23.1 Brake specific exhaust emission of hydrocarbons (HC), carbon monoxide(CO) and nitric oxides (NOx). When tested in accordance with 4.7.10.4.1, the brake specific exhaust emission of HC shall not exceed 0.5 grams/brake horsepower (g/bhp-hr); CO shall not exceed 5.0 g/bhp-hr; and NOx shall not exceed 6.0 g/bhp-hr.

3.23.2 Total suspended particulate (TSP). When tested in accordance with 4.7.10.4.2, the TSP shall not exceed 15 grams/hour (g/hr) for 3, 4, 10 and 11 modes of the 13 mode Federal Test Procedure.

3.23.3 Steady state smoke opacity (SSSO). When tested in accordance with 4.7.10.4.3, 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.

3.24 Noise limits. Noise levels produced by the truck shall comply with the requirements of MIL-STD-1474, except as indicated herein.

- a. The noise level at the operator's position and at 3.28 feet (one meter) from the perimeter of the truck at all other locations shall not exceed Category D of table I (85 dB(A)). MIL-STD-1474, 5.1.1.2, 5.2, 5.3, and 5.4 shall not apply. Compliance and non-compliance with the required noise limits shall be documented based upon test

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requirements of 4.7.11 and the data requirements of MIL-STD-1474, 5.5.

- b. The following table I shall be used in lieu of table II contained in MIL-STD-1474B:

TABLE I. Steady-state noise limits (db) for personnel-occupied areas.

A-weighted limit (dB(A))	Limit category					
	A*	B*	C*	D*	E**	F**
	108	100	90	85	75	65

3.25 Treatment and painting. The parts of the truck normally painted shall be cleaned, treated, and painted in accordance with the contractor's commercial practice. Unless otherwise specified (see 6.2), final color shall be contractor's normal color. When specified (see 6.2), treatment, priming and topcoating shall be done in accordance with MIL-T-704, type A, topcoat color yellow 13538. When CARC is specified (see 6.2), treatment, priming and topcoating shall be done in accordance with MIL-T-704, type F or G as applicable, topcoat color green 383.

3.26 Identification marking. Unless otherwise specified (see 6.2), each truck shall be identified with an identification plate conforming to MIL-P-514, type I, style I, composition C (GG-P-455, type I, grade A, class 1) which shall be located in a visible and permanent location on the truck. Also, state the independent testing laboratory name, independent laboratory registration or index number assigned to the inspected truck, and date and location of independent laboratory inspection. Unless otherwise specified (see 6.2), a shipping data plate and instruction plates/labels shall conform to MIL-P-514, type III, composition C (GG-P-455, type I, grade A, class 1). All plates shall be securely attached to the truck with bolts, rivets or screws and shall be furnished and mounted by the contractor. The truck shall also be equipped with instructions, warnings and caution plates prominently located and describing any special or important procedure to be followed in operating, loading and servicing the truck or its components.

3.26.1 Truck marking. When vehicle provided with contractor commercial color, contractor commercial markings shall be provided. When yellow or CARC paint is provided (see 3.25) markings shall be black.. Characters shall be block-type capital letters and Arabic numerals. Location, and character size shall be as shown in table II.

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TABLE II Marking Location and size.

Information	Example	Location	Minimum Character Size (Ht.)
Agency	US	On each side and rear	1-1/2 inches (3.8 cm)
Registration No.	10D315	On each side and rear	1-1/2 inches (3.8 cm)
Capacity	6000 lb. cap. 24" L.C.	On each side	2 inches (5.1 cm)
Safety	No Smoking	On rear of mast	1 inch (2.5 cm)
	No Riders	On rear of mast	1 inch (2.5 cm)
Tire Pressure	TP100 PSI	On frame above each tire	1 inch (2.5 cm)
(Pneumatic only)			
Type Fuel	Gasoline	Near fuel tank filler	1 inch (2.5 cm)
Lifting/Tiedown Points	Lift/Tiedown	Near lift/tiedown points	1 inch (2.5 cm)

3.27 Electromagnetic radiation. The truck shall not exceed the limits of electromagnetic radiation specified in SAE J551.

3.28 High altitude electromagnetic pulse (EMP). When specified (see 6.2), schematic and electrical diagrams detailed to the component level (i.e., resistors, capacitors filters, transistors (SCRs) with value of all components of the truck shall be furnished by the contractor to the Government to assist the Government in performing the EMP evaluation. When specified (see 6.2), a truck shall be furnished to the Government and shall be evaluated by the Government to determine necessary protection devices for protection against EMP.

3.29 Workmanship. Each truck shall have no evidence of cracks, dents, scratches, burrs, sharp edges, loose parts, missing fasteners, distortions, spatter, or foreign material. Workmanship of the truck should, in no case, be less than that of comparable products furnished to the commercial market.

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 purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections

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are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall 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 program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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

- First article inspection (see 4.4).
- b. Quality conformance inspection (see 4.6).
- c. Inspection comparison (see 4.9).
- d. Inspection of packaging (see 4.10),

4.3 Inspection conditions. Unless otherwise specified herein, all examinations and tests shall be performed at the ambient temperature and climatic conditions existing at the place of examination and test. Only that maintenance established by the contractor and submitted as the maintenance schedule (see 4.4) prior to commencement of the tests shall be performed during the tests.

4.4 First article inspection. Prior to production the manufacturers shall furnish one or more trucks (see 6.2) produced from production tooling for first article evaluation and test (see 6.4). The truck and its components shall be compared with this document, published literature and calculations and test data to verify compliance with this specification. The truck shall then be subjected to tests and examination as marked in column 1, table III and column 1, table IV. When the contractor can provide verifiable data demonstrating compliance to any or all parts of the specified inspection and testing, these inspections and tests may be waived by the Government. Prior to examination and tests, the following shall be performed.

- a. Service the truck with the oils, greases, and fuel specified herein and designated for use in the ambient temperature at which the test will be conducted. When a diesel engine is furnished, diesel fuel shall 'be used during all testing of the first-produced trucks.
- b. Conduct production run-in as specified in 4.8.
- c. Set the hydraulic system relief pressure as specified by manufacturer and record. Any change made to this shall constitute failure of all tests .

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- d. Furnish a schedule of maintenance to be followed during all testing of the first-produced trucks. A list of special tools required to perform this maintenance shall also be provided.

4.4.1 First article examination. Prior to testing, the first-produced truck(s) shall be examined for the defects marked "X" in column 1 of table III. Presence of one or more defects shall be cause for rejection.

4.4.2 First article tests. Upon successful completion of examinations specified in 4.4.1, the truck(s) and components shall be subjected to the tests marked "X" in column 1 of table IV. Acceptance of a first-produced truck shall not exclude the remaining trucks from the quality conformance inspections and acceptance provisions specified in section 4.

4.5 First article inspection failure. Failure of a first-article on production truck to meet any requirement specified herein during and as a result of the examination and tests specified in 4.4 or 4.6 shall be cause for rejection of the first-article truck(s) and for refusal by the Government to continue acceptance of production trucks until evidence has been provided by the manufacturer that corrective action has been taken to eliminate the deficiencies. Correction of such deficiencies shall be accomplished by the manufacturer at no cost to the Government on trucks previously accepted and produced under the contract. Any deficiencies found as a result of the first article inspection will be considered prima facie evidence that all trucks accepted prior to the completion of the first article inspection are similarly deficient unless evidence to the contrary is furnished by the contractor and such evidence is acceptable to the contracting officer.

4.6 Quality conformance inspection.

4.6.1 Quality conformance tests. Each truck shall be subjected to production run-in as specified in 4.8 and tested as specified in column 2 of table IV. Failure of any test shall be cause for rejection.

4.6.2 Quality conformance examination. After successful completion of all tests specified in 4.6.1, each truck shall be examined for the defects marked "X" in column 2 of table III. Presence of one or more defects shall be cause for rejection.

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TABLE III. Examination schedule.

First article	Quality conformance	Defect	Requirement paragraphs
1	2	3	4
X	X	101. Material not as specified.	3.4
X	X	102. Material not resistant to corrosion or treated to be resistant to corrosion and deterioration for the applicable storage and operating environments.	3.4.1
X	X	103. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other.	3.4.1.1
X	X	104. Contractor does not have documentation available for identification of material, material finishes, or treatment.	3.4.2
X	X	105. Used, rebuilt or remanufactured components, pieces, or parts incorporated in the trucks.	3.4.3
X	X	106. Screw threads not as specified.	3.4.4
X	X	107. Safety not as specified.	3.7
X	X	108. Human factors not as specified.	3.8
X	X	109. Maintainability not as specified.	3.9
X	X	110. Lubrication provisions lubricants not as specified.	3.9.2
X	X	111. Engine not as specified.	3.11
X	X	112. Fuel system not as specified.	3.11.1
X	X		3.11.2
X	X	113. Cold weather starting system not as specified.	3.11.3
X	X	114. Crankcase ventilation not as specified.	3.11.4
X	X	115. Alternator not as specified.	3.11.5
X	X	116. Starting system not as specified.	3.11.6
X	X	117. Air cleaner system not as specified.	3.11.7

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TABLE III. Examination schedule - Continued.

First article	Quality conformance	Defect	Requirement paragraphs
1	2	3	4
X	X	118. Exhaust system not as specified.	3.11.8
X	X	119. Oil filter not as specified.	3.11.9
X	X	120. Oil sampling valve not as specified.	3.11.10
X	X	121. Cooling system not as specified.	3.11.11
X	X	122. Drive train not as specified.	3.12
X	X	123. Transmission not as specified.	3.12.1
X	X	124. Hydraulic system not as specified.	3.13
X	X	125. Tires not as specified.	3.12.2
X	X	126. Hydraulic tubing, hoses and fittings not as specified.	3.13.1
X	X	127. External leakage not as specified.	3.13.2
X	X	128. Uprights and carriage not as specified.	3.14
X	X	129. Load backrest not as specified.	3.14.1
X	X	130. Steering system not as required.	3.15
X	X	131. Service brakes not as specified.	3.16.1
X	X	132. Parking brake not as specified.	3.16.2
X	X	133. Brake fluid not as specified.	3.16.3
X	X	134. Towing device not as specified.	3.17
X	X	135. Controls and instrumentation not as specified.	3.18
X	X	136. Instruments not as specified.	3.18.1
X	X	137. Hourmeter not as specified.	3.18.2
X	X	138. Battery not as specified.	3.19.1
X	X	139. Ignition switch not as specified.	3.19.2
X	X	140. Floodlamp not as specified.	3.19.3
X	X	141. Taillight not as specified.	3.19.4
X	X	142. Operators overhead guard not as specified.	3.20
X	X	143. Seat not as specified.	3.21

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TABLE III. Examination schedule - Continued.

First article	Quality conformance	Defect	Requirement paragraphs
1	2	3	4
X	X	144. Rearview mirrors not as specified.	3.22
X	X	145. Treatment & painting not as specified.	3.25
X	X	146. Identification marking not as specified.	3.26
X	X	147. Truck marking not as specified.	3.26.1
X	X	148. Workmanship not as specified.	3.29

TABLE IV. Test schedules.

First article	Quality conformance	Test	Test paragraph	Requirements paragraph
1	2	3	4	5
X		Operating temperature.	4.7.1	3.5
X	X	Upright tilt.	4.7.2.1	3.6.1
X	X	Collapsed mast height.	4.7.2.2	3.6.2
X	X	Maximum fork height.	4.7.2.3	3.6.3
X	X	Free lift height.	4.7.2.4	3.6.4
X	X	Drift.	4.7.2.5	3.6.5
X	X	Sideshift.	4.7.2.6	3.6.6
X	X	Fork size and spacing.	4.7.2.7	3.6.7
X	X	Lifting and lowering speed.	4.7.2.8	3.6.8, 3.6.9
X		Right angle turn.	4.7.2.9	3.6.10
X	X	Slope ascension.	4.7.2.10	3.6.11, 3.16.2
X	X	Underclearance.	4.7.2.11	3.6.12
X		Stability.	4.7.2.12	3.6.13
X	X	Travel speed.	4.7.2.13	3.6.14
X	X	Acceleration.	4.7.2.14	3.6.15
X		Endurance.	4.7.2.15	3.6.16, 3.11.5
X		Nuclear-Biological-Chemical.	4.7.3	3.8.1
X		Maintenance operations.	4.7.4	3.9.1

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TABLE IV. Test schedules - Continued.

First article	Quality conformance	Test	Test paragraph	Requirements paragraph
1	2	3	4	5
X	X	Slinging and tiedown.	4.7.5.1	3.10.1
X		Air transportability.	4.7.5.2	3.10.2
X		Rail impact.	4.7.5.3	3.10.3
X		Highway transport.	4.7.5.4	3.10.4
X		Water transport.	4.7.5.5	3.10.5
X		Cold start test.	4.7.6	3.11.3
X		Starter test.	4.7.7	3.11.6
X		Steering test.	4.7.8	3.15
X		Braking test.	4.7.9	3.16.1
X		General emission test HC, CO and NOx.	4.7.10.4.1	3.23.1
X		Total suspended particulate.	4.7.10.4.2	3.23.2
X		Steady state smoke opacity.	4.7.10.4.3	3.23.3
X		Noise level measurement.	4.7.11	3.24
X		Electromagnetic radiation.	4.7.12	3.27
X		Electromagnetic pulse.	4.7.13	3.28

4.7 Demonstrations and tests.

4.7.1 Operating temperature. Demonstrate that the truck can start without preheating within 5 minutes and operate as specified within 15 minutes after engine start as specified in 3.5. The truck shall have been cold soaked to attain a stabilizing temperature specified. Nonconformance shall constitute failure of this test.

4.7.2 Performance.

4.7.2.1 Upright tilt. Place truck without load on flat level surface. Raise forks to an elevation of 2 feet. Tilt mast to full forward position and record angle of tilt, measured from the front surface of the outer mast channel. Tilt mast to full rearward position and record angle of tilt measured from the same surface. Nonconformance to 3.6.1 shall be cause for rejection.

4.7.2.2 Collapsed mast height. With no load and mast in the true vertical position, measure and record collapsed mast height. Nonconformance to the applicable specification sheet shall be cause for rejection.

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4.7.2.3 Maximum fork height. With no load and mast in the true vertical position, measure and record the maximum fork height. Nonconformance to the applicable specification sheet shall be cause for rejection.

4.7.2.4 Free lift height. With no load and mast in the true vertical position, measure and record the free lift height. Nonconformance to the applicable specification sheet shall be cause for rejection.

4.7.2.5 Drift. Start the truck and allow the hydraulic system oil to reach normal operating temperature. Position truck on a level surface and raise the rated load to the maximum lift height with uprights in a true vertical position. Immediately mark a reference point on upright. After 10 minutes record vertical and rotational drift. Nonconformance to 3.6.5 shall constitute failure of this test.

4.7.2.6 Sideshift. Sideshift level forks to extreme left position. Note and measure any increase in truck width and whether there are any protrusions beyond the sideshift carriage. Sideshift forks to extreme right position. Measure sideshift travel. Note and measure any increase in truck width and whether there are any protrusions beyond the sideshift carriage. Nonconformance to 3.6.6 shall constitute failure of this test.

4.7.2.7 Fork size and spacing. Measure and record fork size and spacing. Nonconformance to the applicable specification sheets shall be cause for rejection.

4.7.2.8 Lifting speed and lowering speed. Measure and record distance in inches from floor to top surface of forks in fully lowered position. Record time in seconds required to raise capacity load to maximum fork height using a timing device. Record the difference between maximum fork height and the height of the forks in the lowered position. Record time in seconds to lower capacity load at maximum speed (full open valve) to 3 or 4 foot height, load to be abruptly stopped at the 3 to 4 foot height. Repeat the raising and lowering three times. Raise capacity load to maximum height and simulate hose failure to demonstrate conformance to 3.13. Remove load and raise empty forks to maximum lift height. Record time in seconds required to lower forks to lowered position. Nonconformance to 3.6.8 or 3.6.9 shall be cause for rejection.

4.7.2.9 Right angle turn. With capacity load on forks raised 6 inches above ground, demonstrate in accordance with test method 3 that the truck can meet the right angle turn dimension as specified on the applicable specification sheet. Nonconformance to 3.6.10 shall be cause for rejection.

4.7.2.10 Slope ascension. Drive truck forward with capacity load along a horizontal approach and onto a ramp or slope of specified grade and bring to a complete stop. Apply parking brake to see if brake holds on slope, release parking brake. Start from a dead stop and proceed up the ramp to a horizontal surface. Remove capacity load and repeat above test. Nonconformance to 3.6.11 shall be cause for rejection.

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4.7.2.11 Underclearance. With no load and mast in the true vertical position, measure and record underclearance. Nonconformance to the applicable specification sheet shall be cause for rejection.

4.7.2.12 Stability. Perform applicable stability test specified in ASME B56.1. Nonconformance to 3.6.13 shall be cause for rejection.

4.7.2.13 Travel speed. Operate the truck at governed speed on a level surface with capacity load in carry position. Truck shall attain speed specified in both directions. The speed shall be the average of three runs in each direction. Nonconformance to 3.6.14 or failure of any component, overheating, malfunction, or leakage of fluid shall be cause for rejection.

4.7.2.14 Acceleration test. Run acceleration test as required in 3.6.15. Nonconformance to 3.6.15 and the applicable specification sheet shall be cause for rejection.

4.7.2.15 Endurance testing. Unless otherwise specified (see 6.2) the truck, carrying the capacity load, shall be operated for a minimum of 280 hours over a course as shown in figure A-1 following the criteria laid out in the truck operations test method no. 1. The surface shall be paved with concrete, asphalt, macadam or equivalent. Any incident resulting in internal component failure of the engine, transmission, transfer case, differential, hydraulic pump or permanent deformation of the truck chassis shall constitute an endurance failure. Fluid leakage, inability to perform operation, or overheating shall also constitute an endurance failure. Inability of the alternator to maintain the battery charge at full electric load shall also constitute an endurance failure. Any unscheduled maintenance action during this truck operation demonstration taking one person more than 15 minutes to correct shall constitute a reliability failure. Any endurance failure shall be cause for truck rejection. A total of four reliability failures shall be cause for rejection. During this test, the truck shall operate without refueling for the minimum time specified in 3.11.1 or 3.11.2 as applicable.

4.7.3 Nuclear-biological-chemical (NBC) operability. When specified (see 6.2) the truck shall be tested in accordance with 3.8.1. Nonconformance to 3.8.1 shall constitute failure of this test.

4.7.4 Maintenance operations. Perform the maintenance operations as listed in 3.9.1. Nonconformance to 3.9.1 shall constitute failure of this test.

4.7.5 Transportability test.

4.7.5.1 Slings and tiedown provisions test. The slings and tiedown provisions shall be tested in accordance with MIL-STD-209 to prove conformance to 3.10.1. Inability to meet the requirements of 3.10.1 shall constitute failure of this test.

4.7.5.2 Air transportability test. Unless otherwise specified (see 6.2) the trucks shall be tested in accordance with MIL-STD-1791 to prove

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conformance to 3.10.2. Inability to meet the requirements of 3.10.2 shall constitute failure of this demonstration.

4.7.5.3 Rail impact test. Unless otherwise specified (see 6.2) the first article truck shall be tested in accordance with MIL-STD-810 to prove conformance to 3.10.3. Inability to meet the requirements of 3.10.3 shall constitute failure of this test.

4.7.5.4 Highway transport test. The truck shall be tested to conform to 3.10.4. Inability to meet the requirements of 3.10.4 shall constitute failure of this test.

4.7.5.5 Water transportability test. Unless otherwise specified (see 6.2) the truck shall be tested to conform to 3.10.5. Inability to meet the requirements of 3.10.5 shall constitute failure of this demonstration.

4.7.6 Cold start test. Unless otherwise specified (see 6.2) test the truck in accordance with test method no. 2. One or more of the following shall constitute failure of this test:

- Damage to any part of the truck due to storage at -25 'F (see 3.5).
- b. Engine does not start within 5 minutes after beginning the first cranking (see 3.5).
- c. Engine does not run smoothly within 15 minutes after starting without unnatural or continued control manipulation (see 3.5).
- d. Instruments and gauges do not operate.
- e. Battery charging system does not show positive charge.

4.7.7 Starting system. Start the truck, energizing the starter switch. Allow the engine to run for a minimum of 15 seconds. Re-energize the starter switch while the engine is running. Any evidence of starter engagement while engine is running shall be cause for rejection. Nonconformance to 3.11.6 shall constitute failure of this test.

4.7.8 Steering test. With the engine stopped and the truck traveling in the forward direction at a speed not greater than 2 mph (3.2 Km/h), measure the force tangential to the steering wheel required to turn the rim of the steering wheel. Nonconformance to 3.15 shall constitute failure of this test.

4.7.9 Braking test. Perform applicable braking test specified in ASMR B56.1. Nonconformance to 3.16.1 shall be cause for rejection.

4.7.10 Diesel exhaust emissions.

4.7.10.1 Diesel exhaust emission tests. Diesel exhaust emission testing shall not commence until the contractor has demonstrated conformance to the endurance and cold start requirements.

4.7.10.2 Selection/verification preparation of diesel engine for exhaust emission tests. When clean bum diesel engine is specified (see 6.2) exhaust

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emissions test shall be conducted on two engines selected randomly from the production stock of engines. Each engine shall be equipped for dynamometer testing with production accessories (air cleaner, alternator, fan, etc.) as tested in the endurance and cold start tests. The fuel delivery system of the two test engines shall be identical and their adjustment and fuel delivery rates shall be determined and verified to be within 1 percent of those of the engine used in the endurance and cold start tests. If the fuel delivery systems are not identical and adjusted and calibrated to be within 1 percent of each other, this shall be cause to prohibit commencement of further emission testing until corrected. Each of the test engines shall then be run-in for at least 80 hours. During the run-in the engines shall be subjected to an even distribution of the loads and speeds from the 13 modes of the Federal test procedure. After the run-in is complete, the horsepower of each of the emission test engines shall be determined. Each engine shall be capable of developing horsepower within 5 percent of the rated horsepower at rated speed as published by the engine manufacturer for this application. Failure of the test engines to develop sufficient horsepower until corrected shall be cause to prohibit further testing.

4.7.10.3 General emission test conditions. Each emission test specified herein shall be performed two times with each emission test engine and the results averaged to obtain the value which is compared to appropriate specification requirements. All emission testing shall be conducted using a D2 diesel control fuel as specified by 40 CFR Parts 81-99. The 80 hour run-in may be conducted with the contractor's choice of diesel fuel.

4.7.10.4 Emission test procedures.

4.7.10.4.1 Emission test Procedures for HC, CO and NOX. Determine the emissions rate of HC, CO and NOx in accordance with the steady-state 13 mode Federal Test Procedure (FTP), for new diesel heavy duty engines as specified by Title 40 Code of Federal Regulations Part 86, subpart D). Brake specific values after being averaged in accordance with 4.7.10.3 of more than 0.5 g/bhp-hr HC, 5.0 g/bhp-hr CO, and 6.0 g/bhp-hr NOX as specified in 3.23.1 shall constitute failure of this test.

4.7.10.4.2 Total suspended particulate (TSP) emission test procedure. The TSP emission measurement system shall be in accordance with procedures outlined by the Federal Register Volume 40, Part 86. Measurement shall be made, however, with the engine at steady state modes taken from the 13 mode Federal Test Procedure. Testing for TSP 3, 4, 10, and 11 modes of the 13 mode test shall be conducted. Average TSP emission rates exceeding 15 g/hr at any mode as specified (see 3.23.2) shall constitute failure of this test.

4.7.10.4.3 Steady state smoke capacity test and procedures. Steady state smoke opacity levels, shall be determined using the smoke measurement system specified by Title 40 Code of Federal Regulations Subpart I for new diesel heavy duty engines. Instead of the 3 modes specified in subpart I the engine modes to be tested shall be taken from the steady state 13 mode Federal Test Procedures (FTP) as specified by Title 40, Code of Federal Regulations Subpart

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D for new gasoline fueled and diesel heavy duty engines. The high load modes 5, 6, 8, and 9 shall be excluded from the smoke test. Measurement of smoke opacity at all of the remaining of the 13 mode FTP test shall be conducted. Average smoke opacity values exceeding 5 percent at any mode as specified in 3.23.3 shall constitute failure of this test.

4.7.11 Noise level test. Noise levels shall be measured in accordance with MIL-STD-1474 requirements and reported in the format indicated by MIL-STD-1474, figure 7. As a minimum: noise levels shall be measured when equipment is operating under full load. MIL-STD-1474, 5.1.2.1.4 contours shall be taken at not fewer than 12 equal arc increments, one increment shall include data from the noisiest position. Additionally the noise level at the typical operating position shall be provided as dB(A) level.

4.7.12 Electromagnetic radiation. Test the truck in accordance with SAE J551. Measurement shall also be taken from the front and rear of the truck at 33 foot distances. As a minimum, the electromagnetic radiation report shall include results of all testing and a list of components used to reduce the electromagnetic radiation. Nonconformance to 3.27 shall constitute failure of this test.

4.7.13 Electromagnetic pulse. When specified (see 6.2) the Government will evaluate the schematics and electrical diagrams to determine possible problem areas that may be encountered on the end item. A production truck shall be subjected to non-destructive EMP testing by the Government at a Government facility.

4.7.14 Tire loadings. Determine the weight supported by the steer (trail) wheels with and without a rated load on the forks by driving the wheels onto a platform scale or utilizing two axle scales. Determine the weight supported by drive (load) wheels in the same manner as the steer wheels. Nonconformance to 3.12.2 shall be cause for rejection.

4.8 Production run-in. Each truck carrying a capacity load shall be subjected to a production run-in and servicing as specified herein. Inability to complete the run-in, overheating, failure of any components, malfunction of any control, or evidence of leakage of fluids in excess of class 3 in accordance with SAE J1176 shall be cause for rejection of the truck by the Government until such deficiencies are corrected.

4.8.1 Travel. Demonstrate starting, ascending and descending a 20 20 percent ramp, steering, inching and high speed travel, operate all lights, horn, and brake system not less than two times during this demonstration.

4.8.2 Mast assembly. Demonstrate ability to lift capacity load to full lift height at full lift speed and lower load at full opened valve. Demonstrate ability to side shift capacity load throughout full range of side shift. Demonstrate ability to feather controls of all hydraulic functions. Each operation shall be performed at least three times.

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4.8.3 Servicing and adjustment. Unless otherwise specified (see 6.2), prior to delivery, the manufacturer shall service and adjust each truck for customer operational use, including at least the following:

- a. Adjustment of mast assembly.
- b. Adjustment of engine, transmission, and power train.
- c. Adjustment of brake system.
- d. Adjustment of steering.
- e. Continuity check of the electrical system, including filling and charging of battery unless otherwise specified in the preservation and packing requirement.
- f. Check torque on all wheel lug nuts and proper inflation of tires.
- g. Service the cooling system with an antifreeze water solution, 50-50 percent by volume.
- h. Check fluid levels and fill to required level if necessary.

4.9 Inspection comparison. The Government may select trucks at any time during the contract production period and subject the trucks to the examination specified in column 1 of table III and to the tests specified in column 1 of table IV to determine conformance to the requirements of this specification. The inspection will be performed by the Government, at a site selected by the Government, on units selected at random from those which have been accepted by the Government and will not include the previously inspected first article trucks. In addition to any test specified as part of the inspection comparison, the Government reserves the right to conduct any and all other tests contained in this specification as part of the inspection comparison, and failure of such additional tests shall have the same effect as failure of those tests specified as inspection comparison.

4.9.1 Inspection failure. Failure of an inspection comparison truck to meet any requirement specified herein during and as a result of the examination and tests specified in 4.7 shall be cause for rejection of the inspection comparison truck(s) and shall be cause for refusal by the Government to continue acceptance of production trucks until evidence has been provided by the contractor that corrective action has been taken to eliminate the deficiencies. Correction of such deficiencies shall be accomplished by the contractor at no cost to the Government on trucks previously accepted and produced under the contract. Any deficiencies found as a result of the inspection comparison will be considered prima facie evidence that all trucks accepted prior to the completion of inspection comparison are similarly deficient unless evidence to the contrary is furnished by the contractor and such evidence is acceptable to the contracting officer.

4.10 Inspection of packaging. The preservation, packing and marking of each truck shall be inspected as specified in appendix B of MIL-STD-162.

5. PACKAGING

5.1 Presentation, packing, and marking. Each complete truck shall be preserved, packed and marked in accordance with MIL-STD-162 for type I mobile

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or type II crated, as specified (see 6.2). The level of preservation and level of packing shall be level A, level B level C or commercial as specified (see 6.2).

5.2 Level C packing. The trucks shall be packed to assure carrier acceptance and safe delivery to destination at lowest ratings in compliance with Uniform Freight Classification Rules or National Motor Freight Classification Rules.

6. NOTES

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

6.1 Intended use. Trucks described herein are intended for stacking, unstacking, and moving cargo in and around warehouses loading platforms, and docks within the military supply system; also for moving cargo in and out of transport carriers such as highway trailers and vans, cargo containers, railroad cars, and cargo vessels. Diesel powered trucks will be operated in and out of Richmond earth covered ammunition storage facilities and in other uses where internal combustion powered trucks are operated. The pneumatic tired trucks are intended for operation over paved, semi-prepared and other hard surfaces for short distances. The solid rubber tired trucks are intended for use on prepared surfaces such as concrete or hardstand.

6.2 Acquisition requirements. Acquisition documents should specify the following:

Title, number, and date of the specification.

Issue of DODISS to be cited in the solicitation and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).

- c. Specification sheet title, number and date.
- d. When first article test is not specified (see 3.3).
- e. Number of trucks in sample for first article test (FAT) (see 3.3 and 4.4).
- f. When 0 l F to 120 "F operating temperature is specified (see 3.5).
- g. When sideshift is not required (see 3.6.6 and 4.7.2.6).
- h. When 24 hours of endurance testing is specified (see 3.6.16 and 4.7.2.15).
- i. When other than GS, DS or LPS rating is specified (see 3.7 and 6.7).
- j. When NBC operability is required (see 3.8, 3.8.1 and 4.7.3).
- k. When air transportability is not required (see 3.10.2 and 4.7.5.2).
- l. When rail transportability is not required (see 3.10.3 and 4.7.5.3).
- m. When marine transportability is not required (see 3.10.5 and 4.7.5.5).
- n. Type of engine to be furnished (see 3.11).
- o. When cold weather starting is not required (see 3.11.3 and 4.7.6).
- p. When oil sampling valve is not required (see 3.11.10).
- q. When solid tires on pneumatic rims are required (see 3.12.2).
- r. When rearview mirror is required (see 3.22).

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- s. When clean burn diesel engine is required (see 3.23 and 4.7.10.2).
- t. When other than contractors color is required (see 3.25).
- u. When clean treatment, priming and topcoat final color shall be in accordance with color 13538 of MIL-T-704 (see 3.25).
- v. When CARC coating is required (see 3.25).
- w. When identification plate is not required (see 3.26).
- x. When shipping data plate is not required (see 3.26).
- y. When schematics, electrical diagrams and EMP evaluation is required (see 3.28 and 4.7.13).
- z. When high altitude electromagnetic test truck and testing is required (see 3.28 and 4.7.13).
- Type of preservation and packaging required (see 5.1).
- bb. Level of preservation and packaging required (see 5.1).

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 are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure 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.

<u>Reference Paragraph</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
3.10	DI-PACK-80880	Transportability Report	none

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

6.4 First article. When a first article inspection is required, the item(s) should be a preproduction model. The first article should consist of one or more units. The contracting officer should 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.

6.4.1 Incident report. When the contractor conducts the demonstration and test specified herein, a written report within 24 hours, of any malfunction or

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failure during the conduct of the demonstration and test is required. As a minimum, the report shall describe components and parts affected, rest and g conditions, date of incident, hourmeter reading, how detected and description of incident and corrective action taken. A minimum Of one original will be furnished the pertinent contracting officer specified in the contract. Distribution of copies will be identified in the contract.

6.5 Definitions.

6.5.1 Capacity load. Capacity load shall be established with a load equivalent to an unrestrained cube with overall dimensions twice the load center dimensions and whose center of gravity is located at the geometrical center of the cube. The tolerances for weight shall be ± 1 percent and -0 percent.

6.5.2 Load center. The load center shall be 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. The tolerances for dimensions shall be ± 1 percent

6.6 Noise levels: When the required maximum noise limit(s) are established to be technically infeasible and beyond the state-of-the-art for the item/system being procured, the contracting officer may request additional information on noise sources. As such, documentation shall be furnished to the procuring activity for consideration of whether or not increase of the required limit(s) is justified and how noise levels may best be minimized. Documentation shall contain technically defensible data including technically supported design considerations, technically supported design recommendations for noise reduction, and technically supported predictions of the resultant noise levels. Clearly stated, convincing, and technically/fiscally supported trade-off analyses of noise control benefit against other design requirements such as weight, access, etc., shall be provided.

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

6.8 Disposability. One or more of the following methods shall be used to accomplish disposal of lubricating oils, antifreeze, batteries, paint and tires; reuse, recycling, baling, sanitary landfill, composting, incineration, pyrolysis, or sea disposal.

6.9 Government-loaned property. The contracting officer should arrange to loan the property listed in 3.8.1.

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6.10 Subject term (key word) listing.

Diesel engine, clean burning option
Industrial depot operation
Palletized load handling
Solid tire

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

Custodians:

Army - ME
Navy - SA
Air Force - 99

Preparing activity:

Army - ME

Project 3930-0658

Review activities:

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

User activity:

Navy - OS, SH

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APPENDIX

TEST METHOD NO. 1

TRUCK OPERATIONS

1. Test Course:

- a. Layout of course. The test course shall be set up equivalent to the provisions of figure A-1. 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 corner and other critical points to assist in keeping the truck being tested within the course limits.

Table A-I. Aisle widths for test course (FT).

Capacity (lb)	Solid-tired trucks	Pneumatic-tired trucks
2000 (907 kg)	10 (3.1 m)	12 (3.7 m)
4000 (1814 kg)	12 (3.7 m)	15 (4.6 m)
6000 (2722 kg)	14 (4.3 m)	18 (5.5 m)

- b. Obstacle inclusion. The obstacle test shall be set up in accordance with provisions of figure A-2 or A-3, as applicable, as a Part of the test course. Iron, wood, cement or steel blocks may be used. A guideline 15 feetm) 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-4.
- d. Course surface. The course shall be paved with a material having a road resistance of approximately 30-50 pounds per ton. It shall be dry, clean and free of any nonplanned obstacles or foreign material while conducting the endurance test.
- e. Pallet areas. Pallet loads in the first pallet area shall be stacked in accordance with figure A-S or A-6, 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

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course at that point. Side pallet stacks shall be high enough that the bottom of the top face of the top pallet in each stack is 6 inches (152 mm) below the maximum lift height of the vehicle under test. The stack marked "X" on figure A-1 shall be high enough that the bottom of the top face of the pallet, when placed upon it, shall be 6 inches (152 mm) below the maximum lift height of the vehicle under test. Pallet loads in the second pallet area shall be stacked in accordance with figure A-7 or A-8, 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. Side pallet stacks shall be high enough so that the bottom of the top pallet will be approximately as high as the maximum lift height of the truck under test. The stack marked "Y" on figure A-1 shall be high enough that the bottom of the top face of the pallet, when placed upon it, shall be at the midpoint between ground level and the maximum lift height of the vehicle under test. Pallet loads in the third pallet area shall be stacked in accordance with figure A-9. They shall be placed 2 inches (51 mm) apart, positioned as shown on figure A-1, in a direction parallel to, and touching in a direction perpendicular to, the axis of the test course at that point. Side pallet stacks shall be one pallet load (48 inches (122 cm) plus the height of the pallet) high.

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 "START" on figure A-1. As the operator starts the truck, he shall operate the horn for approximately 1 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 first pallet area. The rated load will have been placed in this location on the stack marked "X".
- c. The truck shall make a 90-degree right-hand turn in one motion without backing, proceed to the face of the pallet stack marked "X", raise forks to maximum fork height so hydraulic relief-valve is activated, then adjust fork height and remove the 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 along the main aisle in the portion of the course marked "B" until it reaches the second pallet area.
- d. The truck shall proceed rearward to a point beyond the pallet area opening, reverse its direction, and move forward to the face of the pallet stack marked "Y", making the 90-degree left-hand turn in one motion without backing. The rated load shall be on top of the pallet marked "Y".

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- e. The truck shall back out of the stack aisle into the main aisle, making the 90-degree right-hand turn in one motion without going forward, and proceed forward along the main aisle in the portion of the course marked "C" until it reaches the third pallet area.
- f. The truck shall make a 90-degree right-hand turn in one motion without backing and pick up rated load which has been 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, 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 and then resume ascending the ramp. 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. On every other lap, the operator shall turn off the ignition and restart the engine. On alternate laps the operator shall engage the starter switch without turning off the engine. After completion of this portion of the test, proceed along the main aisle and start the next cycle. All stops shall be at the maximum safe deceleration rate. The operator shall actuate and release the parking brake at least once during each circuit.
- j. The truck shall then reenter the portion of the course marked "A". In portions "A", "B", "C", and "1)", 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.

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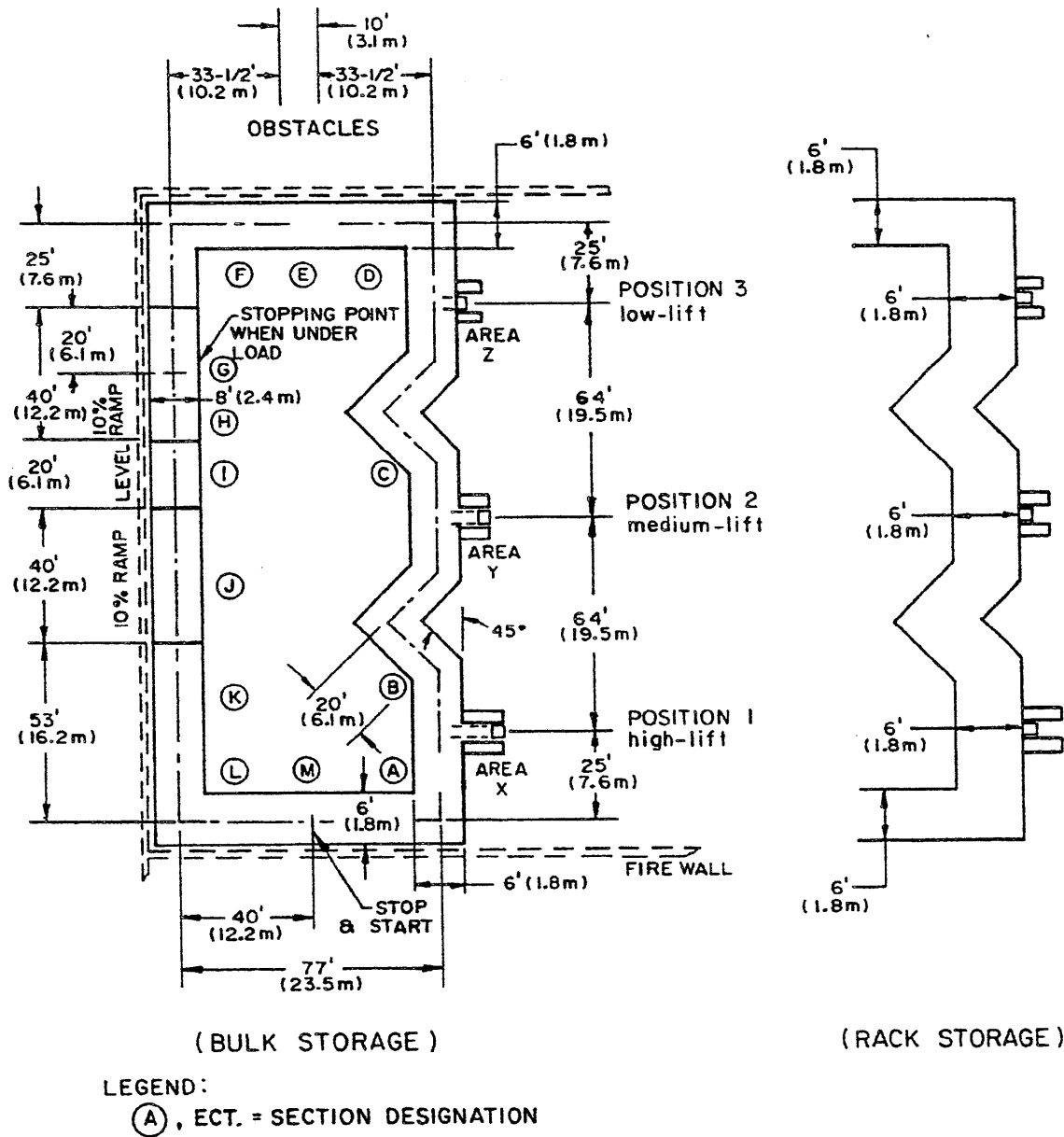
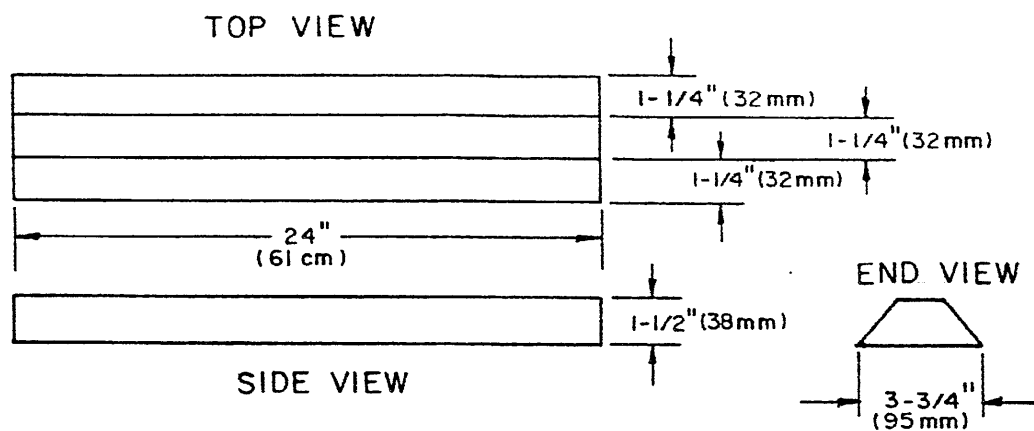


FIGURE A-1. Typical indoor test course.

X-2309 E

MIL-T-52932D

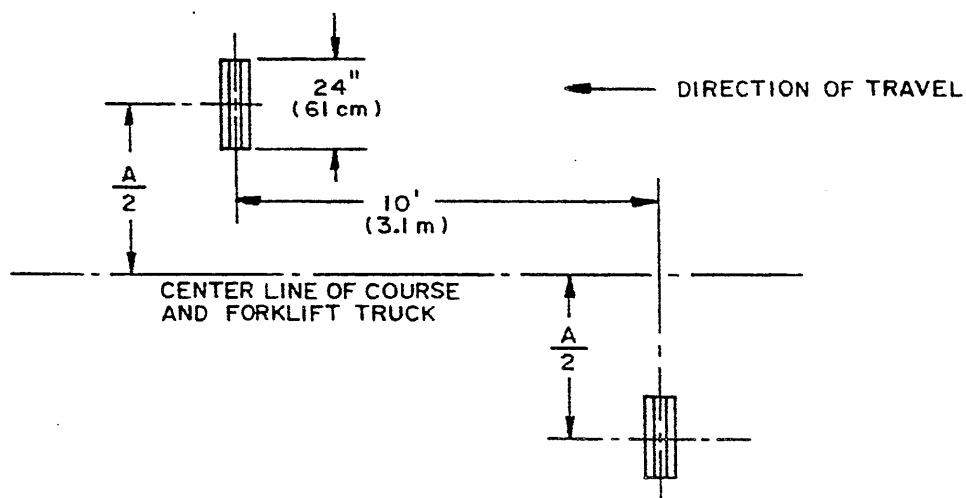
APPENDIX



2 BLOCKS REQUIRED.

BLOCKS TO BE ATTACHED TO TEST COURSE AS SHOWN BELOW.

LAYOUT OF OBSTACLE COURSE



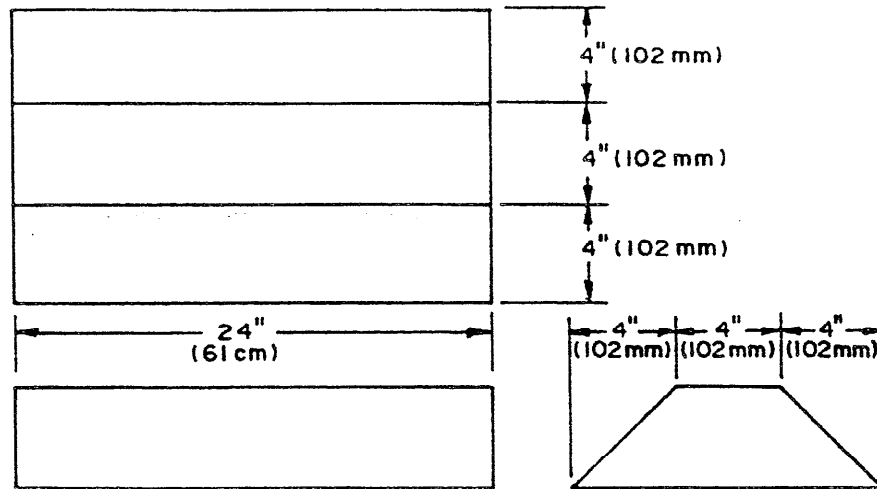
A = DISTANCE BETWEEN CENTERLINES OF DRIVING WHEELS.

FIGURE A-2. Details of obstacle construction for truck, fork, lift, solid rubber tires.

X-2310 B

MIL-T-52932D

APPENDIX



HEIGHT OF OBSTACLE BLOCK
 2" (51mm) FOR 2000 AND 4000 POUND TRUCKS
 3" (76mm) FOR 6000 POUND TRUCKS

LAYOUT OF OBSTACLE COURSE

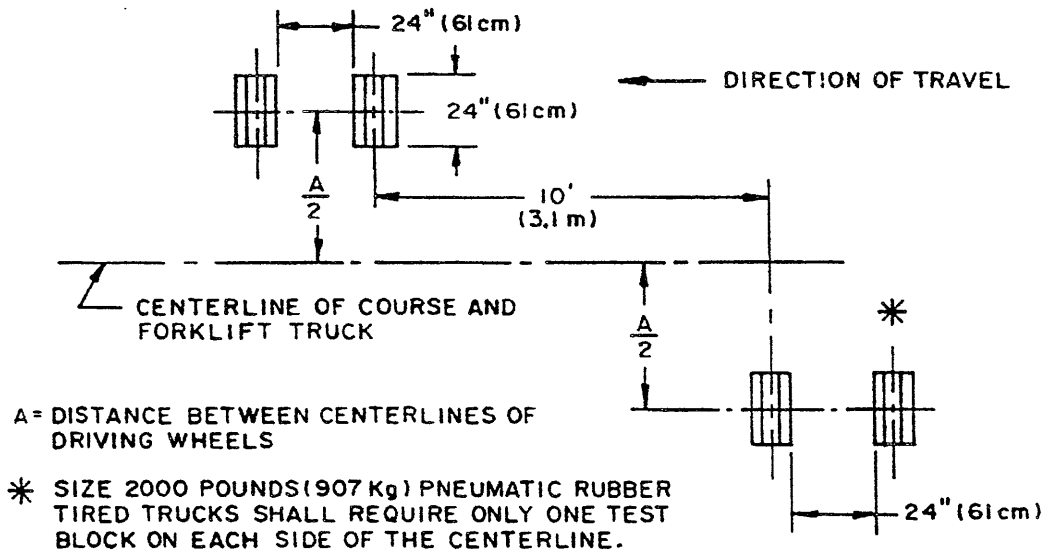
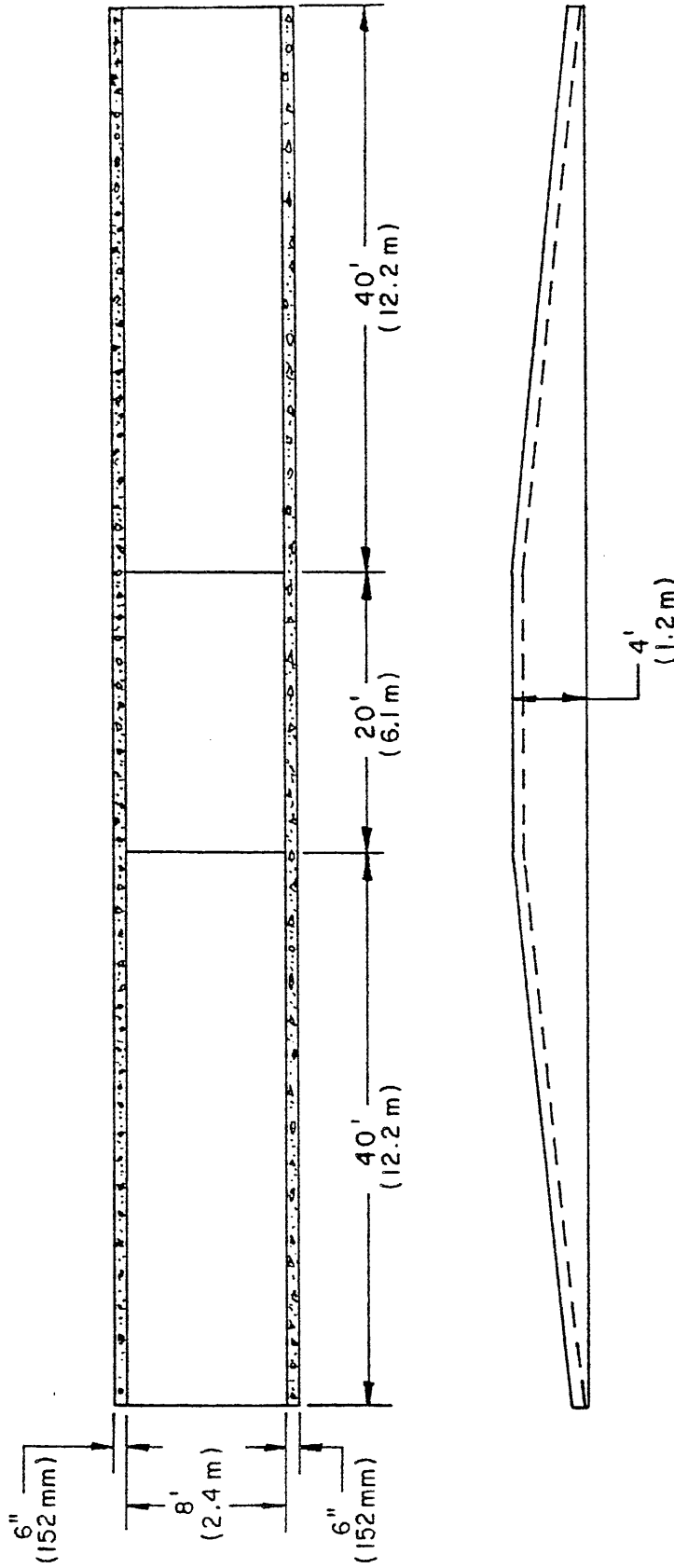


FIGURE A-3. Details of obstacle construction for truck, fork, lift, pneumatic rubber tires.

X-2311B

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A P P E N D I X



SPECIFICATIONS:

RAMP TO BE 6 INCH (152 mm) PAD (CONCRETE OR EQUIVALENT), FINE FLOAT FINISH ON COMPACTED FILL.

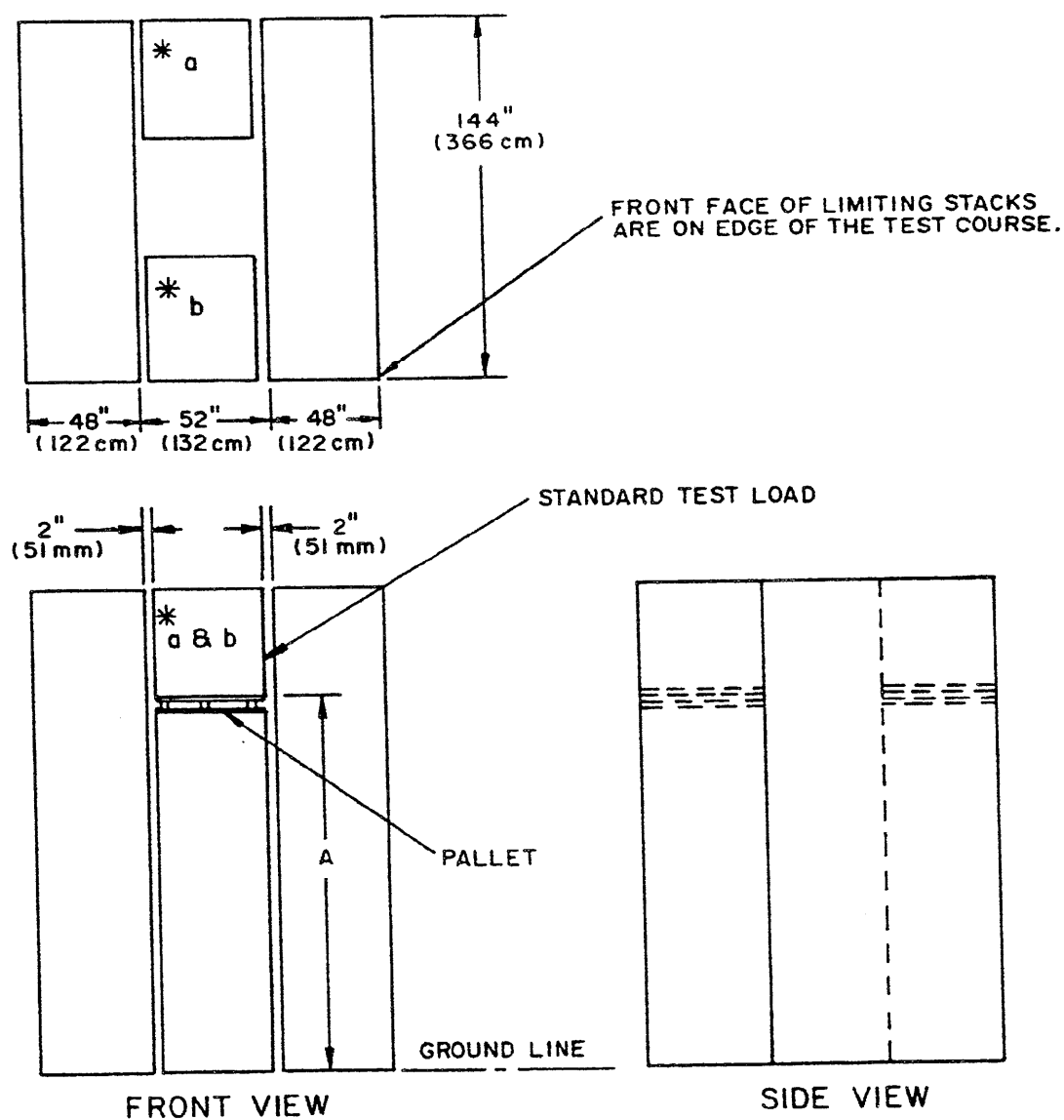
CURBING TO BE REINFORCED.

FIGURE A-4. Ramp design.

X-2312C

MIL-T-52932D

A P P E N D I X



A = MAXIMUM LIFT HEIGHT FOR FORKS LESS 6 INCHES (152 mm).

SUPPORT FOR STANDARD LOAD SHOULD BE OF SUITABLE STRENGTH TO SUSTAIN TEST LOAD. LIMITING STACKS MAY BE PALLETS, PALLET RACKS OR BOTH.

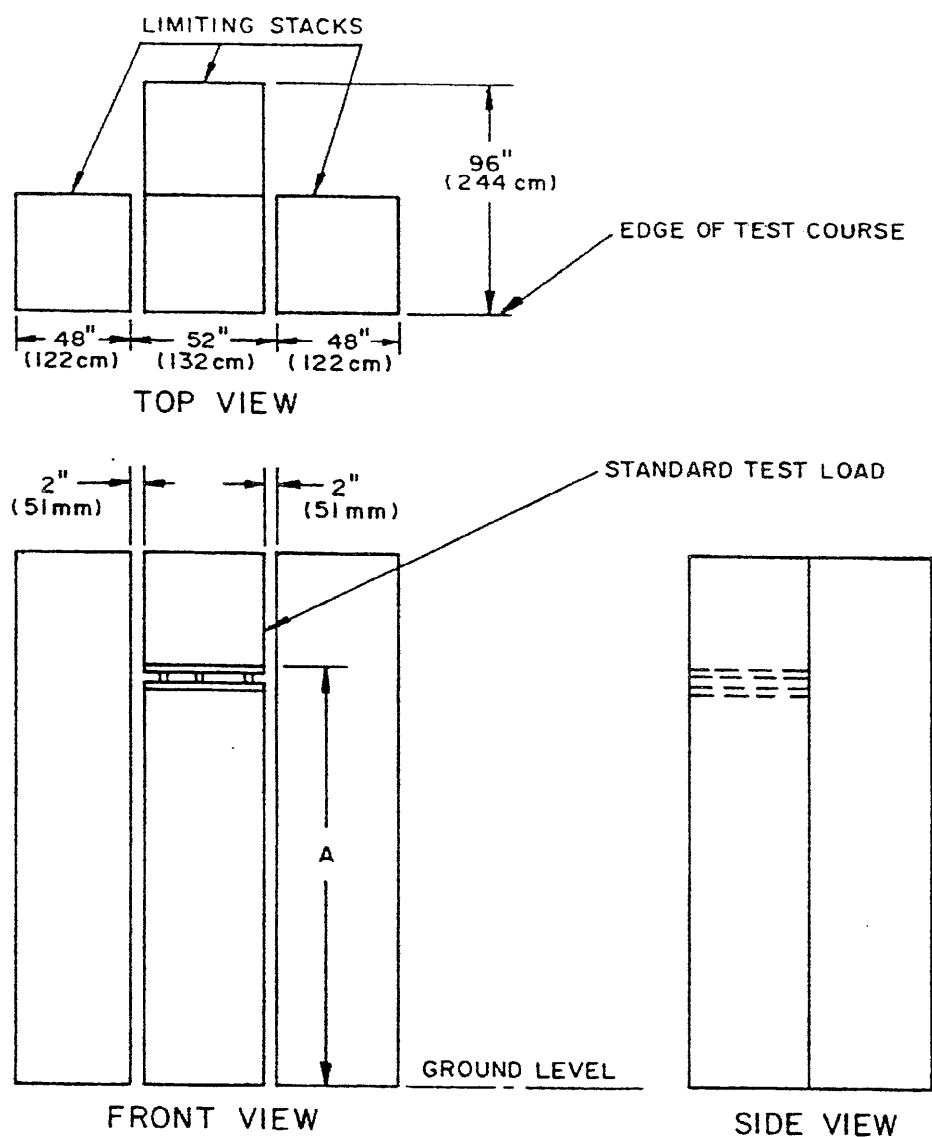
- * (a) BULK STORAGE
(b) RACK STORAGE

FIGURE A-5. Stack layout-position 1
solid rubber tired truck.

X-2313 D

MIL-Y-52932D

APPENDIX



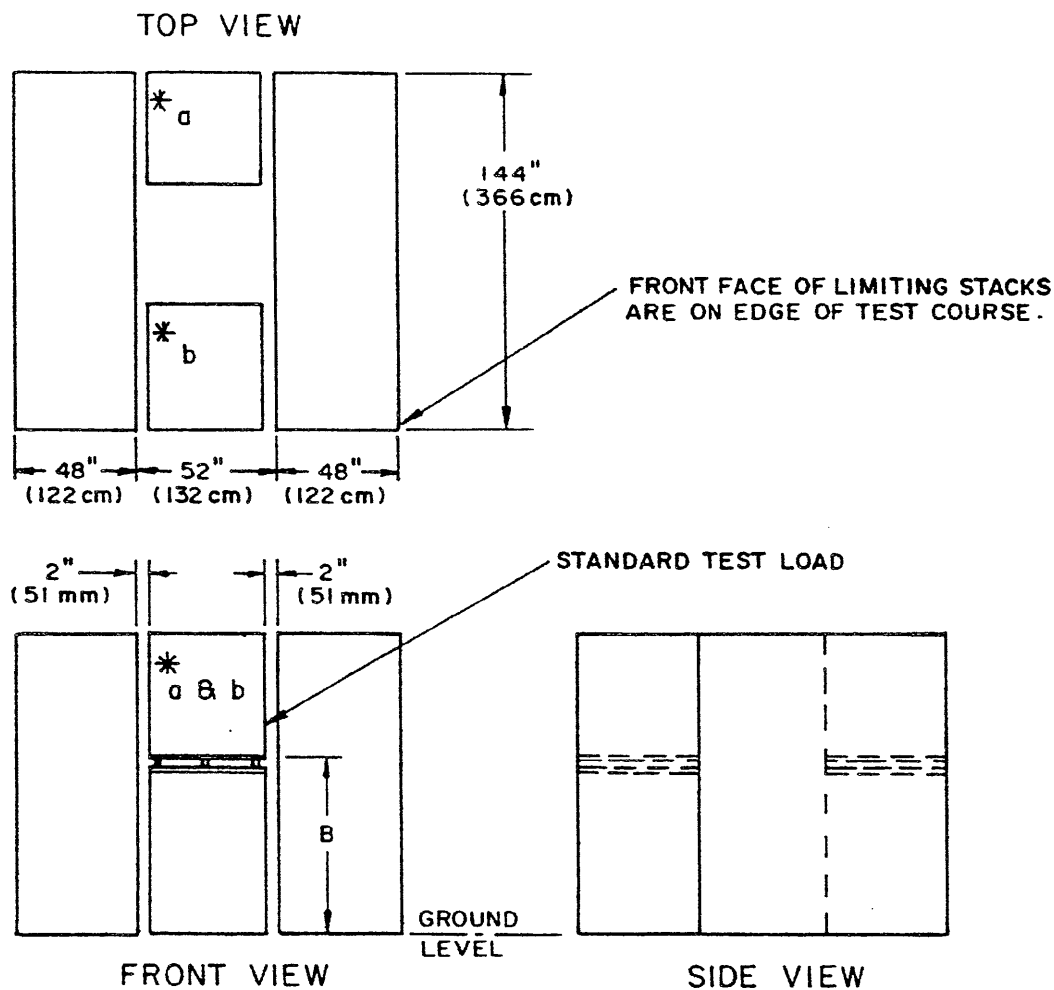
A = MAXIMUM LIFT HEIGHT OF FORKS LESS 6 INCHES (152 mm).

SUPPORT FOR STANDARD LOAD SHOULD BE OF SUITABLE STRENGTH TO SUSTAIN TEST LOAD. LIMITING STACKS MAY BE PALLETS, PALLET RACKS OR BOTH.

FIGURE A-6. Stack layout-position I pneumatic rubber tired trucks.

X-2314 A

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APPENDIX



B = ONE-HALF MAXIMUM LIFT HEIGHT OF FORKS.

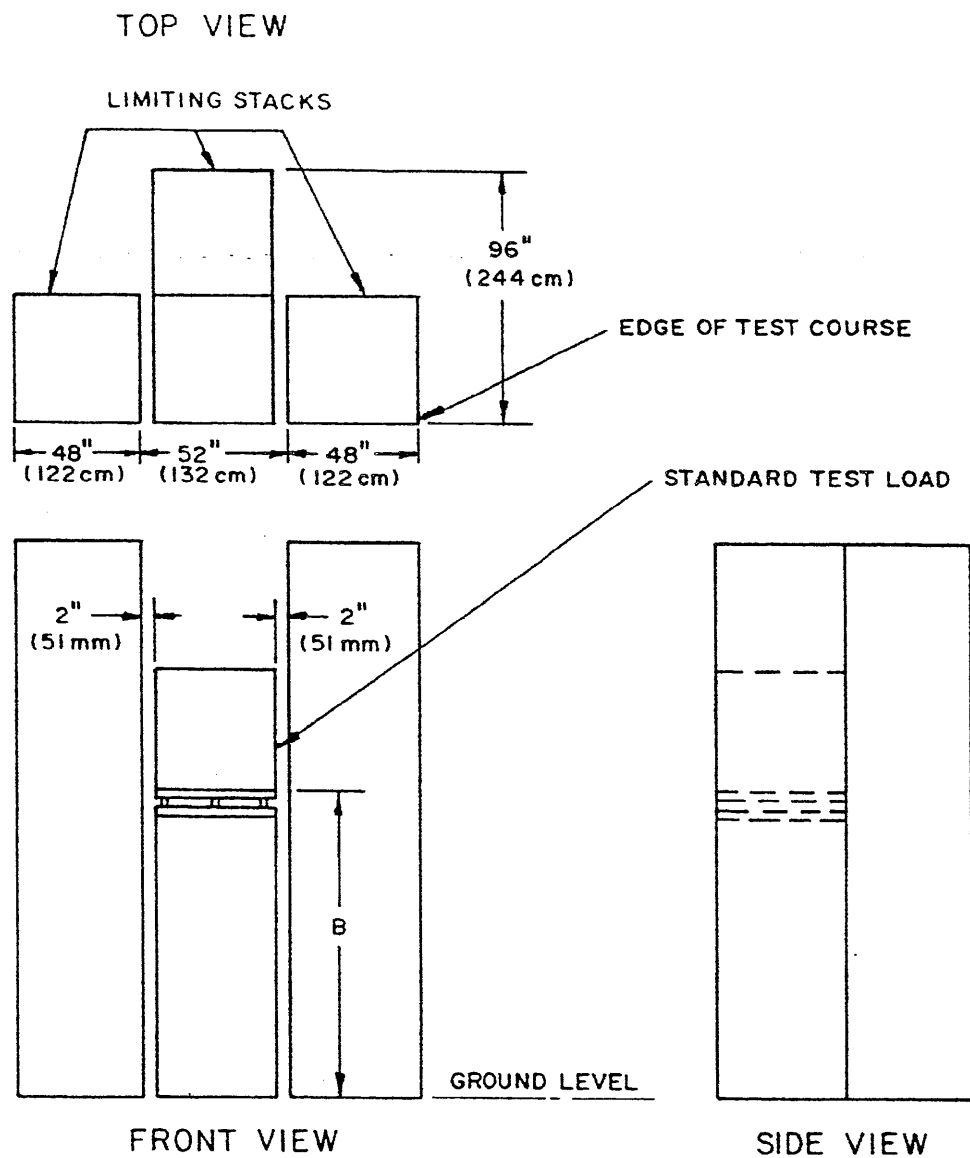
SUPPORT FOR STANDARD LOAD SHOULD BE OF SUITABLE STRENGTH TO SUSTAIN TEST LOAD. LIMITING STACKS MAY BE PALLETS, PALLET RACKS, OR BOTH.

- * (a) BULK STORAGE
(b) RACK STORAGE

FIGURE A-7. Stack layout-position 2
solid rubber tired truck.

X-2315C

M I L - T - 5 2 9 3 2 D
A P P E N D I X



B = ONE - HALF MAXIMUM LIFT HEIGHT OF FORKS.

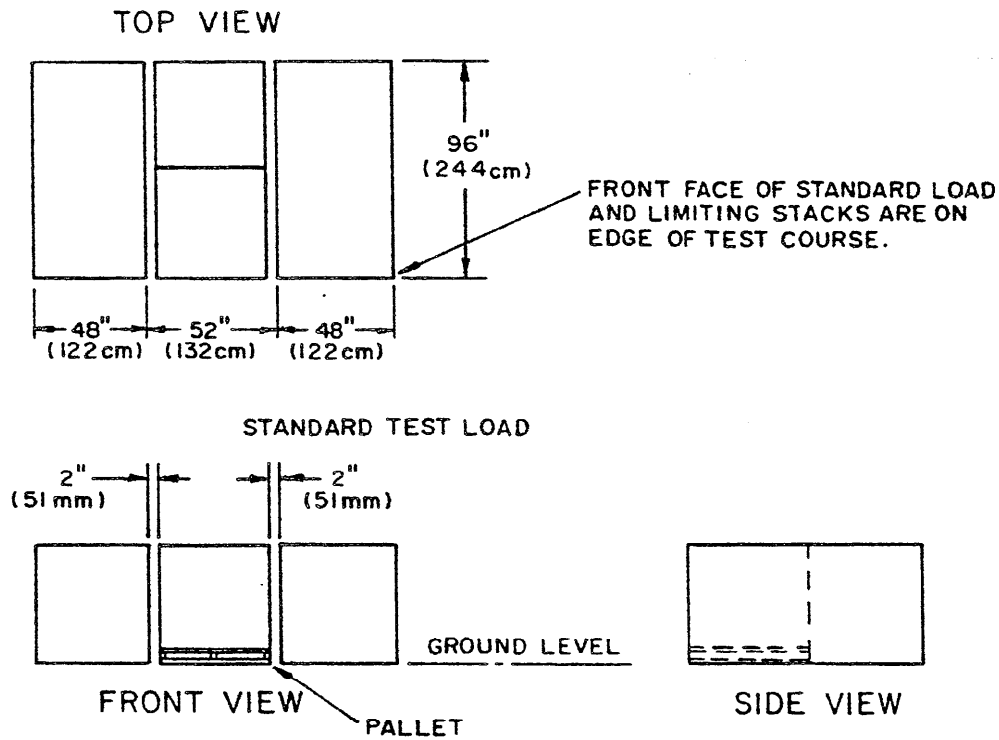
SUPPORT FOR STANDARD LOAD SHOULD BE OF SUITABLE STRENGTH TO SUSTAIN TEST LOAD. LIMITING STACKS MAY BE PALLETS, PALLET RACKS, OR BOTH.

FIGURE A-8. Stack layout-position 2 pneumatic rubber tired trucks.

X-2316 A

MIL-T-52932D

A P P E N D I X



LIMITING STACKS MAY BE STACKED PALLETS.

FIGURE A-9. Stack layout-position 3.

X-2317 B

MIL-T-52932D

APPENDIX

TEST METHOD NC?. 2

LOW-TEMPERATURE TEST (MINUS 25 °F)

1. TEST APPARATUS:

- Cold chamber.
- b. Arctic clothing.
- c. Thermocouples with potentiometer(s) or other temperature measuring device.
- d. Battery hydrometer.
- e. Wattmeter or ammeter.
- f. Voltmeter.

2. TEST PROCEDURE:

- a. Semite the forklift with applicable lubricants for -25 °F, operation including engine oil, transmission oil, drivetrain lubricants, hydraulic oil and antifreeze.
- b. Check the specific gravity of battery electrolyte to insure full charge.
- c. Cold soak the truck to attain a stabilized temperature no warmer than -25 °F. During and after this period, examine the truck for damage. Stabilization is attained when the engine coolant, - fuel, lubricating oil, and battery temperatures reach -25 F, as indicated by thermocouples located as follows:
 - (1) In the two center cells of each battery between the plates and at middepth of the electrolyte (unless sealed maintenance free batteries are furnished.
 - (2) In the volumetric center of the hydraulic system oil reservoir.
 - (3) In the engine lubricating oil gallery and in the oil sump.
 - (4) In the engine coolant in the engine-cooling-jacket discharge pipe or air cooling exhaust chamber of air cooled engines.
 - (5) In the chamber at a horizontal angle of 45 degrees from the sides and ends of the truck, not less than 3 feet (91 cm) from each corner of the truck at engine-crankshaft level.
- d. Maintain the -25 0F, ± 5 °F, temperature throughout the entire test.
- e. One operator wearing arctic clothing, including mittens, shall perform all priming and starting operations.
- f. Substitute or supplementary batteries or other electrical cranking energy shall not be used.
- g. Glowplugs working off the cranking batteries and auxiliary fluid priming systems which are permanently mounted on the truck and normally used in starting the engine may be used.

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- h. start the truck. Starting should be accomplished within 5 minutes of the initial attempt. Smooth engine running without unnatural or continued control manipulation, and without use of primers and priming fluids, should be obtained within 15 minutes after starting.
- i. When started, run engine 15 minutes. after completion of the 15 minute operation, operate the engine as follows:

- (1) 10 minutes idling.
- (2) 10 minutes half throttle.
- (3) 5 minutes full throttle.

Perform the 25-minute cycle three times.

- j. Maintain and record temperatures prior to engine starting, immediately after engine starting, and at 10 minute intervals during warmup and cycling, at the following (but not limited to) locations on the truck:
 - (1) Battery (unless sealed maintenance free batteries are furnished).
 - (2) Hydraulic tank.
 - (3) Engine oil.
 - (4) Engine coolant.
 - (5) Chamber air.
- k. During engine cycling, and while wearing arctic mittens and boots, the operator shall perform each of the following:
 - (1) Engage and disengage power train to the wheels in all gears.
 - (2) Operate through two complete movement cycles all brakes, shafts and 'cylinders (as permitted by space limitations in chamber).
 - (3) Mount to and dismount from the operator's position on the truck .

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APPENDIX

TEST METHOD NO. 3

RIGHT ANGLE TURN

1. TEST COURSE:

- Level paved surface.
- b. Test course in accordance with "course layout" (see figure A-10).

2. TEST APPARATUS:

- Tape measure.
- b. Movable vertical barrier'.
- c. Inclinator.

3. TEST PROCEDURE:

- a. Truck is placed 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 in vertical position.
- b. Pallet is raised 6 inches (152 mm) above floor.
- c. Position movable vertical barrier within 4 inches 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.

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3. DOCUMENT TITLE Trucks, Lift, Fork, Internal Combustion Engine, 2000-4000-6000 Pound Capacity, General Specification for			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
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